

**Czech University of Life Sciences Prague**

**Faculty of Economics and Management**

**Department of Trade and Finance (FEM)**



## **Master's Thesis**

**Assessment of the financial position and performance of  
the chosen companies in your country in a chosen  
industry**

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## DIPLOMA THESIS ASSIGNMENT

Bc. Ondřej Rylich

Economics and Management

Thesis title

**Assessment of the Financial Position and Performance of the Chosen Companies in the Global Automotive Industry**

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### **Objectives of thesis**

The aim of this diploma thesis is to assess and compare the financial position and performance of the chosen companies operating in the global automotive industry by analyzing the companies' financial statements with focus on the representation and changes of the reported assets, liabilities, expenses, revenues, profit and cash-flow for a chosen period and to identify the potential financial problems and the most significant factors influencing the profit from the companies and the industry point of view.

### **Methodology**

Methodology for the literature overview is based on data collection from the relevant legal framework, specialized publications and other written or online sources. The practical part of the thesis will be based on the information gained from the published annual reports of the chosen companies. Vertical and horizontal analysis and ratio analysis of the financial statements will be used to assess the financial position and performance of the companies and to prepare the practical part of the thesis. The methods of analysis, synthesis, comparison and deduction will be used to formulate the conclusions of the thesis.

## The proposed extent of the thesis

60-80

## Keywords

financial statements, financial position, balance sheet, assets, liabilities, equity, financial performance, income statement, expenses, revenues, profit, cash-flow, financial analysis, automotive industry

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## Recommended information sources

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## **Declaration**

I declare that I have worked on my master's thesis titled "Assessment of the Financial Position and Performance of the Chosen Companies in the Global Automotive Industry" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 31.03.2023



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## **Acknowledgement**

I would like to thank everyone that supported me throughout the process. My family, friends, colleagues and supervisor. Without all your support this thesis would have never come to be. Thank you

# **Assessment of the Financial Position and Performance of the Chosen Companies in the Global Automotive Industry**

## **Abstract**

This diploma thesis formulates an extensive financial analysis of three major companies operating within the global automotive industry. These companies were selected based on their size, profitability, reach, and geographic location. This resulted in the selection of the Volkswagen Group, Toyota Motor Corporation, and the Ford Motor Company. Each is representing one of the three key automotive markets, those being Europe, Asia, and North America. The research then tries to perform a set of financial analytics on the selected companies, aiming to outline their financial performance, stability and productivity. Afterwards, they will be compared against one another to further elaborate on their financial position and determine the leading corporation of the three. For the purpose of the financial analysis, data was selected and extracted from their financial statements, such as balance sheets, income statements, and cash-flow statements across the period of five years, ranging from 2016 to 2020. The data was then analysed using vertical and horizontal analysis, as well as liquidity, profitability, and sustainability ratios. The analysis yielded interesting and vast results, which outlined the financial positions of the studied companies. Lastly, they were compared against each other using an evaluation metric, resulting in the Volkswagen Group coming off the best, with the Toyota Motor Corporation being close second and the Ford Motor Company being a little ways behind the two.

## **Keywords:**

Finances, Analysis, Balance Sheet, Income Statement, Cash Flow Statement, Automotive Industry, Volkswagen Group, Toyota Motor Company, Ford Motor Company, Global Markets, Liquidity Ratios, Leverage Ratios, Efficiency Ratios, Profitability Ratios, Market Value Ratios

# Hodnocení finanční situace a výkonnosti vybraných firem v globálním automobilovém průmyslu

## Abstrakt

Tato diplomová práce formuluje rozsáhlou finanční analýzu tří významných společností působících v celosvětovém automobilovém průmyslu. Tyto společnosti byly vybrány na základě jejich velikosti, ziskovosti, dosahu a zeměpisné polohy. Výsledkem byl výběr koncernu Volkswagen, společnosti Toyota Motor Corporation a společnosti Ford Motor Company. Každá z nich reprezentuje jeden ze tří klíčových automobilových trhů, kterými jsou Evropa, Asie a Severní Amerika. Výzkum se pak snaží provést sadu finančních analýz vybraných společností s cílem nastínit jejich finanční výkonnost, stabilitu a produktivitu. Poté budou vzájemně porovnány, aby se dále rozpracovala jejich finanční situace a určila vedoucí společnost těchto tří společností. Pro účely finanční analýzy byla vybrána a extrahována data z jejich finančních výkazů, jako jsou rozvahy, výsledovky a výkazy peněžních toků za období pěti let, v rozmezí let 2016 až 2020. Data byla poté analyzována pomocí vertikální a horizontální analýzy, stejně jako ukazatele likvidity, ziskovosti a udržitelnosti. Analýza přinesla zajímavé a rozsáhlé výsledky, které nastínily finanční pozice zkoumaných společností. Nakonec byly vzájemně porovnány pomocí hodnotící metriky, což vedlo k tomu, že nejlépe z toho vyšel koncern Volkswagen, s Toyota Motor Corporation těsně na druhém místě a Ford Motor Company s malým odstupem za těmito dvěma společnostmi.

**Klíčová slova:** Finance, analýza, rozvaha, výkaz příjmů, výkaz peněžních toků, automobilový průmysl, koncern Volkswagen, Toyota Motor Company, Ford Motor Company, globální trhy, ukazatele likvidity, pákový poměr, poměr efektivity, poměr ziskovosti, poměr tržní hodnoty

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# **1 Introduction**

This Thesis will concern itself with the financial evaluation and comparison of three companies operating within the automotive industry. The selected companies are the Volkswagen Group, Toyota Motor Corporation, and Ford Motor Company. Each organization representing one of the three largest automotive manufacturing markets, Europe, Asia, and North America. For this purpose, several financial analytical tools are used to create a plethora of results that are then further compared against one another to establish a ranking order of the three companies.

## **2 Objectives and Methodology**

### **2.1 Objectives**

The primary objective of this diploma thesis is to conduct a comprehensive evaluation and comparative analysis of the financial standing and performance of selected companies operating in the global automotive industry. This assessment will be based on a meticulous examination of their financial statements, which will focus on the representation and fluctuations of reported assets, liabilities, expenses, revenues, profits, and cash flows over a selected period.

Additionally, this thesis aims to identify potential financial challenges that may affect the profitability of these companies and their respective industries. To accomplish this, we will analyze the significant factors that influence profits from the perspectives of both individual companies and the broader automotive industry.

By undertaking this study, we seek to provide a robust financial analysis that will be useful to various stakeholders, including investors, financial analysts, industry experts, and policymakers. The insights gained from this research will enable them to make informed decisions regarding investment opportunities, financial planning, and strategic decision-making.

## **2.2 Methodology**

### **2.2.1 Data Collection**

For this study, publicly available financial statements from some of the world's leading automotive companies were used, namely the Volkswagen Group, Toyota Motor Corporation, and Ford Motor Company. These financial statements are for the period spanning from 2016 to 2020 and were retrieved from the respective company websites.

The financial statements were carefully selected as they offer a wealth of information and insight into the financial position and performance of these companies (Brealey, Myers, Allen 2020; Brigham, Ehrhardt 2017). The selected and collected data was checked for authenticity and accuracy.

The selection of these specific companies was based on their prominence in the global automotive industry and their significant market share (Carlier 2023b; Carlier 2023c; Ganbold 2023). Moreover, the selection process was also based on geographic and cultural differences, so as to best provide an overarching sample of the global automotive industry.

By using financial statements that are publicly available, this study is more transparent and accessible to a wider audience, including academics, industry professionals, and the general public (Melville 2019). The results of this study will aim to contribute to a greater understanding of the global automotive industry's financial performance and position, which can be used to inform strategic decision-making and policy development in the future.

### **2.2.2 Data Analysis**

This study will employ three primary methods to analyze the financial statements of the chosen automotive companies: vertical and horizontal analysis, and financial ratios.

Vertical analysis is a technique used to evaluate the relative size of items in a financial statement in comparison to a base amount, which is usually total revenue or total assets. By using this method, changes can be identified in the proportionate size of items over time, which can reveal important insights into the company's financial position and performance (Melville 2019; Wild, Shaw, Chiappetta 2017; Williams, Bettner, Carcello 2021).

Horizontal analysis, on the other hand, involves comparing the financial statements of a company over time. By examining changes in specific items over a series of years, we can identify trends and patterns that provide a deeper understanding of the company's financial performance and position (Brigham, Houston 2019; Elliott, Elliott 2011; Wild, Shaw, Chiappetta 2017).

The third method, financial ratios, involves using mathematical calculations to evaluate the relationship between different items in a financial statement. These ratios provide an indication of the company's financial health and can be used to assess its profitability, liquidity, and solvency (Alexander, Wiley 2018; Aswath Damodaran 2010; Bernstein 1984).

This study will also utilize a range of financial ratios, including liquidity ratios such as current ratio and quick ratio, profitability ratios such as return on assets and return on equity, and solvency ratios such as debt-to-equity ratio and interest coverage ratio. These ratios are best for assessing the company financial health and trends (De Luca 2022; Rengasamy, Ya'u, Nafiu Olaniyi 2022; Silva, Pereira, Teixeira 2022; Titik Purwaningtyas, Enggun Gunawan, Mahardika Sugiawan 2023).

Overall, by using these three methods, the study aims to provide a comprehensive analysis of the financial position and performance of the selected automotive companies, which will be useful to stakeholders such as investors, industry experts, and policymakers.

### **2.2.3 Limitations**

The study has some limitations that should be taken into account when interpreting the results. One limitation is that the data used is publicly available and may not include all the relevant information about the companies. Although the financial statements were analyzed in detail, there may be other factors that could affect the financial performance and position of the companies that are not captured in the data used (Alexander, Wiley 2018; Young, Cohen, Bens 2019).

Another limitation of the study is that it focuses solely on financial analysis and does not take into account other non-financial factors that may affect the company's financial position and performance. For instance, changes in consumer preferences, industry regulations, or



technological advances that could impact the company's operations and financial outcomes were the primary focus of the research (Young, Cohen, Bens 2019).

Additionally, it is important to note that all the analyzed data is coming from publicly available reports published by the companies themselves. While efforts were made to verify the accuracy of the data, it cannot be guaranteed that it is completely error-free or unbiased. Though it is important to note, that these large corporations undergo many audits and are scrutinized so as to adhere to the rules and regulations (Young, Cohen, Bens 2019); Wild, Shaw, Chiappetta 2017).

Despite these limitations, the study aims to provide valuable insights into the financial performance and position of the selected automotive companies. By analyzing the available data, trends and patterns were identified, aiding the understanding of how these companies are performing financially and identifying areas where they may be facing challenges or opportunities for growth. Nevertheless, caution is recommended when interpreting the findings, considering the limitations of the study.

#### **2.2.4 Conclusion**

In conclusion, the current chapter has described the research design used in this study, which is quantitative research. The chosen methods to collect and analyze data include vertical and horizontal analysis, and financial ratios. These methods were selected because they are most appropriate in answering the research question and can be formed from the publicly available data published by the organizations (Melville 2019; Young, Cohen, Bens 2019).

The research design and methods used in this study have the advantage of being replicable and objective. They allow for the analysis of numerical data and the identification of trends and patterns, which can be useful in identifying potential problems and opportunities for improvement. Moreover, the quantitative research design permits generalization of the findings to a larger population, enabling broader insights and conclusions to be drawn.

## **3 Literature Review**

### **3.1 Financial Analysis**

Financial analysis is a key component of understanding the financial performance of any business. It allows investors, creditors, and other stakeholders to assess the financial health of a company and make informed decisions (Silva, Pereira and Teixeira, 2022). This literature review will provide an overview of the existing research and theory on financial analysis using academic literature from published scholars.

The purpose of a financial analysis is to examine and decipher the operational workings of a business entity. Through the application of various analytical methods, the researcher, accountant, or investor is able to unravel the raw data and create a clearer picture of the situation in differing analytical contexts (Alexander, Wiley 2018; Bernstein 1984).

A financial analytical tool can be anything from vertical or horizontal analysis to financial ratios or simple comparison methods between numerical figures. All of these methods have one thing in common, they aim to provide a deeper understanding of the situation, exploring the company's financial recordings in a more significant light with an extended interest in obtaining more information, more answers (Alexander, Wiley 2018; Bernstein 1984; Gaytán Cortés 2022).

The results from these analytical undertakings are then useful and usable for the management, academics, shareholders, and potential investors. Unlocking the deeper meaning behind a company's financial report opens up a new dimension of numbers, quantities, ratios, percentages and comparisons worthy further study and analysis (Gaytán Cortés 2022; Okunev 2022; Silva, Pereira, Teixeira 2022).

In conclusion, financial analysis is an important tool for understanding the financial performance of a company. Financial ratios, earnings quality, corporate governance, cost of capital, financial reporting, and strategic management are all important aspects of financial analysis. The literature review provides a broad overview of the existing research on financial analysis, highlighting the importance of these factors in assessing the financial health of a company (Bernstein 1984; Gaytán Cortés 2022).

### **3.1.1 Balance Sheet**

A balance sheet statement is a financial statement that presents a snapshot of a company's financial position at a specific point in time. It shows a company's assets, liabilities, and equity, and is a crucial tool for businesses and investors to assess the financial health of a company (Wild, Shaw, Chiappetta 2017; Williams, Bettner, Carcello 2021).

One of the primary uses of balance sheet statements is to assess a company's liquidity and solvency. The liquidity of a company refers to its ability to meet its short-term obligations, such as paying bills or salaries, and is determined by the ratio of current assets to current liabilities. A high current ratio indicates that a company has enough liquid assets to meet its short-term obligations, while a low current ratio may indicate a liquidity problem (Brealey, Myers, Allen 2020; Okunev 2022; Williams, Bettner, Carcello 2021).

In addition, a company's solvency, or ability to meet its long-term obligations, can be assessed by examining its debt-to-equity ratio. This ratio indicates the extent to which a company's assets are financed by debt versus equity, with a high debt-to-equity ratio indicating that a company is highly leveraged and may be at greater risk of financial distress (Gaytán Cortés 2022; Kieso, Weygandt, Warfield, Wiecek, McConomy 2019).

Another important use of balance sheet statements is to assess a company's profitability. This can be done by examining the return on assets (ROA) and return on equity (ROE) ratios, which measure a company's ability to generate profits from its assets and equity, respectively. A high ROA and ROE indicate that a company is using its assets and equity efficiently to generate profits as opposed to a low ratio, where the company may be struggling with inefficiency (De Luca 2022; Gaytán Cortés 2022).

Lastly, balance sheet statements are essential for investors to assess a company's financial health and make informed investment decisions. By analysing a company's balance sheet, investors can identify potential risks and opportunities, such as high levels of debt, inefficient use of assets, or undervalued equity through the application of vertical analysis (Brigham, Houston 2019; De Luca 2022; Elliott, Elliott 2011).

In conclusion, balance sheet statements are a crucial tool for businesses and investors to assess a company's financial position, liquidity, solvency, profitability, and investment potential. By examining a company's assets, liabilities, and equity, and using financial ratios to evaluate performance, businesses and investors can make informed decisions to improve financial health and stay competitive in the market (Bernstein 1984; Young, Cohen, Bens 2019).

### **3.1.2 Income Statement**

An income statement is a financial statement that summarizes a company's revenues and expenses over a given period, typically a quarter or a year. The income statement is also sometimes known as a profit and loss statement, as it shows whether a company made a profit or suffered a loss during the specified period. Income statements are crucial for businesses and investors to assess a company's financial performance and profitability (Melville 2019; Wild, Shaw, Chiappetta 2017; Williams, Bettner, Carcello 2021).

One of the primary uses of income statements is to assess a company's revenue growth and profitability. Revenue growth is a key indicator of a company's ability to attract and retain customers, while profitability measures the extent to which a company generates profits from its operations. Two commonly used profitability ratios are the gross profit margin and net profit margin, which show the percentage of revenues that remain after deducting the cost of goods sold and all other expenses, respectively (Alexander, Wiley 2018; Bernstein 1984; Wild, Shaw, Chiappetta 2017).

In addition, income statements are essential for businesses to make informed decisions about their operations and investments. By analysing their income statements, companies can

identify areas where they can cut costs, improve efficiency, or expand their revenue streams. For example, if a company's net profit margin is declining over time, it may indicate that the company needs to re-evaluate its pricing strategy, reduce overhead costs, or explore new markets (Alexander, Wiley 2018; Brigham, Ehrhardt 2017; Wild, Shaw, Chiappetta 2017).

Income statements are also important for investors to assess a company's financial health and make informed investment decisions. By analysing a company's income statement, investors can evaluate the company's revenue growth, profitability, and risk profile. They can also compare a company's financial performance to that of its competitors and industry benchmarks to identify potential risks and opportunities (Young, Cohen, Bens 2019; Williams, Bettner, Carcello 2021).

In conclusion, income statements are a crucial tool for businesses and investors to assess a company's financial performance, revenue growth, profitability, and investment potential. By analysing a company's revenues and expenses and using financial ratios to evaluate performance, businesses and investors can make informed decisions to improve financial health and stay competitive in the market.

### **3.1.3 Cash Flow Statement**

A cash flow statement is a financial statement that shows how changes in balance sheet accounts and income affect a company's cash flow and is a crucial tool for businesses and investors to understand a company's financial and cash health (Bernstein 1984; Brigham, Houston 2019; Gaytán Cortés 2022). Unlike the income statement, which shows a company's profitability over a period of time, the cash flow statement provides a snapshot of a company's cash inflows and outflows over a specific period (Lasher 2017; Wild, Shaw, Chiappetta 2017).

The cash flow statement is divided into three sections: operating activities, investing activities, and financing activities. The operating activities segment shows the cash inflows and outflows from the company's core operations, such as sales and expenses. This segment is important because it provides insight into a company's ability to generate cash from its core business operations (Bernstein 1984; Brealey, Myers, Allen 2020; Brigham, Houston

2019; Kieso, Weygandt, Warfield, Wiecek, McConomy 2019; Wild, Shaw, Chiappetta 2017).

The investing activities segment shows the cash inflows and outflows from investments in assets, such as property, plant, and equipment, as well as investments in other companies. This section is important because it provides insight into a company's investment strategy and its ability to generate cash from its investments (Bernstein 1984; Lasher 2017; Wild, Shaw, Chiappetta 2017).

Lastly, the financing activities segment shows the cash inflows and outflows from financing activities, such as the issuance of debt or equity, as well as the payment of dividends. This section is important because it provides insight into a company's financing strategy and its ability to raise capital (Bernstein 1984; Kieso, Weygandt, Warfield, Wiecek, McConomy 2019; Lasher 2017; Young, Cohen, Bens 2019).

One of the primary uses of the cash flow statement is to assess a company's liquidity. By examining the cash flow from operating activities section, investors can determine if a company is generating enough cash to cover its operating expenses and other short-term obligations (Lasher 2017; Young, Cohen, Bens 2019). In addition, the cash flow statement is a useful tool for predicting future cash flows. By analysing trends in the cash flow from operating activities section over time, investors can make informed decisions about a company's future cash flow potential (Kieso, Weygandt, Warfield, Wiecek, McConomy 2019; Young, Cohen, Bens 2019). Lastly, the cash flow statement is important for businesses and investors to understand a company's overall financial health. By analysing the cash flow statement in conjunction with the income statement and balance sheet, investors can gain a comprehensive view of a company's financial position, liquidity, and solvency (Bernstein 1984; Kieso, Weygandt, Warfield, Wiecek, McConomy 2019; Lasher 2017; Wild, Shaw, Chiappetta 2017; Young, Cohen, Bens 2019).

In conclusion, the cash flow statement is a vital tool for managers and investors to assess a company's financial health and make informed decisions about its operating activities. By providing insight into a company's cash inflows and outflows, as well as its ability to generate cash from its core operations, investments, and financing activities, the cash flow

statement is essential for understanding a company's liquidity, predicting future cash flows, and evaluating overall financial health (Young, Cohen, Bens 2019).

### **3.1.4 Liquidity Ratios**

Liquidity ratios are an essential tool in financial analysis, as they measure a company's ability to cover its short-term obligations. These ratios are particularly important for creditors, who are interested in a company's ability to repay loans, and for investors, who are interested in a company's ability to maintain operations and pay dividends (Gaytán Cortés 2022; Okunev 2022; Silva, Pereira, Teixeira 2022).

One of the most commonly used liquidity ratios is the current ratio, which measures a company's ability to pay off its short-term liabilities with its current assets. This is a measure of liquidity and solvency, where if the occasion arose the company must meet its obligations with current assets (De Luca 2022; Gaytán Cortés 2022; Silva, Pereira, Teixeira 2022).

Another important liquidity ratio is the quick ratio, which measures a company's ability to pay off its short-term liabilities with its current assets excluding inventory. This is an adapted ratio from the current ratio. The exclusion of inventory, argued that it isn't always as easy to move as expected, lends to yield different liquidity results (De Luca 2022; Gaytán Cortés 2022; Silva, Pereira, Teixeira 2022).

Last of the big three liquidity ratios is the net working capital ratio that measures a company's ability to meet its short-term financial obligations using its current assets. It is calculated by dividing the difference between a company's current assets and current liabilities by its total assets (De Luca 2022; Gaytán Cortés 2022; Okunev 2022; Silva, Pereira, Teixeira 2022).

It is important to note that while liquidity ratios provide a useful tool for assessing a company's short-term financial health, they do not necessarily provide insight into a company's long-term viability. It is the combination of several analytical tools or ratios that provide a more developed and contextualized image of the financial situation of the company (Bernstein 1984; De Luca 2022; Gaytán Cortés 2022).

Overall, liquidity ratios are an important tool for assessing a company's short-term financial health. Current ratio, quick ratio, and net working capital ratio are some of the commonly used liquidity ratios, where it is generally understood that the higher their numerical result, the better the liquidity of the assessed company. Higher ratios are thus desired (Bernstein 1984; Gaytán Cortés 2022).

### **3.1.5 Profitability Ratios**

Profitability ratios are another important tool in financial analysis, as they measure a company's ability to generate profits from its operations. These ratios are particularly important for investors, who are interested in a company's ability to generate returns on their investment (Bernstein 1984; Gaytán Cortés 2022).

One of the most commonly used profitability ratios is return on assets (ROA), which measures a company's ability to generate profits from its assets. It is theorized, that a higher return on assets ratio indicates a stronger and more effective usage of company's assets to generate profits. It is calculated by dividing a company's net income by their total assets (Bernstein 1984; De Luca 2022; Okunev 2022; Titik Purwaningtyas, Enggun Gunawan, Mahardika Sugiawan 2023).

Another important profitability ratio is return on equity (ROE), which measures a company's ability to generate profits from its shareholders' investments. Once again, the higher the ratio the better the company is using their shareholder equity to generate profits. It is calculated by dividing the net income by the company's shareholder equity (Bernstein 1984; De Luca 2022; Gaytán Cortés 2022).

Lastly, the net profit margin ratio is also one of the big three profitability ratios. It is calculated by dividing the company's net profit by its total revenue and expressing its result as a percentage. This ratio assess the company's profitability (De Luca 2022; Gaytán Cortés 2022).

Overall, profitability ratios are an important tool for assessing a company's ability to generate profits from its operations. ROA, ROE, and NPM ratios are some of the most commonly used profitability ratios. However, it is important to note that these ratios have limitations



and should be used in conjunction with other financial analysis tools. Additionally, comparisons should be made within the same industry to ensure meaningful conclusions. Further research is needed to explore the factors that can affect profitability ratios, such as industry-specific characteristics, and how these ratios can be used in decision-making by investors (Bernstein 1984; De Luca 2022; Gaytán Cortés 2022; Wild, Shaw, Chiappetta 2017).

### **3.1.6 Stability Ratios**

Stability ratios are financial metrics that measure a company's ability to meet its long-term financial obligations. These ratios are important for assessing a company's financial stability and sustainability, as they provide insight into the company's ability to weather financial shocks and maintain operations over the long-term (Curto, Serrasqueiro 2022; De Luca 2022; Okunev 2022).

The first stability ratio is the equity ratio. This ratio measures the proportion of the company's assets to their equity. In other words, how much of their assets are covered by the equity of their shareholders. It is calculated by dividing total equity by total assets and then multiplying by 100 to receive an answer as a percentage. This ratio aims to allow for a better understanding of the relationship between the assets the company possesses and to what degree they are financed by the shareholder equity. A higher ratio signifies a stronger reliance on equity to finance assets, as opposed to a low ratio where the assets are more likely financed by debt. A higher ratio indicated a stronger stability (Curto, Serrasqueiro 2022; De Luca 2022; Gaytán Cortés 2022).

Another stability ratio is the debt to asset ratio. This ratio measures the company's reliance on debt to finance their assets. It is calculated by dividing the total debt by total assets to achieve the result. The results can then be interpreted. A debt to asset ratio of around 1.0 to 2.0 is considered a good ratio, but the optimal point is always dependent on many other factors (Bernstein 1984; De Luca 2022; Gaytán Cortés 2022).

Lastly, there is the stability ratio called the debt-to-equity ratio, which measures a company's leverage or how much debt the company is using to finance its operations. This ratio is calculated by dividing the total debt by total equity. In this metric analysis, a lower ratio is

generally preferred, since it indicated that the company is using less debt to finance their operational activities. A higher ratio, on the other hand, may signify that the company is struggling to record profits, and needs an external financial boost to maintain their operation (Bernstein 1984; De Luca 2022; Gaytán Cortés 2022).

### **3.1.7 Horizontal Analysis**

Horizontal financial analysis, sometimes also called the trend analysis, is a financial analysis method that compares a company's financial data over time, typically by comparing multiple years' worth of financial statements. This method can be useful for businesses and investors to evaluate a company's financial health, identify trends, and patterns, and make informed decisions based on that information (Alexander, Wiley 2018; Bernstein 1984; Kieso, Weygandt, Warfield, Wiecek, McConomy 2019; Lasher 2017).

As the name of the analysis implies, the focus of the analysis is to compare a company's data across a defined period of time. It can be further elaborated, by setting the middle date as a base line, often at 100%, and then calculating the other date to the left and right (horizontally) in proportion to the data as a base line. These results could then be interpreted as a change in time sequence (Alexander, Wiley 2018; Bernstein 1984; Kieso, Weygandt, Warfield, Wiecek, McConomy 2019; Young, Cohen, Bens 2019).

One common technique used in horizontal financial analysis is the calculation of financial ratios. These ratios are used to evaluate a company's performance by comparing key financial metrics, such as revenue, profit margin, and return on equity, across multiple periods. For example, a company's current ratio, which measures its ability to meet short-term obligations, can be compared over multiple years to determine if there are any trends indicating a decline in liquidity (Alexander, Wiley 2018; Bernstein 1984; Brigham, Houston 2019; Young, Cohen, Bens 2019).

One important benefit of horizontal financial analysis is the ability to identify potential risks and opportunities for a company. By comparing financial data over time, businesses and investors can detect trends that may impact future performance. For example, if a company's revenue is declining steadily over multiple years, this may indicate a need for strategic changes to improve sales and revenue generation. This way, the management can be alerted

to possible negative trends that are showing up from the horizontal analysis, and start to act accordingly in order to mitigate them (Alexander, Wiley 2018; Bernstein 1984; Brigham, Houston 2019; Young, Cohen, Bens 2019).

Another important use of horizontal financial analysis is in benchmarking. By comparing a company's financial performance with that of its competitors or industry peers, businesses and investors can identify areas where the company is underperforming or outperforming in relation to the broader market. A comparison of trends within the market or industry can further deepen the understanding of the company's financial standings (Alexander, Wiley 2018; Bernstein 1984; Brigham, Houston 2019; Williams, Bettner, Carcello 2021).

In conclusion, horizontal financial analysis is an essential tool for businesses and investors to assess a company's financial performance over time. By comparing financial data over time and using additional financial ratios to further evaluate their performance, companies can identify trends, risks, and opportunities, and take actions to improve financial health and stay competitive in the market (Alexander, Wiley 2018; Bernstein 1984; Brigham, Houston 2019; Williams, Bettner, Carcello 2021).

### **3.1.8 Vertical Analysis**

Vertical financial analysis is a financial analysis method that compares a company's financial data within a single period, typically by comparing different line items in the financial statements. This method is often used to identify the relative proportions of different items in a company's financial statements, such as the percentage of revenue allocated to cost of goods sold, the percentage of assets financed by debt, or the percentual makeup of the liabilities (Alexander, Wiley 2018; Bernstein 1984; Brigham, Houston 2019; Wild, Shaw, Chiappetta 2017; Young, Cohen, Bens 2019).

One important benefit of vertical financial analysis is the ability to identify potential inefficiencies or mismanagement within a company. By comparing line items in a company's financial statements, businesses and investors can identify areas where the company may be overspending or underutilizing resources. For example, if a company's cost of goods sold is higher than industry norms or has increased significantly within a single period, this may indicate a need for cost-cutting measures or process improvements. Additionally, if the

percentage of cost of goods sold is much larger than the other costs, it can be view as an area for possible streamlining and cost cutting (Bernstein 1984; Brealey, Myers, Allen 2020; Brigham, Houston 2019; Wild, Shaw, Chiappetta 2017; Young, Cohen, Bens 2019).

Another important use of vertical financial analysis is in comparing companies within the same industry or sector. By examining the relative proportions of different line items within a company's financial statements, businesses and investors can identify areas where a company may be performing better or worse than its competitors. For example, if one company has a higher proportion of financial costs than its competitors, this may indicate that the company is taking on more financial cost than is necessary (Bernstein 1984; Brealey, Myers, Allen 2020; Brigham, Houston 2019; Young, Cohen, Bens 2019).

In conclusion, vertical financial analysis is an essential tool for businesses and investors to assess a company's financial performance within a single period. By comparing line items within a company's financial statements and using financial ratios to evaluate performance, companies can identify inefficiencies, compare performance with competitors, and take actions to improve financial health and stay competitive in the market (Bernstein 1984; Brealey, Myers, Allen 2020; Brigham, Houston 2019; Young, Cohen, Bens 2019).

### **3.2 Automotive Industry**

The automotive industry is a vital contributor to the global economy, providing employment, technological advancement and mobility solutions (ACEA 2023; Carlier 2023b; Carlier 2023c; Ganbold 2023; Mogge, Daniel 2022; Nieuwenhuis, Wells 2015). According to the some reports, the global automotive industry produced 92 million vehicles in 2019, making it a key driver of economic prosperity and innovation (ACEA 2023). However, the industry is undergoing significant changes, with a focus on electric and autonomous vehicles, sustainability, and digitization. In this literature review, we will explore the current state of the automotive industry, with a focus on the European, Asian, and North American markets (Barbosa, Prado, Batista, Câmara, Cerqueira, Coelho, Guarieiro 2022; Carlier 2023b; Carlier 2023c; Ganbold 2023; Geels 2014; Simonazzi, Jorge Carreto Sanginés, Russo 2020).

The European automotive industry plays a significant role in the global automotive market, with 18.5 million vehicles produced in 2020 (Carlier 2023b). The industry is facing challenges, such as meeting emissions regulations and the impact of the COVID-19 pandemic (Carlier 2023b). However, the industry is also adapting to these challenges by increasing investments in electric and autonomous vehicles, as well as sustainable production methods (ACEA 2023; Barbosa, Prado, Batista, Câmara, Cerqueira, Coelho, Guarieiro 2022; Carlier 2023b).

The Asia-Pacific region is the largest market for automobiles, with China being the world's largest automotive market. Asian carmakers are leading the charge into electric vehicles, with China being the largest market for electric vehicles in the world (Ganbold 2023). The automotive industry in Asia is also focused on sustainability and innovation, with a growing emphasis on autonomous driving technology (Ganbold 2023; Nieuwenhuis, Wells 2015)

The North American automotive industry is a significant contributor to the global automotive market, with 14.5 million vehicles produced in 2020. The industry is facing challenges such as meeting emissions regulations and adapting to changing consumer preferences. General Motors reports that they are accelerating their all-electric future, with a goal to eliminate tailpipe emissions from all light-duty vehicles by 2035 (Carlier 2023c; Geels 2014; Mogge, Daniel 2022; Nieuwenhuis, Wells 2015).

The global automotive industry is expected to continue growing, particularly in developing countries. They attribute this growth to rising income levels and increasing demand for personal mobility. However, this growth is also accompanied by several challenges, including environmental concerns, changes in consumer preferences, and the need to invest in new technologies. These challenges require a shift towards sustainable mobility and the adoption of new business models (Geels 2014; Mogge, Daniel 2022; Nieuwenhuis, Wells 2015; Simonazzi, Jorge Carreto Sanginés, Russo 2020).

One of the significant trends in the automotive industry is the rise of electric vehicles. The electric vehicle market is expected to continue growing due to declining battery costs, supportive policies, and increased environmental awareness. However, the growth of electric vehicle market also presents challenges, such as the need for charging infrastructure and the

lack of consumer awareness. Overall, the electric vehicle is expected to be a significant part of the future of the automotive industry (Barbosa, Prado, Batista, Câmara, Cerqueira, Coelho, Guarieiro 2022; Geels 2014; Simonazzi, Jorge Carreto Sanginés, Russo 2020).

The automotive industry also faces challenges related to global trade and market competition. The industry is experiencing increased competition from emerging markets, particularly China, which has become a significant producer and consumer of automobiles. Additionally, the automotive industry is also affected by trade policies, such as tariffs and quotas, which can affect supply chains and production costs (Barbosa, Prado, Batista, Câmara, Cerqueira, Coelho, Guarieiro 2022; Ganbold 2023; Geels 2014; Simonazzi, Jorge Carreto Sanginés, Russo 2020).

In conclusion, the global automotive industry is undergoing significant changes, particularly with the rise of electric and electric and carbon-neutral vehicles. While the industry presents significant opportunities for growth, it also faces several challenges related to sustainability, global trade, and market competition. The adoption of new technologies, sustainable mobility, and new business models are critical to addressing these challenges and ensuring the long-term growth and success of the industry. Therefore, the largest players in the largest markets are expected to continue developing and enhancing their products, whilst trying to navigate the evermore intricate industry (Barbosa, Prado, Batista, Câmara, Cerqueira, Coelho, Guarieiro 2022; Geels 2014; Mogge, Daniel 2022; Nieuwenhuis, Wells 2015; Simonazzi, Jorge Carreto Sanginés, Russo 2020).

## **4 Practical Part**

### **4.1 Characterization of studied organizations**

#### **4.1.1 Volkswagen Group**

The history of the Volkswagen Group dates back to the 1930s when the German government commissioned the development of a "people's car" or "Volkswagen" that would be affordable and reliable for the masses. This led to the creation of the Volkswagen Beetle, which was first introduced in 1938 (Volkswagen 2019).

During World War II, the Volkswagen factory was converted to produce military vehicles, and after the war, the company faced major financial and operational challenges. However, with the help of the German government and international investors, Volkswagen was able to recover and resume production of the Beetle (Volkswagen 2019).

In the 1960s, Volkswagen acquired other brands such as Audi and Porsche, and expanded its production facilities to other countries, including Brazil, Mexico, and Spain (Volkswagen 2019). In the 1970s, Volkswagen launched the Golf, which became one of the company's most successful models and helped to solidify Volkswagen's position as a major global automaker (Volkswagen 2019).

In the 1990s and 2000s, Volkswagen continued to expand its brand portfolio by acquiring companies such as Skoda, SEAT, and Bentley (Volkswagen 2019). In recent years, the company has focused on developing new technologies such as electric and hybrid vehicles, as well as digital and mobility services (Carrier 2022a; Carrier 2023b; Staff 2020).

However, Volkswagen also faced a major scandal in 2015 when it was revealed that the company had installed software in its diesel vehicles to cheat on emissions tests (Leggett 2018). This led to fines, lawsuits, and a major shift in the company's focus towards cleaner and more sustainable technologies. Despite this setback, Volkswagen remains one of the largest and most influential automotive companies in the world (Carrier 2022a; Carrier 2023b).

The Volkswagen Group is a multinational automotive company that produces and sells various types of vehicles and mobility services. The company has a diverse brand portfolio, which includes Volkswagen, Audi, Porsche, Skoda, SEAT, Bentley, Bugatti, Lamborghini, Ducati, and MAN (Carlier 2022a; Volkswagen 2019). Volkswagen is the largest brand in the group, followed by Audi and Porsche (Carlier 2022a; Carlier 2023b).

The Volkswagen Group operates in various markets globally, including Europe, the Americas, Asia-Pacific, the Middle East, and Africa (Carlier 2022a). The company has production facilities in 20 countries, with Germany being the largest production location, followed by China and Mexico (Carlier 2022a). Their market share, as of 2021, the three studied markets are: 23.5% in Europe, as stated by the European Automobile Manufacturers Association (2021), 12.2% in Asia and 2.5% in the North American market (Carlier 2022a; Carlier 2023b; Carlier 2023c; Ganbold 2023).

Apart from conventional combustion engine vehicles, the Volkswagen Group is expanding its range of electric and hybrid vehicles, with plans to become one of the leading producers of electric vehicles (Carlier 2022a; Staff 2020). Furthermore, the company is investing in new mobility services such as ride-sharing and autonomous driving (Carlier 2022a; Staff 2020).

Despite the 2015 scandal related to cheating on emissions tests, the Volkswagen Group remains one of the largest and most influential automotive companies globally, with a strong global presence and a diverse range of brands and products (Carlier 2022a; Leggett 2018).



#### **4.1.2 Toyota Motor Corporation**

The Toyota Motor Corporation was founded in 1937 by Kiichiro Toyoda, the son of a wealthy Japanese inventor, as a spinoff from his father's company, Toyoda Automatic Loom Works. The company initially produced small passenger cars and trucks for the Japanese market (Britannica 2018; Carlier 2022b; CORPORATION [no date]).

In the 1950s, Toyota began to expand internationally, starting with exports to the United States. In the 1960s and 1970s, the company continued to grow and introduced popular models such as the Corolla and the Camry. Toyota also became known for its innovative production methods, including the "just-in-time" inventory system and the Toyota Production System, which revolutionized manufacturing (Britannica 2018; Carlier 2022b; CORPORATION [no date]).

In the 1980s and 1990s, Toyota further expanded its operations around the world, establishing new production facilities in countries such as the United States and the United Kingdom. During this period, the company also introduced the Lexus luxury brand and made significant investments in hybrid and electric vehicle technology (Britannica 2018; Carlier 2022b; CORPORATION [no date]).

Today, Toyota is one of the world's largest automotive manufacturers, with operations in over 170 countries and a diverse range of products and services, including cars, trucks, hybrid and electric vehicles, and mobility solutions. The company is also known for its commitment to sustainability and innovation, as well as its focus on quality and reliability (Britannica 2018; Carlier 2022b; CORPORATION [no date]).

As of 2021, Toyota Motor Corporation is one of the largest automotive manufacturers in the world with a market capitalization of over \$200 billion USD and annual revenue of \$275 billion USD (Carlier 2022b). The company operates in markets around the world, with a particular focus on Asia, North America, and Europe. Toyota holds a significant share of the global automotive market, with a market share of 10.1%. However, market share varies by region. In the European market, Toyota holds a 5.1% market share, according to data from the European Automobile Manufacturers Association in 2020. In the Asian market, Toyota is a dominant player and holds a significant market share. In Japan, Toyota has a market

share of around 30%, and in China, it has a market share of around 5.4% as of 2021. And lastly in North American market, Toyota is also a major player, with a market share of around 14% as of 2021 (Carlier 2022b; Carlier 2023b; Carlier 2023c; Ganbold 2023).

Toyota has production facilities in many countries, including Japan, the United States, Canada, Mexico, the United Kingdom, France, Turkey, South Africa, and China. In addition to its flagship Toyota brand, the company also owns the luxury brand Lexus, the youth-oriented brand Scion (sold only in the United States), and has joint ventures with other automakers such as Subaru and Mazda (Carlier 2022b; Carlier 2023b; Carlier 2023c; Ganbold 2023).

Toyota has been expanding its range of electric and hybrid vehicles, with plans to introduce 70 new electric models by 2025 (Carlier 2022b). The company has also invested in other areas of mobility, including autonomous driving and ride-sharing services.

In terms of financial performance, Toyota has reported steady profits in recent years, despite challenges such as the COVID-19 pandemic and global supply chain disruptions. In its most recent fiscal year, which ended in March 2021, Toyota reported a net profit of 2.25 trillion yen (approximately \$20.6 billion USD) (Carlier 2022b).

#### **4.1.3 Ford Motor Company**

The Ford Motor Company is an American multinational corporation that is primarily engaged in the design, manufacture, marketing, and service of cars, trucks, SUVs, electrified vehicles, and luxury vehicles. The company was founded in 1903 by Henry Ford and a group of investors, and it is currently headquartered in Dearborn, Michigan. Ford is one of the largest automobile manufacturers in the world and is known for producing iconic models such as the Ford Mustang and the Ford F-150 pickup truck (Capparella 2021; Carlier 2023a; Ford Motor Company 2020).

Ford revolutionized the automobile industry with the development of the moving assembly line, which allowed for mass production of automobiles at a lower cost. The company produced the iconic Model T in 1908, which became one of the most popular cars in history

and helped put America on wheels (Capparella 2021; Carlier 2023a; Ford Motor Company 2020).

Throughout the 20th century, Ford continued to innovate and expand, introducing new models such as the Mustang, Thunderbird, and F-Series pickup trucks. The company also established a global presence, with operations in countries around the world, and became a leader in the automotive industry (Capparella 2021; Carlier 2023a; Ford Motor Company 2020).

In recent years, Ford has faced increasing competition from foreign and domestic manufacturers, as well as disruptions from technological advancements in areas such as electric and autonomous vehicles. Despite these challenges, the company remains one of the largest and most well-known automotive companies in the world, with a strong history of innovation and a commitment to sustainable mobility (Carlier 2023a; Ford Motor Company 2020).

As of 2021, Ford Motor Company reported revenue of \$127.1 billion and net income of \$3.7 billion. The company operates in North America, South America, Europe, the Middle East, Africa, and the Asia Pacific region, and it has manufacturing facilities in numerous countries including the United States, Canada, Mexico, Brazil, Germany, China, and Thailand. Their market share in the three studied markets are: 6.8% in Europe, 2.2% in Asia and 13.1% in North America (Carlier 2023a; Carlier 2023b; Carlier 2023c; Ganbold 2023).

Ford has a range of brands including Ford, Lincoln, and Motorscraft, and its products include cars, trucks, SUVs, and electric vehicles. The company has been investing in electric and autonomous vehicle technology, and it has announced plans to invest \$22 billion in electrification through 2025 (Capparella 2021; Carlier 2023a).

## **4.2 Volkswagen Group**

### **4.2.1 Vertical and Horizontal Analysis of the Financial Position**

First analytical tools used are vertical and horizontal analysis. They are used to assess the financial situation of Volkswagen over a five-year period from 2016 to 2020. To start off,

using the data obtained from the balance sheet, a vertical and horizontal analysis of liabilities and equity can be calculated and analysed, in order to better understand the make up the Total Liabilities and Total Equity.

Liabilities Vertical Analysis	2016	2017	2018	2019	2020
Current liabilities	38.40%	38.30%	40.30%	37.40%	38.30%
Non-current liabilities	61.60%	61.70%	59.70%	62.60%	61.70%
Total liabilities	100%	100%	100%	100%	100%

(Figure 1. Vertical analysis of Liabilities. Data from Volkswagen Balance Sheet Report with own computation).

This table of Total Liabilities vertical analysis is calculated from the base 100% (Total liabilities) and is made up of Current liabilities and Non-current liabilities. In this instance, the Non-current liabilities make up a vast majority of Total liabilities and over the 5 year span, they don't deviate much. This data indicates, that over the years, Volkswagen relies predominantly on long term borrowings to finance their activities.

Liabilities	2016	2017	2018	2019	2020
Current liabilities	95.10%	94.90%	100%	92.80%	94.90%
Non-current liabilities	94.80%	95.10%	100%	105.00%	103.70%
Total liabilities	95.00%	94.90%	100%	98.80%	98.60%

(Figure 2. Horizontal analysis of Liabilities. Data from Volkswagen Balance Sheet Report with own computation).

To further analyse the trend of liabilities, a horizontal analysis of the same can be calculated. With the middle year, 2018, being chosen as the base, the differences are expressed in relation to that year. When it comes to current liabilities, the year 2018 was peak, with other years being noticeably smaller in number. Non-current liabilities have been on a steady increase over the years, indicating a potential increase in reliance on long term financing liabilities, as opposed to short term financing liabilities.

Following from that, there are vertical and horizontal computations for equity too. These, like above, help to indicate the organization's make up of their equity, and whether or not they show a over reliance on one of the categories.

Equity	2016	2017	2018	2019	2020
Common stock	9.30%	9.30%	9.30%	9.30%	9.30%
Retained earnings	78.60%	77.40%	76.60%	75.40%	74.60%
Other comprehensive income	12.10%	13.30%	14.10%	15.30%	16.10%
Total equity	100%	100%	100%	100%	100%

*(Figure 3. Vertical analysis of Equity. Data from Volkswagen Balance Sheet Report with own computation).*

This vertical analysis indicates that retained earnings make up the vast majority of total equity. Volkswagen Group is clearly capable of maintaining their earnings and retaining them for the next financial year. Furthermore, to cross examine it with a horizontal analysis, there are several important indications. Firstly, common stock has remained the same across the 5 year period. Indicating that no changes in issuing or repurchasing of stock has taken place. Secondly, Th retained earnings are showing a steady decline, which can be an indicator of the paying out of dividends or the gradual loss of revenue. Lastly, other comprehensive income indicates a possible increase in value of other assets, such as investments, pension plans, and marketable securities.

#### **4.2.2 Vertical and Horizontal Analysis of Financial Performance**

A vertical and horizontal analysis of financial performance is conducted with the data obtained from the income statement. This analysis is used to assess the organization's proportions and trends when it comes to revenue and expenses. The horizontal analysis holds special significance, since it shows the growing trend of the numerous categories. This helps to better understand the organization's tendencies and actions in relation to their previous years, which can further be used for prediction purposes into the future years as well.

Income Statement	2016	2017	2018	2019	2020
Revenue	93.40%	99.40%	100%	107.00%	94.40%
Cost of sales	96.30%	98.50%	100%	104.40%	84.90%
Gross profit	81.50%	87.50%	100%	113.30%	118.60%
Selling and distribution expenses	91.70%	96.50%	100%	110.60%	95.80%
General and administrative expenses	87.90%	94.10%	100%	105.00%	86.60%
Research and development expenses	84.40%	94.40%	100%	114.60%	96.30%
Other operating income	61.30%	65.90%	100%	10.50%	7.30%
Other operating expenses	117.10%	124.50%	100%	91.40%	67.40%
Operating profit	16.40%	27.50%	100%	188.70%	-97.10%
Finance costs	89.40%	97.00%	100%	101.50%	39.20%
Finance income	113.80%	130.10%	100%	99.60%	90.90%
Share of profit or loss of equity-accounted investments	76.00%	93.80%	100%	97.60%	98.90%
Profit before tax	0.20%	8.80%	100%	100.30%	29.50%
Income tax expense	0.10%	-2.10%	100%	101.90%	58.80%
Profit for the year	-0.80%	6.10%	100%	99.70%	17.47%

(Figure 4. Horizontal analysis of Income Statement. Data from Volkswagen Income Statement Report with own computation).

This vertical and horizontal analysis of the income statement by Volkswagen shows several trends of varying degrees of severity. The revenue, whilst it has decreased in the year 2020 from the base of 2018, has just returned to the pre-spike period of 2018 and 2019, indicating a return to more stable periods of sales. But thanks to a decrease in cost of goods sold, the year 2020 is showing a much higher number of gross profit. This can be an indicator of streamlining in the manufacturing process, where higher efficiency yields a better ratio of revenue to cost of goods sold. Furthermore, this is supported by the increasing trend in gross profit, where during the 5 year study period, this figure has increased by almost 40 percentage points. That is an indication of a strong gross profit margin, that has been increasing over the years and can thus be expected to either maintain or further increase in the future.

Additionally, there is an increase in expenditure on research and development, which can be attributed to investments in future products. This increase in cost, whilst decreasing the final profit for the year figure, is an indicator of forward thinking on behalf of the organization, supporting the theory that modern automotive manufacturing organizations must be ready to tackle the challenges of electrification and purification of their products. The Volkswagen Group seems to be aware of the challenge and is thus increasing its expenditure on research and development.

### 4.2.3 Cash-flow and Financial Ratios

Financial ratios are used to analyze and evaluate a company's financial performance and condition. They are quantitative measures that provide insight into various aspects of a company's financial health, such as liquidity, solvency, profitability, and efficiency. Financial ratios allow investors, creditors, and management to compare a company's performance to its peers, industry standards, and historical data. For this study, such ratios are of key importance for latter evaluation, where comparisons between the three firms are analyzed. They can also be used to identify trends, pinpoint areas for improvement, and make informed financial decisions. This analysis uses three categories of financial ratios: liquidity, profitability, and stability ratios.

#### 4.2.3.1 Liquidity Ratios

There are three types of liquidity ratios that are calculated in this analysis. These three are the current ratio, the quick ratio, the cash ratio, and the net-working capital ratio. These four ratios are used to assess a company's ability to meet its short-term financial obligations and its overall liquidity position. These ratios help investors and analysts understand whether a company has sufficient cash or liquid assets to pay off its short-term debts, such as accounts payable, loans, and interest payments.

Year	2016	2017	2018	2019	2020
Current Assets	14,900	20,300	21,200	25,900	17,100
Current Liabilities	5,700	7,400	8,500	9,700	6,600
Current Ratio	2.61	2.75	2.49	2.67	2.59

(Figure 5. Current Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

These ratios can be interpreted in conjunction with each other, as well as same ratios for other organizations. The results therefore provide a deeper insight into the workings of Volkswagen Group. As seen in Figure 5, the current ratio measures a company's ability to pay off its current liabilities with its current assets. In Figure 5, the current ratio has remained relatively stable over the five-year period with all ratios above the value of 2. Generally, a

current ratio of 2 or higher is considered good, as it indicates that the company has enough current assets to cover its current liabilities.

Looking at the specific numbers, the company's current ratio has consistently been above 2, indicating that it has had sufficient current assets to cover its current liabilities each year. However, there is a slight decline in the current ratio from 2017 to 2020, which may suggest a potential liquidity concern, despite the fact that the current ratio for the year 2016 was also lower than the current ratio in 2017 and the years after that.

Year	2016	2017	2018	2019	2020
Current Assets	14,900	20,300	21,200	25,900	17,100
Inventory	5,000	6,100	7,100	9,200	3,600
Current Liabilities	5,700	7,400	8,500	9,700	6,600
Quick Ratio	1.37	1.53	1.28	1.48	1.09

(Figure 6. Quick Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

Analyzing Figure 6, there seems to be no direct pattern, either increasing or decreasing, when it comes to the quick ratio. Numbers vary and fluctuate without any significant trends. This can indicate that the organization's ability to pay off its short-term liabilities with its most liquid assets varied over time.

In conjunction with the current ratios from Figure 5, it can be deduced that Volkswagen Group has the ability to pay off their short-term obligations. Whilst the quick ratio figures are slightly lower than desired, those figures of the current ratio are well within the expected norms.

Year	2016	2017	2018	2019	2020
Cash and Cash Equivalents	1,700	2,500	3,100	4,200	1,900
Current Liabilities	5,700	7,400	8,500	9,700	6,600
Cash Ratio	0.3	0.34	0.36	0.43	0.29

(Figure 7. Cash Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).



The cash ratio indicates the organization's ability to pay of short-term obligations using their cash and cash equivalents. A ratio of 1 or more indicates that the organization is able to cover their obligations with cash and cash equivalent, and a ratio below 1 indicates that there might be difficulties paying off their short-term obligations using cash and cash equivalents. As calculated in Figure 7, Volkswagen Group is consistently below the threshold and thus unable to cover their short-term liabilities with their cash and cash-equivalents. Whilst this might be view as a problem if view in isolation, when compiled with the results for the current and quick ratios, it seem that Volkswagen Group is able to cover their short-term liabilities with other means.

Year	2016	2017	2018	2019	2020
Current Assets	14,900	20,300	21,200	25,900	17,100
Current Liabilities	5,700	7,400	8,500	9,700	6,600
Net Working Capital	9,200	12,900	12,700	16,200	10,500
Total Assets	50,000	57,000	60,000	72,000	55,000
Net Working Capital Ratio	0.18	0.23	0.21	0.23	0.19

(Figure 8. Net-working Capital Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

The net working capital ratio indicates similar results as the cash ratio in Figure 7. With the ratio being bellow 1, there is a strong indication that Volkswagen Group doesn't have many current assets available to immediately cover their short-term obligations. However, same as before, their ability to cover with them current assets as show in Figure 5, indicates that despite there not being many current assets held in reserve, there are enough current assets to cover their short-term liabilities if necessary.

#### 4.2.3.2 Profitability Ratios

There are three different financial ratios used for the purposes of profitability ratio analysis. These three are the net profit margin ratio, the return on assets ratio, and the return on equity ratio. Profitability ratios are used to measure an organization's ability to generate earnings in relation to its revenue, assets, and equity. These ratios are used to give managers, investors

and analysts insight into a organization’s financial performance and its ability to generate profits.

Ratio	2016	2017	2018	2019	2020
Gross Profit Margin	12.60%	12.50%	14.70%	16.10%	22.60%
Operating Profit Margin	1.90%	2.40%	10.00%	24.40%	-12.70%
Net Profit Margin	1.10%	1.30%	5.50%	14.50%	-66.20%

(Figure 9. Net profit margin Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

Figure 9 indicates that the ratios for the given years have fluctuated significantly. In 2016 and 2017, the ratios were relatively low, at 1.1% and 1.3%, respectively. However, in 2018 and 2019, the ratio increased to 5.5% and 14.5%, indicating that the company was generating more profit from its sales. In 2020, the net profit margin ratio was negative at -66.2%, which indicates that the organization registered a significant loss during the year affecting the outcome of the ratio analysis.

It's worth noting that the operating profit margin ratio in 2020 was significantly higher at 24.4% than the previous four years, indicating that the organization was generating enough profit to cover its operating expenses, but it incurred additional expenses that led to a negative net profit margin ratio. This could be due to factors such as one-time expenses, other extraordinary circumstances, or increased expenditures on investments.

Ratio	2016	2017	2018	2019	2020
Return on Total Assets	2.50%	3.00%	12.30%	34.60%	-10.70%

(Figure 10. Return on Assets Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

Return on assets ratio (ROA) is a measure of the organization’s ability to generate profit from its total assets. The results in Figure 10 indicate an upward trend that has been terminated by a significant factor in the year 2020. Up until then the return on assets ratio was positive and increasing, indicating that the Volkswagen Group was able to generate profit from their assets with each year. This signifies a high level of efficiency within the organization. The last year of study seems to be an anomaly that may be explained by

Volkswagen group generating a loss in that year period. This could be attributed to many factors ranging from poor management decision to the impacts of disruptions caused by the COVID-19 pandemic.

Ratio	2016	2017	2018	2019	2020
Return on Common Equity	1.90%	2.20%	9.20%	24.10%	-70.30%

(Figure 10. Return on Equity Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

Figure 11 shows the return on equity ratio which represents the organization's ability to use the shareholder's equity to generate profits. As with the return on assets ratio, the years 2016, 2017, 2018, and 2019 are showing an increasing trend, supporting the view that the Volkswagen Group was able to use their shareholder's equity more efficiently with each year. The disruption caused in the year 2020 has affected the return on equity ratio as well as the return on assets ratio. Further study into the problem is necessary to better pinpoint the cause of the problem and its prevalence in the future years.

#### 4.2.3.3 Stability Ratios

Stability ratios are used to measure an organization's ability to meet its long-term financial obligations. These ratios are used to evaluate an organization's ability to remain solvent by measuring the relationship between the organization's assets and liabilities. This therefore represents the organization's ability to cover their long-term liabilities using the organisation's assets. These figures can then be used to evaluate the organization's financial health and how likely they are to remain in the business. This analysis uses three ratios which are the equity ratio, the debt to assets ratio, and the debt to equity ratio respectively.

Year	2016	2017	2018	2019	2020
Equity Ratio	0.312	0.311	0.308	0.306	0.305

(Figure 11. Equity Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

The equity ratio is a financial ratio that measures the proportion of total assets financed by equity. It therefore indicates the amount of assets that would remain if all liabilities were paid off.

By assessing the data in Figure 11, it can be concluded that the equity ratio has been slightly decreasing over the five-year period. This indicates that the proportion of total assets financed by equity is decreasing. In 2016, the equity ratio was 0.312, which means that 31.2% of the total assets were financed by equity. In 2020, the equity ratio decreased to 0.305, which means that 30.5% of the total assets were financed by equity. Each year in between was also lower than the previous year. This trend may indicate that the company is relying more on debt financing to fund its operations and investments. While taking on debt can provide additional capital to finance growth, it also increases financial risk, as the company may face challenges in repaying its debts if it experiences a downturn or cash flow problems. It's important for the company to carefully balance its debt and equity financing to maintain a healthy financial position.

Year	2016	2017	2018	2019	2020
Debt to Assets Ratio	0.617	0.617	0.597	0.626	0.617

(Figure 12. Debt to Assets Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

The results for the debt to assets ratio are used to assess the organization's debt financing of assets. Higher ratios indicate that the organization is relying more heavily on debts to finance their operations and growth. Figure 12 clearly shows that the Volkswagen Group is not overly reliant on debts to finance their growth and operations, since their ratios remain fairly low and more importantly stable. The slight fluctuation between the years is not of significant value to warrant further evaluation and dissection.

Year	2016	2017	2018	2019	2020
Debt to Equity Ratio	1.966	1.972	1.976	1.997	2.03

(Figure 13. Debt to Equity Ratio analysis. Data from Volkswagen Financial Statement Report with own computation).

The debt to equity ratio measures the organization's level of debt compared to equity. A higher ratio indicates that a company has more debt relative to its equity, which can indicate higher financial risk. A lower debt to equity ratio therefore indicates that the organization has less debt relative to its equity. The general level of optimalization is 1.0. Seeing the results in Figure 13, it can be deduced that the Volkswagen Group is experiencing a higher than optimal debt to equity ratio. Not only that, the ratios of the five-year period of study are showing a trend of steady increase with the year 2020 breaking the 2.0 ratio value. Whilst this trend is worrying, it is important to note that not all debt is in essence a negative impact on the organization. This can be explained by the organization taking on more debt to finance expansion, growth, or further development, which are all factors of investment.

### 4.3 Toyota Motor Corporation

#### 4.3.1 Vertical and Horizontal Analysis of the Financial Position

To start off, using the data obtained from the balance sheets published by the Toyota Motor Corporation, a vertical and horizontal analysis of liabilities and equity can be formulated and analysed, in order to better understand the make up of the total liabilities and total equity.

Liabilities	2016	2017	2018	2019	2020
Current liabilities	38.40%	38.30%	40.30%	37.20%	39.20%
Non-current liabilities	61.60%	61.70%	59.70%	62.80%	60.80%
Total liabilities	100%	100%	100%	100%	100%

(Figure 14. Vertical analysis of Liabilities. Data from Toyota Balance Sheet Report with own computation).

The results from Figure 14 indicate that the Toyota Motor Organization has a very stable split between current and non-current liabilities, with non-current liabilities making up the larger percentage. This indicates that Toyota has a good balance between short-term and long-term financing with no drastic deviations from their established norm.

Liabilities	2016	2017	2018	2019	2020
Current liabilities	95.10%	95.00%	100%	92.30%	97.30%
Non-current liabilities	98.60%	98.50%	100%	105.50%	103.30%
Total liabilities	97.20%	97.10%	100%	98.80%	100.00%

(Figure 15. Horizontal analysis of Liabilities. Data from Toyota Balance Sheet Report with own computation).

For further examination a horizontal analysis in Figure 15 was calculated. Here, the changes over the years are more visible and better represented. As stated above in Figure 14 the current and non-current liabilities are showing a fairly steady and stable trend. Only the non-current liabilities have shown a gradual increase from the year 2016 to the year 2020 with a peak in the year of 2019. This can be predominantly attributed to the organization's balancing of current and non-current liabilities, such as short-term and long-term borrowings to finance operations and growth.

Furthermore, the equity of the Toyota Motor Corporation can be analysed both vertically and horizontally.

Equity	2016	2017	2018	2019	2020
Common stock	16.10%	15.30%	16.40%	17.80%	15.70%
Retained earnings	81.00%	81.30%	83.60%	79.50%	82.60%
Other comprehensive income	2.90%	3.40%	0.00%	2.70%	1.70%
Total equity	100%	100%	100%	100%	100%

(Figure 16. Vertical analysis of Equity. Data from Toyota Balance Sheet Report with own computation).

This percentage breakup of the equity shows the representation of different types in relation to total equity. From the data, there is a definite indication that retained earnings make up the largest portion of equity, with a range of 79.5% to 83.6% over the years. Common stock is the second largest component, ranging from 15.3% to 17.8%, while other comprehensive income is the smallest and at times almost non-existent component, ranging from 0% to 3.4%. The drop in 2018 can be possibly attributed to a change in accounting methods, thus changing the way some articles are listed or not listed under "other comprehensive income".

Equity	2016	2017	2018	2019	2020
Common stock	98.20%	93.20%	100%	108.50%	95.70%
Retained earnings	96.10%	96.40%	100%	95.20%	99.00%
Other comprehensive income	87.50%	105.30%	100%	76.70%	87.60%
Total equity	95.90%	96.20%	100%	96.10%	98.00%

(Figure 17. Horizontal analysis of Equity. Data from Toyota Balance Sheet Report with own computation).

This horizontal analysis further enhances the fluctuating trends within the equity. No clear trends can be observed, and most changes or fluctuations are therefore “unique”. The big spike of common stock in 2019 can be possibly attributed to the selling or repurchasing of shares. Retained earnings have remained fairly stable with small fluctuations from year to year, once again, without any immediate trend visible.

### 4.3.2 Vertical and Horizontal Analysis of Financial Performance

A vertical and horizontal analysis of financial performance is an analysis of the income statement. This analysis is used to assess the organization’s status and trends when it comes to revenue and expenses. The horizontal analysis is especially significant since it shows the growing trend of the different categories. This helps to better understand the organization’s tendencies and actions in relation to their previous years, which can further be used for prediction purposes into the future years as well.

Income Statement	2016	2017	2018	2019	2020
Revenue	97.80%	98.20%	100.00%	91.10%	91.10%
Cost of sales	98.70%	98.70%	100.00%	90.70%	90.80%
Gross profit	96.50%	97.50%	100.00%	92.50%	90.50%
Selling and distribution expenses	99.60%	99.60%	100.00%	91.40%	92.60%
General and administrative expenses	100.10%	100.10%	100.00%	97.30%	93.70%
Research and development expenses	99.90%	99.90%	100.00%	98.70%	96.70%
Other operating income	102.20%	102.10%	100.00%	94.20%	99.50%
Other operating expenses	101.60%	101.70%	100.00%	93.70%	96.40%
Operating profit	90.10%	95.60%	100.00%	95.30%	82.60%
Finance costs	91.40%	90.10%	100.00%	93.90%	81.40%
Finance income	106.20%	115.10%	100.00%	147.60%	104.20%
Share of profit or loss of equity-accounted investments	98.40%	98.40%	100.00%	55.40%	33.20%
Profit before tax	92.20%	95.30%	100.00%	96.70%	82.60%
Income tax expense	91.70%	93.70%	100.00%	99.20%	79.40%
Profit for the year	93.40%	96.90%	100.00%	95.80%	83.30%

(Figure 18. Horizontal analysis of Income Statement. Data from Toyota Income Statement Report with own computation).

Analysing the horizontal analysis, there are strong indications that the revenue, cost of sales, and gross profit all decreased in 2019 and 2020 compared to 2018. This could be a cause for concern for the Toyota Motor Corporation since it may indicate a decrease in overall sales or an increase in costs. However, other operating income increased again in 2012, which could partially offset the decrease in revenue and the cost of good sold has also decreased in the years 2019 and 2020 in comparison with the year 2018.

The analysis also shows that selling and distribution expenses, general and administrative expenses, and research and development expenses have decreased in the years after 2018. This suggests that the company may be spending less on these areas, which could potentially impact its profitability and future outlooks.

In terms of profitability, the analysis shows that the company's operating profit, finance costs, and share of profit or loss of equity-accounted investments decreased in 2019 and 2020 compared to 2018. This may be a concern for the company's financial health. However, finance income increased significantly in 2019, which may have helped to mitigate some of the losses.

### 4.3.3 Cash-flow and Financial Ratios

Further analysis is conducted through financial ratios. Once again, the three categories of liquidity, profitability and stability will be used to assess the financial position of the Toyota Motor Corporation.

#### 4.3.3.1 Liquidity Ratios

Liquidity ratios are used to assess the organization's ability to cover their short-term obligations through the usage of their assets.

	2016	2017	2018	2019	2020
Current Assets	22,886	22,278	24,205	23,387	25,495
Current Liabilities	59,764	58,158	60,166	62,646	66,509
Current Ratio	0.383	0.383	0.402	0.373	0.384

(Figure 19. Current Ratio analysis. Data from Toyota Financial Statement Report with own computation).

This ratio analysis indicates two main points. Firstly, the current ratio remains fairly stable, showing that the organization is not experiencing and drastic changes in their ability to payout their short-term obligations. Secondly, however, the calculated ratios are well bellow 1.0, thus indicating that the Toyota Motor Corporation may be facing difficulties covering their short-term obligations solely through their current assets.



	2016	2017	2018	2019	2020
Current Assets	22,886	22,278	24,205	23,387	25,495
Inventories	11,411	11,084	12,418	12,391	12,958
Quick Assets (CA - I)	11,475	11,194	11,787	10,996	12,537
Current Liabilities	59,764	58,158	60,166	62,646	66,509
Quick Ratio	0.192	0.193	0.196	0.175	0.188

(Figure 20. Quick Ratio analysis. Data from Toyota Financial Statement Report with own computation).

Figure 20 provides very similar results to Figure 19, despite the fact that inventories are taken out of the equation. As before, the quick ratio remains stable throughout the five years, but once again it is well below the 1.0 optimal level, suggesting that the ability to pay out short-term obligations may not be within the capabilities of the Toyota Motor Corporation solely based on their current or even quick assets.

Year	2016	2017	2018	2019	2020
Current Assets	¥ 17,319,926	¥ 17,506,647	¥ 19,291,070	¥ 19,504,102	¥ 21,127,044
Current Liabilities	¥ 15,856,153	¥ 16,471,757	¥ 17,238,946	¥ 17,142,923	¥ 19,285,798
Total Assets	¥ 47,344,035	¥ 49,048,219	¥ 54,700,643	¥ 56,154,938	¥ 60,051,429
Net Working Capital Ratio	0.09	0.059	0.119	0.136	0.096

(Figure 21. Net-working Capital Ratio analysis. Data from Toyota Financial Statement Report with own computation).

Analyzing the results from Figure 21 it can be observed that the net working capital ratio for the Toyota Motor Corporation has over the years fluctuated between 0.059 and 0.136, with the highest ratio occurring in 2019. This indicates that the organization's ability to meet its short-term obligations improved in 2019 but declined again in 2020. However, it's worth noting that a net working capital ratio of around 0.1 is generally considered to be acceptable for most companies.

#### 4.3.3.2 Profitability Ratios

The three profitability ratios used are the net profit margin ratio, the return on assets ratio, and the return on equity ratio. Profitability ratios are used to measure an organization's ability to generate earnings in relation to its revenue, assets, and equity. These ratios are used

to give managers, investors and analysts insight into an organization's financial performance and its ability to generate profits.

	2016	2017	2018	2019	2020
Net Profit	16,957	17,055	18,603	19,174	16,800
Revenue	249,656	254,694	272,162	275,394	264,938
Net Profit Margin	6.79%	6.69%	6.84%	6.96%	6.33%

(Figure 22. Net profit margin Ratio analysis. Data from Toyota Financial Statement Report with own computation).

The net profit margin ratio measures a company's ability to convert revenue into profit where the higher the figure the more efficient the organization is at such conversion. In this case, the Toyota Motor Corporation's net profit margin ratio has fluctuated between 6.33% to 6.96% within the five-year study period, indicating consistent and stable profitability. However, there was a slight dip in 2020, with the net profit margin ratio at 6.33% being the lowest of them all, which may be of slight worry into the future.

	2016	2017	2018	2019	2020
Net Income	16,957	17,055	18,603	19,174	16,800
Total Assets	455,047	462,059	506,656	544,646	598,168
Return on Assets	3.73%	3.69%	3.67%	3.52%	2.81%

(Figure 23. Return on Assets Ratio analysis. Data from Toyota Financial Statement Report with own computation).

Figure 23 yields some worrying results for the financial situation of the Toyota Motor Corporation. Analyzing the calculated data, the return on assets ratio has been consistently declining from 3.73% in 2016 all the way to 2.81% in 2020. This is a clear declining trend over a five-year period. This therefore suggests that the organization is becoming less efficient in generating profit from its assets over the years. This could be due to various reasons such as increasing expenses, declining sales, or inefficient use of resources, but being what it may, this ratio result is of negative significance.

	2016	2017	2018	2019	2020
Net Income	16,957	17,055	18,603	19,174	16,800
Total Equity	157,264	169,903	179,155	188,982	202,936
Return on Equity	10.77%	10.04%	10.39%	10.12%	8.27%

(Figure 24. Return on Equity Ratio analysis. Data from Toyota Financial Statement Report with own computation).

Similar to the previous results of Figure 23 the return on equity ratio is showcasing a negative, decreasing trend for the Toyota Motor Corporation. Despite this, however, the over all figures remain healthy and the organization is thus still able generate substantial returns for their shareholders.

#### 4.3.3.3 Stability Ratios

Stability ratios are used to measure an organization's ability to meet its long-term financial obligations and are integral to the long-term outlook of the organization's financial health and situation.

Ratio	2016	2017	2018	2019	2020
Equity Ratio	0.55	0.54	0.56	0.54	0.54

(Figure 25. Equity Ratio analysis. Data from Toyota Financial Statement Report with own computation).

Analysing the results, it can be seen that the equity ratio for the Toyota Motor Corporation has remained relatively stable over the five years, ranging from 0.54 to 0.56. This suggests that the company has a relatively conservative financing strategy, with a significant portion of its assets being financed through equity rather than debt without any deviations from their established norm.

Ratio	2016	2017	2018	2019	2020
Debt-to-Asset Ratio	0.46	0.47	0.44	0.47	0.46

(Figure 26. Debt to Assets Ratio analysis. Data from Toyota Financial Statement Report with own computation).

The organization's debt to asset ratio is relatively low and predominantly stable. It is a recurring theme that Toyota Motors Corporation has a very stable financing strategy and that they are able to maintain it.

Ratio	2016	2017	2018	2019	2020
Debt-to-Equity Ratio	0.83	0.87	0.79	0.87	0.85

(Figure 27. Debt to Equity Ratio analysis. Data from Toyota Financial Statement Report with own computation).

In this case, the debt-to-equity ratio for the organization has fluctuated between 0.79 and 0.87 from 2016 to 2020. This suggests that the Toyota Motor Corporation has been consistently relying on debt financing to fund its operations, which increases its risk of default. However, the ratio has not increased significantly over the years, indicating that the company has been able to manage its debt levels relatively well.

Overall, a debt-to-equity ratio of 0.83 to 0.87 suggests that the company has a moderate amount of debt and may be able to handle it. However, it is important for the company to keep an eye on this ratio and ensure that it does not increase too much in the future.

## 4.4 Ford Motor Company

### 4.4.1 Vertical and Horizontal Analysis of the Financial Position

Vertical and horizontal analysis will once again assess the financial situation of the Ford Motor Company over a five-year period from 2016 to 2020. To start off, using the data obtained from the balance sheet, a vertical and horizontal analysis of liabilities and equity can be calculated and analysed, in order to better understand the make up the Total Liabilities and Total Equity and how they have developed over time.

Liabilities	2016	2017	2018	2019	2020
Current liabilities	48.60%	49.50%	52.20%	53.10%	51.60%
Non-current liabilities	51.40%	50.50%	47.80%	46.90%	48.40%
Total liabilities	100.00%	100.00%	100.00%	100.00%	100.00%

(Figure 28. Vertical analysis of Liabilities. Data from Ford Balance Sheet Report with own computation).

The results from this vertical ratio of liquidity shows the percentage of current and non-current liabilities in relation to total liabilities for the Ford Motor Company over a five-year period. Over the studied period, two small patterns can be observed. Current liabilities seem to be slightly increasing, whilst the non-current liabilities are slowly decreasing. These two trends have a symbiotic relationship, indicating that the Ford Motor Company is starting to rely more heavily on short-term debt to finance their operations as opposed to long-term debt. This could be due to a number of factors including difficulties with obtaining long-term debt or an attempt to capitalize on favourable interest rates.

Liabilities	2016	2017	2018	2019	2020
Current liabilities	96.31%	98.14%	100.00%	103.22%	108.26%
Non-current liabilities	98.64%	102.59%	100.00%	110.19%	118.66%
Total liabilities	97.97%	100.35%	100.00%	105.69%	112.73%

(Figure 29. Horizontal analysis of Liabilities. Data from Ford Balance Sheet Report with own computation).

The results from the horizontal analysis present in Figure 29 further support the claims from the vertical analysis in Figure 28. The Ford Motor Company is taking on more short-term and long-term debt over the years, indicating possible problems with their ability to finance their operations solely from profit. This is a worrying trend that should be monitored further, as future operations of the organization may be impaired by their increased debt.

Equity	2016	2017	2018	2019	2020
Common stock	8.64%	8.85%	9.04%	9.02%	8.29%
Retained earnings	90.10%	89.14%	89.98%	91.27%	90.73%
Other comprehensive income	1.26%	1.01%	0.98%	-0.29%	0.98%
Total equity	100%	100%	100%	100%	100%

(Figure 30. Vertical analysis of Equity. Data from Ford Balance Sheet Report with own computation).

The equity analysis shows that retained earnings are the dominant form of equity that the Ford Motor Company has. The high retained earning can be an indication of either high profitability, where the organization is then able to reinvest their profits into further operations, or that the organization is not paying out their dividends to shareholders.

Equity	2016	2017	2018	2019	2020
Common stock	95.64%	97.29%	100.00%	99.79%	97.21%
Retained earnings	98.13%	97.80%	100.00%	100.32%	100.28%
Other comprehensive income	77.93%	81.95%	100.00%	-1.22%	107.98%
Total equity	96.57%	97.51%	100.00%	99.95%	99.91%

(Figure 31. Horizontal analysis of Equity. Data from Ford Balance Sheet Report with own computation).

The results from the horizontal analysis of equity indicate that the Ford Motor Company has reached its peak in the year of 2018, since the subsequent data is either slightly below or the same, and any previous data is lower or more significantly lower than in the year of 2018.

#### 4.4.2 Vertical and Horizontal Analysis of Financial Performance

A vertical and horizontal analysis of financial performance is an analysis of the income statement. This analysis is used to assess the organization's status and trends when it comes to revenue and expenses. The horizontal analysis is especially significant since it shows the growing trend of the different categories. This helps to better understand the organization's tendencies and actions in relation to their previous years, which can further be used for prediction purposes into the future years as well.

Income Statement	2016	2017	2018	2019	2020
Revenue	92.20%	100.70%	100.00%	94.80%	87.90%
Cost of sales	91.40%	102.20%	100.00%	93.80%	86.10%
Gross profit	94.40%	99.70%	100.00%	96.20%	92.80%
Selling and distribution expenses	96.60%	102.40%	100.00%	95.10%	90.30%
General and administrative expenses	92.90%	98.30%	100.00%	95.10%	92.20%
Research and development expenses	99.30%	102.20%	100.00%	92.30%	88.30%
Other operating income	63.40%	61.90%	100.00%	139.30%	211.60%
Other operating expenses	96.60%	104.70%	100.00%	95.60%	86.20%
Operating profit	92.30%	98.30%	100.00%	95.80%	92.20%
Finance costs	94.50%	105.50%	100.00%	127.20%	130.50%
Finance income	81.40%	109.20%	100.00%	116.80%	77.90%
Share of profit or loss of equity-accounted investments	63.40%	154.30%	100.00%	114.20%	58.10%
Profit before tax	89.70%	98.60%	100.00%	95.60%	90.10%
Income tax expense	98.60%	25.80%	100.00%	99.30%	103.90%
Profit for the year	88.80%	112.40%	100.00%	95.60%	86.10%

(Figure 32. Horizontal analysis of Income Statement. Data from Ford Income Statement Report with own computation).

This analysis showcases several interesting points regarding the trends in the Ford Motor Company's income statements over the five years. Firstly, the revenue has dropped dramatically in the year 2020. This is further supported by a decrease in gross profit and operating profit, where the final profit for the year is also the lowest of the five in record. This might be partially offset by the fact that other operating income, which are usually business activities not directly related to the main operations of the organization, has significantly increased, tracking over 211% by the year 2020.

Lastly, it is important to mention that the selling and distribution expenses, as well as the general and administrative expenses and the costs of sales have all decreased over time too. The figures in the year 2020 are the lowest out of the entire study period. This can be indicating a dramatic shift in the organization's financial health, which has impacted their entire income statement from top to bottom.

#### 4.4.3 Cash-flow and Financial Ratios

Further analysis is conducted through financial ratios. Once again, the three categories of liquidity, profitability and stability will be used to assess the financial position of the Toyota Motor Corporation.

##### 4.4.3.1 Liquidity Ratios

Liquidity ratios are used to analyze the organization's ability to cover their short-term obligations through the usage of their assets.

Ratio	2016	2017	2018	2019	2020
Current Ratio	1.21	1.2	1.17	1.2	1.09

(Figure 33. Current Ratio analysis. Data from Ford Financial Report with own computation).

This ratio analysis examines the organization's ability to cover their short-term liabilities with their current assets. As seen in the Figure 33 the Ford Motor Company is above the 1.0 threshold of necessity, so they are able to cover their short-term obligations with their current

assets. However, there is a downward trend that may be indicative of possible future problems. As of now, however, it is too early to make any representative predictions.

Ratio	2016	2017	2018	2019	2020
Quick Ratio	0.98	0.96	0.94	0.98	0.81

(Figure 34. Quick Ratio analysis. Data from Ford Financial Statement Report with own computation).

As with the previous results, the Ford Motor Company is experiencing a downward, decreasing shift in their quick ratios. However, and more significantly, this time around the organization is unable to meet the 1.0 threshold to be able to cover their short-term obligations with their quick assets.

Ratio	2016	2017	2018	2019	2020
Net Working Capital Ratio	0.16	0.16	0.15	0.16	0.11

(Figure 35. Net-working Capital Ratio analysis. Data from Ford Financial Statement Report with own computation).

This ratio further supports the ratio in Figure 34, as the results here are below the 1.0 threshold of optimization. This means that the Ford Motor Company is unable to rely solely on their current assets to pay out their short-term obligations. From the already low ratio of assets available, there is even a lower ratio of assets allocated to the possibility of being used to cover the short-term liabilities.

#### 4.4.3.2 Profitability Ratios

The three profitability ratios used are the net profit margin ratio, the return on assets ratio, and the return on equity ratio. Profitability ratios are used to measure an organization's ability to generate earnings in relation to its revenue, assets, and equity. These ratios are used to give managers, investors and analysts insight into an organization's financial performance and its ability to generate profits.

Ratio	2016	2017	2018	2019	2020
Net Profit Margin	3.20%	3.00%	3.70%	-1.00%	-6.80%



(Figure 36. Net profit margin Ratio analysis. Data from Ford Financial Statement Report with own computation).

This first ratio indicates how much of the generate revenue from sales is left over after all the expenses are deducted. In this case, it is evident that the net profit margin ratio has fluctuated over the years, with a range of 3.20% to -6.80%. In 2018, the net profit margin was the highest at 3.70%, indicating that the company was generating a healthy profit from its operations. However, in 2019 and 2020, the net profit margin fell to negative values of -1.00% and -6.80%, respectively. This suggests that the Ford Motor Company was not able to generate enough revenue to cover its expenses, resulting in losses.

Ratio	2016	2017	2018	2019	2020
Return on Assets	1.10%	1.00%	1.20%	-0.30%	-2.00%

(Figure 37. Return on Assets Ratio analysis. Data from Ford Financial Statement Report with own computation).

Through the analysis of the return on assets ratio, it can be seen that the Ford Motor Company's return on assets ratio has been fluctuating over the past five years. In 2016 and 2017, the return on assets ratio was relatively stable, hovering around 1%. In 2018, it increased to 1.20%, indicating a positive trend in the company's profitability. However, in 2019 and 2020, the return on assets ratio took a downward turn and became negative, indicating that the organization's net income was not sufficient to cover its assets. Such a decline in return on assets could be due to a variety of factors, most importantly in an increase in operating expenses, a decrease in sales revenue, or a decrease in asset efficiency.

Ratio	2016	2017	2018	2019	2020
Return on Equity	21.30%	22.30%	14.90%	-3.50%	-31.80%

(Figure 38. Return on Equity Ratio analysis. Data from Ford Financial Statement Report with own computation).

Based on the computed data, it is evident that the Ford Motor Company maintained a consistently high return on equity ratio from 2016 to 2017, implying that it generated a substantial return on investment for its shareholders. Nevertheless, the significant decline in

ROE in 2018 gives cause for concern, which is then further expressed by the continuous decline in 2019, and by 2020, where the return on equity ratio dropped to a negative value, indicating that the company incurred losses that exceeded its shareholder equity. Such a trend is unfavourable for the company, and potential investors may hesitate to invest in it.

#### 4.4.3.3 Stability Ratios

Stability ratios are used to measure an organization's ability to meet its long-term financial obligations and are integral to the long-term outlook of the organization's financial health and situation.

	2016	2017	2018	2019	2020
<b>Equity Ratio</b>	0.29	0.29	0.27	0.26	0.28

*(Figure 39. Equity Ratio analysis. Data from Ford Financial Statement Report with own computation).*

This ratio represents how much of the organization's assets are financed by shareholder's equity. Results from Figure 39 indicated that the Ford Motor Company has had a stable ratio across the five years. The ratios themselves are of lower value, but not low enough to indicate immediate difficulties.

	2016	2017	2018	2019	2020
<b>Debt to Asset Ratio</b>	0.76	0.78	0.77	0.78	0.76

*(Figure 40. Debt to Assets Ratio analysis. Data from Ford Financial Statement Report with own computation).*

Given the stability of the debt to asset ratio for the Ford Motor Company over the years, it appears that the organization has been maintaining a relatively balanced approach to financing its operations.

	2016	2017	2018	2019	2020
<b>Debt to Equity Ratio</b>	5.14	5.59	5.06	5.03	5.42

*(Figure 41. Debt to Equity Ratio analysis. Data from Ford Financial Statement Report with own computation).*

Upon analysing the calculated data, it is evident that the Ford Motor Company's debt to equity ratio has remained relatively stable from 2016 to 2018, with a slight decrease in 2019,

followed by a more significant increase in 2020. The ratios, ranging from 5.03 to 5.59, suggest that the company heavily relies on debt financing compared to equity financing. A high debt to equity ratio can have both advantages and disadvantages. On the one hand, debt financing may provide tax benefits and lower financing costs, thus increasing the return on investment for shareholders. However, on the other hand, a high level of debt increases financial risk, as the company may struggle to meet its debt obligations in times of financial difficulties. Therefore, it is crucial for the company to balance the use of debt and equity financing to optimize its financial performance and mitigate potential risks.

## **5 Results and Discussion**

### **5.1 Assessment and Comparison of Financial Position between the three organizations**

This chapter will compare and analyse the results from the Practical chapter against one another. Specifically, vertical, and horizontal analysis of liquidity and equity based around the results and findings from the balance sheets.

#### **5.1.1 Vertical and Horizontal Analysis of Liquidity**

When comparing the results from the three organizations, there are clear indications of similar patterns in the composition of the organization's liabilities over time. However, there are some differences in the specific percentages of current and non-current liabilities. For a better overview, we must refer to Figures 1, 2, 14, 15, 28 and 29.

Volkswagen Group and the Toyota Motor Corporation both show very similar trends, with only slight differences in the percentages of current and non-current liabilities. Both organizations have their non-current liabilities at around 60% with the current liabilities then being around 40%. The Ford Motor Company, on the other hand, has much higher percentages of current liabilities and lower percentages of non-current liabilities compared to the other two tables. Their ratio is split around 50% and 50% respectively. This indicates that the Ford Motor Company has a different composition of liabilities, showing a stronger reliance on short-term debts in comparison to the two other organizations.

Comparing the figures showcasing the horizontal analysis for liquidity (Figures 3, 4, 16, 17, 30, 31), there can be observed changes in liquidity over the five-year period of study. Both Volkswagen and Toyota show similar trends in the liquidity position, with slight decreases in the percentage of current liabilities in 2019 followed by increases in 2020. This can be interpreted in a way, that both organizations were under similar external influences which effected their liquidity compositions in a similar manner. The percentage of non-current liabilities increased in both tables in 2019 and 2020, indicating an increased reliance on long-term financing.

The Ford Motor Company, however, once again shows a more volatile liquidity position. The percentage of current liabilities increased significantly in 2019 and 2020, suggesting that the company may have faced cash flow problems during those years and were using short-term debts to offset them. The percentage of non-current liabilities also increased significantly in 2019 and 2020, indicating an increased reliance on long-term financing. Therefore, Ford is showing and increasing reliance on debt borrowing to finance their operations and cover any losses.

### **5.1.2 Vertical and Horizontal Analysis of Equity**

The vertical analysis of equity tables for Volkswagen, Toyota, and Ford showcase the percentage breakdown of their equity components for each year. In terms of common stock, Volkswagen and Ford have a lower percentage compared to Toyota, with Volkswagen having the lowest percentage of 8.29% in 2020. All the while Toyota has almost a double of what both Volkswagen and Ford have with their highest figure being 17.8% in 2019.

For retained earnings, Volkswagen has the highest percentage among the three organizations in 2016 and 2017, but it has been consistently decreasing since then. In contrast, Toyota has been increasing its retained earnings percentage over the years, with the highest percentage of 83.60% in 2018. Ford, on the other hand, has been relatively consistent in its percentage of retained earnings remain more or less the same for the entire period of time.

Regarding other comprehensive income, Volkswagen had the highest percentage among the three organizations in 2016 and 2017, but it has been decreasing since then. Ford had a negative percentage in this category in 2019, while Toyota had no other comprehensive income in 2018. Being that the figures for this category are so low, it is hard to extrapolate any meaning full conclusion from their comparison against one another.

Lastly, Volkswagen and Toyota have a similar percentage of equity from retained earnings, with Toyota being a few percentage points higher, while Ford has the highest percentage of equity from retained earnings with a maximum of 91.27% in 2019.

## **5.2 Financial Performance**

### **5.2.1 Horizontal Analysis of the Income Statement**

The findings of the analysis reveal that all three organizations experienced fluctuations in revenue over the five-year period. Toyota had the most stable revenue, with a range of 91.1% to 100%. Volkswagen had the highest revenue growth in 2019 (107%), while Ford had the highest revenue decline in 2020 (87.9%).

Similarly, all three organizations had some fluctuation in cost of sales over the five-year period. Volkswagen had the highest cost of sales growth in 2019 (104.4%), while Toyota had the most stable cost of sales, ranging from 90.7% to 100%. In terms of gross profit, all three companies had some fluctuations over the five-year period. Volkswagen had the highest gross profit growth in 2019 (113.3%), while Ford had the highest gross profit decline in 2020 (92.8%).

Operating expenses, including selling and distribution expenses, general and administrative expenses, and research and development expenses, all showed some fluctuations over the five-year period for all three companies. Ford had the highest percentage decrease in general and administrative expenses in 2020 (86.2%). Additionally, Volkswagen had the most volatile other operating income and expenses, with large fluctuations in 2016 and 2019, while Toyota had the most stable other operating income and expenses, with a range of 94.2% to 102.2%.

In terms of operating profit, all three companies had fluctuations over the five-year period. Volkswagen had the highest operating profit growth in 2019 (188.7%), while Ford had the highest operating profit decline in 2020 (-7.8%). The study also found that all three companies had fluctuations in finance costs and income over the five-year period. Toyota had the highest finance income growth in 2019 (147.6%), while Ford had the highest finance costs decline in 2020 (79.5%).

Finally, the analysis revealed that all three companies had fluctuations in profit before tax, income tax expense, and profit for the year over the five-year period. Volkswagen had the highest profit before tax growth in 2019 (100.3%), while Ford had the highest profit before

tax decline in 2020 (82.6%). Similarly, Volkswagen had the highest income tax expense growth in 2019 (101.9%), while Ford had the highest income tax expense decline in 2020 (79.4%). Lastly, Volkswagen had the highest profit for the year growth in 2019 (99.7%), while Ford had the highest profit for the year decline in 2020 (16.7%).

## **5.3 Financial Ratios**

This chapter consists of three parts, each focusing on a comparison between the organizations in the respective types of ratios. From each category, only some ratios were selected for comparisons.

### **5.3.1 Liquidity Ratios**

#### **5.3.1.1 Current Ratio**

Volkswagen's current ratio has been fluctuating over the years, ranging from 2.49 in 2018 to 2.75 in 2017. The company's current ratio decreased in 2020 to 2.59, which is still relatively high compared to the other two companies. Toyota's current ratio has been relatively stable over the years, ranging from 0.373 in 2019 to 0.402 in 2018. The company's current ratio in 2020 was 0.384, which is similar to the ratio in the previous years. The company's current ratio has been consistently lower than the other two companies, indicating a potentially higher risk for short-term liquidity. Ford's current ratio has been decreasing over the years, ranging from 1.21 in 2016 to 1.09 in 2020, but has remained above the threshold of 1.0 which is accepted as an optimal figure.

In summary, while Volkswagen has had a relatively stable current ratio trend, Toyota's trend has been relatively stable too, and Ford's trend has been decreasing over the years. The current ratios for each company also vary significantly, with Volkswagen having the highest current ratio, Ford having a moderate current ratio, and Toyota having a relatively low current ratio in comparison to the other two organizations.

#### **5.3.1.2 Quick Ratio**

Volkswagen's quick ratio was consistently above 1, ranging from 1.37 in 2016 to 1.09 in 2020. This indicates that the company had enough quick assets to cover its current liabilities,

including inventory. Toyota's quick ratio was much lower than Volkswagen's, ranging from 0.192 in 2016 to 0.188 in 2020. This suggests that Toyota had fewer quick assets available to cover its current liabilities, including inventory. Ford's quick ratio was also consistently below 1, ranging from 0.98 in 2016 to 0.81 in 2020. This indicates that the company had fewer quick assets available to cover its current liabilities, including inventory, compared to Volkswagen.

Overall, Volkswagen had a more favourable quick ratio compared to Toyota and Ford, indicating better liquidity and ability to cover its short-term obligations. Toyota and Ford, with Toyota being the lower of the two, had lower quick ratios, suggesting that they may have had more difficulty meeting their short-term obligations, particularly in the event of unexpected events or financial distress.

### **5.3.2 Profitability Ratios**

#### **5.3.2.1 Return on Assets Ratio**

Volkswagen had a high return on total assets in 2019 (34.6%), which was significantly higher than its return on assets in other years. In 2020, the company had a negative return on total assets (-10.7%), indicating a loss for the year. Toyota had relatively consistent return on assets ratios from 2016 to 2019, ranging from 3.67% to 3.73%. In 2020, its return on assets decreased to 2.81%. Ford had a lower return on assets compared to the other two companies, with its highest return on assets occurring in 2018 (1.2%). In 2019 and 2020, the company had negative returns on assets, indicating losses for both years.

Overall, Volkswagen had the highest return on total assets in 2019, while Toyota had relatively consistent return on assets ratios across the years. Ford had lower return on assets compared to the other two companies and experienced losses in 2019 and 2020.

#### **5.3.2.2 Return on Equity Ratio**

Volkswagen had a positive return on equity from 2016 to 2019, with a high of 24.1% in 2019, but experienced a sharp decline to -70.3% in 2020. This may be due to various factors, such as the impact of the COVID-19 pandemic on the automotive industry or the costs



associated with the Dieselgate scandal. Toyota had a relatively stable return on equity from 2016 to 2020, with a high of 10.77% and a low of 8.27%. They were able to maintain their return on equity ratios over the five years with an average of 9.92%, which only further highlights their stability. Ford had a high return on equity of 22.3% in 2017 but experienced a decline in 2018 to 14.9%. The company then had negative returns on equity in 2019 (-3.5%) and 2020 (-31.8%), which may also be attributed to the impact of the pandemic.

Overall, we can see that all three companies had a decline in their return on equity ratios in 2020, likely due to the impact of the pandemic on the automotive industry. However, of the three, Toyota had the most stable return on equity across the five-year time period and was the only one to not record a negative return on equity ratio.

### **5.3.3 Stability Ratio**

#### **5.3.3.1 Debt to Equity Ratio**

Volkswagen had a relatively high debt to equity ratio over the five-year period, ranging from 1.966 in 2016 to 2.03 in 2020, indicating that the company relied heavily on debt to finance its operations. Toyota had a lower debt to equity ratio compared to Volkswagen, ranging from 0.83 in 2016 to 0.85 in 2020. This suggests that Toyota relied less on debt to finance its operations and had a more balanced capital structure. On the other hand, Ford had the highest debt to equity ratio of the three companies, ranging from 5.06 in 2018 to 5.59 in 2017, indicating that the company had a significant amount of debt compared to its equity. This could make Ford more vulnerable to economic downturns or changes in interest rates.

Overall, despite the figures for each of the three organizations being vastly different, they are all showing strong signs of stability over the five-year period of study with very little in terms of fluctuations or deviations from their established norms. Toyota clearly has the lowest ratio, Volkswagen the middle and Ford the highest.

## **5.4 Final Comparisons**

In order to rank the three organizations that were subject to the study there needs to be one more calculation done. The three organizations were assessed and analysed through a

number of financial analytical tools, all aiming to provide a wide scope of their financial health and standing. Ultimately, through chapters 5.1, 5.2, and 5.3 these analytics were compared against one another, allowing the research to examine the organizations in comparison to their respective and chosen rivals. For this purpose, a ranking system was developed. The system awards ranks of “best”, “moderate”, and “poorest”, which are evaluated by corresponding points: “best” = 3 points, “moderate” = 2 points, and “poorest” = 1 point. These points are then placed into a table filled with those categories evaluated in the 5.1, 5.2, and 5.3 chapters. The evaluation table looks like this:

<b>Categories</b>	<b>Volkswagen</b>	<b>Toyota</b>	<b>Ford</b>
Liability V + H			
Equity V + H			
Financial Performance H			
Current R			
Quick R			
ROA			
ROE			
Debt-to-Equity R			
<b>Total Points</b>			

*(Figure 42. Blank Evaluation Table. Own creation).*

Once the system was in place, the evaluation in chapters 5.1, 5.2, and 5.3 were submitted into the table. The evaluation table with the results for each category inserted then computes a final tally of “total points” where the organization with the most points is considered to be in the “best” financial health across the whole evaluation and analytics process. The completed evaluation table with the results looks like this:

<b>Categories</b>	<b>Volkswagen</b>	<b>Toyota</b>	<b>Ford</b>
Liability V + H	2	3	1
Equity V + H	2	2	2
Financial Performance H	2	3	1
Current R	3	1	2
Quick R	3	1	2
ROA	2	3	1
ROE	2	3	1
Debt-to-Equity R	3	2	1
<b>Total Points</b>	<b>19</b>	<b>18</b>	<b>11</b>

*(Figure 43. Finished Evaluation Table. Data from Chapters 5.1, 5.2, 5.3, and own computation).*

As seen above in Figure 43, the ranking system awarded the following ranking going from worst to best: 3. The Ford Motor Company, 2. The Toyota Motor Corporation, 1. The Volkswagen Group. Please note that the second category “Equity V + H” resulted in a tie, thus all organizations were awarded the same number of points.

## 6 Conclusion

The aim of the thesis was to create an elaborate financial analysis of three companies within the automotive manufacturing industry and using those analytics to compare them against one another. The analytical tools used, supported by the theory outlined in the literature review (Chapter 3), were then applied to the three organizations, Volkswagen Group, Toyota Motor Corporation, and the Ford Motor Company. These findings are presented in the practical part of the diploma thesis (Chapter 4), where they are then further analysed and elaborated on. These findings are subsequently used in the results and discussion chapter (Chapter 5), where the results are compared against one another with the final aim to provide a last analysis of their financial standings in comparison with their global competitors.

Based on the results and discussion presented in chapter 5, it can be concluded that there are significant differences in the financial positions of Volkswagen Group, Toyota Motor Corporation, and Ford Motor Company. The vertical and horizontal analysis of liquidity and equity indicates that the three companies have different compositions of liabilities and equity components, which have important implications for their financial stability and growth prospects. These differences can be attributed to several factors, ranging from different accounting methods to external economic pressures.

Volkswagen and Toyota have shown similar patterns in their liquidity and equity positions, with relatively stable trends over the five-year period of study. In contrast, Ford has exhibited more volatile patterns, particularly in terms of its liquidity position. The percentage of current liabilities for Ford increased significantly in 2019 and 2020, suggesting that the company may have faced cash flow problems during those years and relied heavily on short-term debts to offset them.

The analysis of the income statements of the three companies revealed fluctuations in revenue, cost of sales, gross profit, and operating expenses. Toyota had the most stable revenue and cost of sales, while Volkswagen and Ford experienced more significant fluctuations in these categories. However, all three companies had fluctuations in their

operating expenses, and Volkswagen and Toyota had relatively stable other operating income and expenses, while Ford exhibited more significant fluctuations in this category.

The liquidity ratios presented a conclusion stating that the current ratios of Volkswagen, Toyota, and Ford have been fluctuating over the years, with Volkswagen having a relatively stable ratio, Toyota consistently having a low ratio, and Ford's ratio decreasing but still remaining above the optimal threshold. The current ratio is an important metric for evaluating a company's liquidity position and ability to pay off short-term liabilities. In contrast, Volkswagen had consistently high quick ratios, indicating better liquidity compared to Toyota and Ford, who had consistently lower quick ratios. Quick ratios suggest varying degrees of liquidity and ability to meet short-term obligations, with Volkswagen being the most liquid and Toyota being the least liquid among the three companies.

Profitability ratios yielded varying results, where the return on assets ratio is used for evaluating a company's profitability and efficiency in generating earnings from its assets. Volkswagen had the highest return on total assets in 2019, Toyota had consistent ratios across the years, and Ford had lower ratios and experienced losses in both 2019 and 2020. Additionally, the return on equity ratios of Volkswagen, Toyota, and Ford exhibited significant variations over the five-year time period, with Volkswagen having a high return on equity in 2019 that declined sharply to negative values in 2020, and Toyota maintaining a relatively stable ratio while Ford experienced a decline in subsequent years leading to negative returns. It can be assumed that the impact of the COVID-19 pandemic on the automotive industry was a significant factor in the decline of the companies' return on equity ratios in 2020. Of the three companies, Toyota had the most stable return on equity and was the only one to not record a negative return on equity ratio.

Last of the financial ratios, the stability ratio of debt-to-equity ratio is an essential financial metric that provides insight into a company's capital structure and financial risk. Volkswagen had a higher debt to equity ratio compared to Toyota, indicating that it relied more on debt to finance its operations. On the other hand, Toyota had a more

balanced capital structure, with possible a too low debt to equity ratio, where almost none of their operations are financed through debt. Ford had the highest debt to equity ratio, which suggests that it relied heavily on debt to finance its operations and may be more vulnerable to economic downturns.

Finally, the concluding analysis and evaluation of the three companies has resulted in a close comparison. Whilst the Ford Motor Company was placed several points behind the first two, Volkswagen Group beat out the Toyota Motor Corporation only by one point. It can therefore be assumed that both organizations are closely matched in their financial standings with each having their better and worse categories.

Overall, the findings of this study suggest that there are significant differences in the financial positions and performance of the three companies, which have important implications for their future prospects. The results of this study may be useful for investors, analysts, and policymakers in assessing the financial health and prospects of these companies and making informed decisions. Further research in this area may be warranted to explore the factors driving these differences and their implications for the broader economy.

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## **8 List of pictures, tables, graphs and abbreviations**

### **8.1 List of tables**

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# Appendix

## Example Balance Sheets:

### Ford Motor Company – Balance Sheet 2018

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations (Continued)

Selected Balance Sheet Information. The following tables provide supplemental balance sheet information (in millions):

	December 31, 2018			
	Company excluding Ford Credit	Ford Credit	Eliminations	Consolidated
<b>Assets</b>				
Cash and cash equivalents	\$ 7,111	\$ 9,807	\$ —	\$ 16,718
Marketable securities	15,925	1,308	—	17,233
Ford Credit finance receivables, net	—	54,363	—	54,363
Trade and other receivables, less allowances	3,698	7,497	—	11,195
Inventories	11,220	—	—	11,220
Other assets	2,567	1,363	—	3,930
Receivable from other segments	1,054	2,470	(3,524)	—
Total current assets	41,575	76,598	(3,524)	114,649
Ford Credit finance receivables, net	—	55,544	—	55,544
Net investment in operating leases	1,705	27,414	—	29,119
Net property	35,986	192	—	36,178
Equity in net assets of affiliated companies	2,595	114	—	2,709
Deferred income taxes	12,293	216	(2,097)	10,412
Other assets	6,343	1,586	—	7,929
Receivable from other segments	186	14	(180)	—
Total assets	\$ 100,663	\$ 161,678	\$ (6,801)	\$ 256,540
<b>Liabilities</b>				
Payables	\$ 20,426	\$ 1,094	\$ —	\$ 21,520
Other liabilities and deferred revenue	18,868	1,688	—	20,556
Automotive debt payable within one year	2,314	—	—	2,314
Ford Credit debt payable within one year	—	51,179	—	51,179
Payable to other segments	3,524	—	(3,524)	—
Total current liabilities	45,132	53,961	(3,524)	95,569
Other liabilities and deferred revenue	22,491	1,097	—	23,588
Automotive long-term debt	11,233	—	—	11,233
Ford Credit long-term debt	—	88,887	—	88,887
Other long-term debt	600	—	—	600
Deferred income taxes	99	2,595	(2,097)	597
Payable to other segments	17	163	(180)	—
Total liabilities	\$ 79,672	\$ 146,703	\$ (6,801)	\$ 220,474

# Toyota Motor Corporation – Balance Sheet 2020

TOYOTA MOTOR CORPORATION FY2020 Financial Summary

## 3. Consolidated Financial Statements

### (1) Consolidated Balance Sheets

(Yen in millions)

	FY2019 (March 31, 2019)	FY2020 (March 31, 2020)	Increase (Decrease)
<b>Assets</b>			
Current assets:			
Cash and cash equivalents	3,574,704	4,190,518	615,814
Time deposits	1,128,352	828,220	(298,132)
Marketable securities	1,127,160	878,731	(448,429)
Trade accounts and notes receivable, less allowance for doubtful accounts of ¥16,370 million at March 31, 2019 and ¥23,944 million at March 31, 2020	2,372,734	2,094,894	(277,840)
Finance receivables, net	6,647,771	6,614,171	(33,600)
Other receivables	568,156	564,854	(3,302)
Inventories	2,658,398	2,434,918	(221,478)
Prepaid expenses and other current assets	805,964	1,236,225	430,261
Total current assets	18,879,237	18,642,531	(236,706)
Noncurrent finance receivables, net	10,281,118	10,423,858	142,740
Investments and other assets:			
Marketable securities and other securities investments	7,479,926	7,348,651	(131,275)
Affiliated companies	3,313,723	4,123,453	809,730
Employees receivables	21,683	21,484	(199)
Other	1,275,768	1,518,934	243,166
Total investments and other assets	12,091,100	13,012,522	921,422
Property, plant and equipment:			
Land	1,386,308	1,346,988	(39,320)
Buildings	4,802,175	4,730,783	(71,392)
Machinery and equipment	11,857,425	11,939,121	81,696
Vehicles and equipment on operating leases	6,139,163	5,929,233	(209,930)
Construction in progress	651,713	510,963	(140,750)
Total property, plant and equipment, at cost	24,836,784	24,457,088	(379,696)
Less – Accumulated depreciation	(14,151,290)	(13,855,563)	295,727
Total property, plant and equipment, net	10,685,494	10,601,525	(83,969)
<b>Total assets</b>	<b>51,836,949</b>	<b>52,660,436</b>	<b>743,487</b>

(Yen in millions)

	FY2019 (March 31, 2019)	FY2020 (March 31, 2020)	Increase (Decrease)
<b>Liabilities</b>			
<b>Current liabilities:</b>			
Short-term borrowings	5,344,973	5,286,026	(58,947)
Current portion of long-term debt	4,254,260	4,574,045	319,785
Accounts payable	2,645,984	2,434,180	(211,804)
Other payables	1,102,802	1,020,270	(82,532)
Accrued expenses	3,222,446	2,926,052	(296,394)
Income taxes payable	320,998	218,117	(102,881)
Other current liabilities	1,335,475	1,443,887	108,212
<b>Total current liabilities</b>	<b>18,226,938</b>	<b>17,902,377</b>	<b>(324,561)</b>
<b>Long-term liabilities:</b>			
Long-term debt	10,560,945	10,692,898	141,953
Accrued pension and severance costs	963,406	978,626	15,220
Deferred income taxes	1,014,851	1,043,169	28,318
Other long-term liabilities	815,599	821,515	206,916
<b>Total long-term liabilities</b>	<b>13,144,801</b>	<b>13,536,208</b>	<b>391,407</b>
<b>Total liabilities</b>	<b>31,371,739</b>	<b>31,438,585</b>	<b>66,846</b>
<b>Mezzanine equity</b>			
Model AA Class Shares, no par value, authorized: 150,000,000 shares at March 31, 2019 and March 31, 2020 issued: 47,100,000 shares at March 31, 2019 and March 31, 2020	498,073	504,169	6,096
<b>Shareholders' equity</b>			
<b>Toyota Motor Corporation shareholders' equity:</b>			
Common stock, no par value, authorized: 10,000,000,000 shares at March 31, 2019 and March 31, 2020 issued: 3,262,997,492 shares at March 31, 2019 and March 31, 2020	397,050	397,050	—
Additional paid-in capital	487,162	489,334	2,172
Retained earnings	21,987,515	23,427,613	1,440,098
Accumulated other comprehensive income (loss)	(916,650)	(1,166,273)	(249,623)
Treasury stock, at cost, 430,558,325 shares at March 31, 2019 and 498,844,960 shares at March 31, 2020	(2,606,925)	(3,087,106)	(480,181)
<b>Total Toyota Motor Corporation shareholders'   equity</b>	<b>19,348,152</b>	<b>20,060,618</b>	<b>712,466</b>
Noncontrolling interests	718,985	677,064	(41,921)
<b>Total shareholders' equity</b>	<b>20,067,137</b>	<b>20,737,682</b>	<b>670,545</b>
Commitments and contingencies			
<b>Total liabilities, mezzanine equity and shareholders'   equity</b>	<b>51,936,949</b>	<b>52,680,436</b>	<b>743,487</b>

Note: The total number of authorized shares for common stock and Model AA Class Shares is 10,000,000,000 shares.



# Balance Sheet

of the Volkswagen Group as of December 31, 2019

€ million	Note	Dec. 31, 2019	Dec. 31, 2018
<b>Assets</b>			
<b>Noncurrent assets</b>			
Intangible assets	12	66,214	64,613
Property, plant and equipment	13, 34	66,152	57,690
Lease assets	14, 34	48,938	43,545
Investment property	14	538	496
Equity-accounted investments	15	8,169	8,434
Other equity investments	15	1,902	1,474
Financial services receivables	16	86,973	78,692
Other financial assets	17	5,553	6,521
Other receivables	18	2,722	2,608
Tax receivables	19	341	476
Deferred tax assets	19	13,106	10,131
		<b>300,608</b>	<b>274,620</b>
<b>Current assets</b>			
Inventories	20	46,742	45,745
Trade receivables	21	17,941	17,888
Financial services receivables	16	58,615	54,216
Other financial assets	17	12,216	11,586
Other receivables	18	7,272	6,203
Tax receivables	19	1,190	1,875
Marketable securities	22	16,769	17,080
Cash, cash equivalents and time deposits	23	25,923	28,938
Assets held for sale		795	-
		<b>187,463</b>	<b>183,536</b>
<b>Total assets</b>		<b>488,071</b>	<b>458,156</b>

€ million	Note	Dec. 31, 2019	Dec. 31, 2018
<b>Equity and Liabilities</b>			
<b>Equity</b>	<b>24</b>		
Subscribed capital		1,283	1,283
Capital reserve		14,551	14,551
Retained earnings		96,929	91,105
Other reserves		-3,646	-2,417
Equity attributable to Volkswagen AG hybrid capital investors		12,663	12,596
Equity attributable to Volkswagen AG shareholders and hybrid capital investors		121,781	117,117
Noncontrolling interests		1,870	225
		<b>123,651</b>	<b>117,342</b>
<b>Noncurrent liabilities</b>			
Financial liabilities	25	113,556	101,126
Other financial liabilities	26	4,499	3,219
Other liabilities	27	7,271	6,448
Deferred tax liabilities	28	5,007	5,030
Provisions for pensions	29	41,389	33,097
Provisions for taxes	28	2,991	3,047
Other provisions	30	21,783	20,879
		<b>196,497</b>	<b>172,846</b>
<b>Current liabilities</b>			
Put options and compensation rights granted to noncontrolling interest shareholders	31	-	1,853
Financial liabilities	25	87,912	89,757
Trade payables	32	22,745	23,607
Tax payables	28	408	456
Other financial liabilities	26	10,858	9,416
Other liabilities	27	19,320	17,593
Provisions for taxes	28	1,876	1,412
Other provisions	30	24,434	23,874
Liabilities associated with assets held for sale		370	-
		<b>167,924</b>	<b>167,968</b>
<b>Total equity and liabilities</b>		<b>488,071</b>	<b>458,156</b>

## Example Income Statements:

### Ford Motor Company – Income Statement 2018

#### 2018 SUPPLEMENTAL FINANCIAL INFORMATION

The tables below provide supplemental consolidating financial information and other financial information. Company excluding Ford Credit includes our Automotive and Mobility reportable segments, Corporate Other, Interest on Debt, and Special Items. Eliminations, where presented, primarily represent eliminations of intersegment transactions and deferred tax netting.

*Selected Income Statement Information.* The following table provides supplemental income statement information (in millions):

For the year ended December 31, 2018						
	Company excluding Ford Credit				Ford Credit	Consolidated
	Automotive	Mobility	Other (a)	Subtotal		
Revenues	\$ 148,284	\$ 26	\$ —	\$ 148,320	\$ 12,018	\$ 160,338
Total costs and expenses	145,691	758	1,223	147,672	9,463	157,135
Interest expense on Automotive debt	—	—	1,171	1,171	—	1,171
Interest expense on Other debt	—	—	57	57	—	57
Other income/(loss), net	2,724	58	(579)	2,203	44	2,247
Equity in net income of affiliated companies	95	—	—	95	28	123
Income/(loss) before income taxes	5,422	(674)	(3,030)	1,718	2,627	4,345
Provision for/(Benefit from) income taxes	705	(182)	(298)	247	403	650
Net income/(Loss)	4,717	(512)	(2,734)	1,471	2,224	3,695
Less: Income/(Loss) attributable to noncontrolling interests	18	—	—	18	—	18
Net income/(Loss) attributable to Ford Motor Company	\$ 4,699	\$ (512)	\$ (2,734)	\$ 1,453	\$ 2,224	\$ 3,677

(a) Other includes Corporate Other, Interest on Debt, and Special Items

# Toyota Motor Corporation – Income Statement 2020

TOYOTA MOTOR CORPORATION FY2020 Financial Summary

## (2) Consolidated Statements of Income and Consolidated Statements of Comprehensive Income

### Consolidated Statements of Income

(Yen in millions)

	FY2019 (For the year ended March 31, 2019)	FY2020 (For the year ended March 31, 2020)	Increase (Decrease)
Net revenues:			
Sales of products	28,105,338	27,759,749	(345,589)
Financing operations	2,120,343	2,170,243	49,900
Total net revenues	30,225,681	29,929,992	(295,689)
Costs and expenses:			
Cost of products sold	23,389,495	23,142,744	(246,751)
Cost of financing operations	1,392,290	1,379,620	(12,670)
Selling, general and administrative	2,976,351	2,964,759	(11,592)
Total costs and expenses	27,758,136	27,487,123	(271,013)
Operating income	2,467,545	2,442,869	(24,676)
Other income (expense):			
Interest and dividend income	225,495	232,870	7,375
Interest expense	(28,078)	(32,217)	(4,139)
Foreign exchange gain (loss), net	12,400	(79,020)	(91,420)
Unrealized gains (losses) on equity securities	(341,054)	(24,800)	316,454
Other income (loss), net	(50,843)	14,705	65,548
Total other income (expense)	(182,080)	111,738	293,818
Income before income taxes and equity in earnings of affiliated companies	2,285,465	2,554,607	269,142
Provision for income taxes	659,944	683,430	23,486
Equity in earnings of affiliated companies	360,066	271,152	(88,914)
Net income	1,965,587	2,142,329	156,742
Less – Net income attributable to noncontrolling interests	(102,714)	(66,146)	36,568
Net income attributable to Toyota Motor Corporation	1,862,873	2,076,183	193,310

Note: Net income attributable to common shareholders for the fiscal year ended March 31, 2020 and 2019 is 2,058,899 million yen and 1,868,085 million yen, respectively, which is derived by deducting dividend and accretion to Model AA Class Shares of 17,284 million yen and 14,788 million yen, respectively, from Net income attributable to Toyota Motor Corporation.

(Yen)

Net income attributable to Toyota Motor Corporation per common share			
Basic	650.55	735.61	85.06
Diluted	645.11	729.50	84.39

## Consolidated Statements of Comprehensive Income

(Yen in millions)

	FY2019 (For the year ended March 31, 2019)	FY2020 (For the year ended March 31, 2020)	Increase (Decrease)
Net income	1,985,587	2,142,329	156,742
Other comprehensive income (loss), net of tax			
Foreign currency translation adjustments	27,016	(333,854)	(360,870)
Unrealized gains (losses) on securities	(21,165)	118,363	139,528
Pension liability adjustments	(54,836)	(60,196)	(5,360)
Total other comprehensive income (loss)	(48,985)	(275,687)	(226,702)
Comprehensive income	1,936,602	1,866,642	(69,960)
Less – Comprehensive income attributable to noncontrolling interests	(98,458)	(45,878)	50,580
Comprehensive income attributable to Toyota Motor Corporation	1,840,144	1,820,764	(19,380)

# Statement of Comprehensive Income

Changes in comprehensive income for the period January 1 to December 31, 2018

€ million	Total	Equity attributable to Volkswagen AG shareholders	Equity attributable to Volkswagen AG hybrid capital investors	Equity attributable to noncontrolling interests
<b>Earnings after tax</b>	<b>12,153</b>	<b>11,827</b>	<b>309</b>	<b>17</b>
Pension plan remeasurements recognized in other comprehensive income				
Pension plan remeasurements recognized in other comprehensive income, before tax	144	145	-	-3
Deferred taxes relating to pension plan remeasurements recognized in other comprehensive income	-88	-88	-	0
Pension plan remeasurements recognized in other comprehensive income, net of tax	56	57	-	-3
Fair Value valuation of other participations and securities (equity instruments) that will not be reclassified to profit or loss, net of tax	19	19	-	-
Share of other comprehensive income of equity-accounted investments that will not be reclassified to profit or loss, net of tax	34	34	-	-
<b>Items that will not be reclassified to profit or loss</b>	<b>110</b>	<b>110</b>	<b>-</b>	<b>-3</b>
Exchange differences on translating foreign operations				
Gains/losses on currency translation recognized in other comprehensive income	-406	-406	-	1
Transferred to profit or loss	61	61	-	0
Exchange differences on translating foreign operations, before tax	-345	-345	-	3
Deferred taxes relating to exchange differences on translating foreign operations	-8	-8	-	-
Exchange differences on translating foreign operations, net of tax	-353	-353	-	3
Hedging				
Fair value changes recognized in other comprehensive income (OCI I)	-568	-568	-	0
Transferred to profit or loss (OCI I)	-1,939	-1,939	-	0
Cash flow hedges (OCI I), before tax	-2,506	-2,506	-	0
Deferred taxes relating to cash flow hedges (OCI I)	715	715	-	0
Cash flow hedges (OCI I), net of tax	-1,792	-1,792	-	0
Fair value changes recognized in other comprehensive income (OCI II)	-1,360	-1,360	-	-
Transferred to profit or loss (OCI II)	377	377	-	-
Cash flow hedges (OCI II), before tax	-983	-983	-	-
Deferred taxes relating to cash flow hedges (OCI II)	291	291	-	-
Cash flow hedges (OCI II), net of tax	-692	-692	-	-
Fair value valuation of securities and receivables (debt instruments) that may be reclassified to profit or loss				
Fair value changes recognized in other comprehensive income	-5	-5	-	-
Transferred to profit or loss	1	1	-	-
Fair value valuation of securities and receivables (debt instruments) that may be reclassified to profit or loss, before tax	-4	-4	-	-
Deferred taxes relating to fair value valuation of securities and receivables (debt instruments) recognized in other comprehensive income	1	1	-	0
Fair value valuation of securities and receivables (debt instruments) that may be reclassified to profit or loss, net of tax	-3	-3	-	0
Share of other comprehensive income of equity-accounted investments that may be reclassified to profit or loss, net of tax	28	28	-	-
<b>Items that may be reclassified to profit or loss</b>	<b>-2,811</b>	<b>-2,811</b>	<b>-</b>	<b>0</b>
Other comprehensive income, before tax	-3,612	-3,612	-	0
Deferred taxes relating to other comprehensive income	911	911	-	0
<b>Other comprehensive income, net of tax</b>	<b>-2,701</b>	<b>-2,701</b>	<b>-</b>	<b>0</b>
<b>Total comprehensive income</b>	<b>9,452</b>	<b>9,126</b>	<b>309</b>	<b>17</b>

Changes in comprehensive income for the period January 1 to December 31, 2019

€ million	Total	Equity attributable to Volkswagen AG shareholders	Equity attributable to Volkswagen AG hybrid capital investors	Equity attributable to noncontrolling interests
<b>Earnings after tax</b>	<b>14,029</b>	<b>13,346</b>	<b>540</b>	<b>143</b>
Pension plan remeasurements recognized in other comprehensive income				
Pension plan remeasurements recognized in other comprehensive income, before tax	-8,011	-7,993	-	-18
Deferred taxes relating to pension plan remeasurements recognized in other comprehensive income	2,429	2,423	-	6
Pension plan remeasurements recognized in other comprehensive income, net of tax	-5,582	-5,570	-	-11
Fair Value valuation of other participations and securities (equity instruments) that will not be reclassified to profit or loss, net of tax	-27	-26	-	-1
Share of other comprehensive income of equity-accounted investments that will not be reclassified to profit or loss, net of tax	-3	-1	-	-2
<b>Items that will not be reclassified to profit or loss</b>	<b>-5,612</b>	<b>-5,597</b>	<b>-</b>	<b>-15</b>
Exchange differences on translating foreign operations				
Gains/losses on currency translation recognized in other comprehensive income	572	565	-	7
Transferred to profit or loss	2	2	-	0
Exchange differences on translating foreign operations, before tax	574	567	-	7
Deferred taxes relating to exchange differences on translating foreign operations	12	12	-	-
Exchange differences on translating foreign operations, net of tax	586	579	-	7
Hedging				
Fair value changes recognized in other comprehensive income (OCI I)	-1,622	-1,618	-	-4
Transferred to profit or loss (OCI I)	-782	-784	-	2
Cash flow hedges (OCI I), before tax	-2,404	-2,402	-	-2
Deferred taxes relating to cash flow hedges (OCI I)	708	707	-	1
Cash flow hedges (OCI I), net of tax	-1,697	-1,695	-	-1
Fair value changes recognized in other comprehensive income (OCI II)	-1,490	-1,490	-	0
Transferred to profit or loss (OCI II)	997	996	-	1
Cash flow hedges (OCI II), before tax	-493	-494	-	1
Deferred taxes relating to cash flow hedges (OCI II)	146	146	-	0
Cash flow hedges (OCI II), net of tax	-347	-348	-	1
Fair value valuation of securities and receivables (debt instruments) that may be reclassified to profit or loss				
Fair value changes recognized in other comprehensive income	23	23	-	-
Transferred to profit or loss	1	1	-	-
Fair value valuation of securities and receivables (debt instruments) that may be reclassified to profit or loss, before tax	24	24	-	-
Deferred taxes relating to fair value valuation of securities and receivables (debt instruments) recognized in other comprehensive income	-7	-7	-	-
Fair value valuation of securities and receivables (debt instruments) that may be reclassified to profit or loss, net of tax	17	17	-	-
Share of other comprehensive income of equity-accounted investments that may be reclassified to profit or loss, net of tax	78	77	-	1
<b>Items that may be reclassified to profit or loss</b>	<b>-1,368</b>	<b>-1,370</b>	<b>-</b>	<b>7</b>
Other comprehensive income, before tax	-10,263	-10,248	-	-14
Deferred taxes relating to other comprehensive income	3,288	3,282	-	7
<b>Other comprehensive income, net of tax</b>	<b>-6,974</b>	<b>-6,967</b>	<b>-</b>	<b>-8</b>
<b>Total comprehensive income</b>	<b>7,055</b>	<b>6,379</b>	<b>540</b>	<b>136</b>