# Business Risk Analysis of Ferrari, Mercedes and Toyota in The Automotive Industry

Ruobing Li*

Faculty of Business and Economics, University of Melbourne, Melbourne, Australia

*Corresponding author: ruobing2@student.unimelb.edu.au

**Abstract.** As one of the largest industries in the world, the automotive industry is booming in recent years. Recently, engine fuels have also undergone a change from conventional fuels to electric vehicles. With the emergence of electronic vehicles and the deterioration of the environment, traditional car companies are facing critical challenges. The purpose of this paper is to analyze which is the better investment for Ferrari, Mercedes and Toyota from various financial data such as Equity Beta and Assets Beta. This paper also compares different financial data of the three companies to explain the business risks. Then, two sets of comparisons between luxury cars and commercial cars, electric cars and fuel cars are applied to argue the reasons for the business risk for each company. From the data, it can be seen that Ferrari has the highest business risk, which means that they are more sensitive to market fluctuations, followed by Mercedes. On the contrary, Toyota's share price fluctuations are stable throughout the year. Finally, this paper provides investors with advice on investing in the automotive industry from their perspective, to help them make savvy decisions whenever possible.

**Keywords:** Automotive industry, Business risk, Investment, Electric cars.

## 1. Introduction

### 1.1 Background

The automobile is one of the largest industries in the world. As technology advances, the rate of car purchase and ownership per capita increases. In many developed countries, such as the UK and Australia, 53% of households had access to two or more motor vehicles. Different models that represent different levels of consumption have gradually emerged, such as luxury cars and commercial vehicles. For example, Ferrari, which is mainly customized, is usually purchased by the upper class. On the contrary, Toyota is a mass brand that most people can afford. Recently, engine fuels have also undergone a change from conventional fuels to electric vehicles. With electronic cars springing out and a worse environment, conventional vehicle companies are facing critical challenges. Many companies in the automotive industry are scrambling to increase their investment in electric vehicles.

### 1.2 Related research

Fujiwara and Nagasawa empirically illustrate that luxury brand strategies can be adapted to food brands along with the manner in which luxury brands have aimed to set themselves apart from mass brands in order to achieve their status as luxury brands [1]. Moreover, they also mentioned the term "Bandwagon Effect" named by Leibenstein to describe the group conformity effect, in which a brand's effectiveness rises as the proportion of members of a reference group who own the brand increases [1]. On the other hand, Yamawaki collected the data sample and studied the intensity of response to entry of automobiles located in Europe and the U.S., showing that automobiles in Europe respond significantly to the market by adjusting the price tags of their products when their currencies appreciate in order to compete with their Japanese competitors [2]. The energy storage systems of electronic cars in Germany and Italy and the propulsion technology of electric motors was studied by Guarnieri et al. based on economic, environmental and social issues to prove that the rise of electric cars would be a great innovation [3]. Takeishi and Fujimoto demonstrated the importance of medium and long-term technological innovation by introducing the concept of "modularization" [4]. The

urgent need to protect the environment has accelerated the competition for alternative sources of engine power in the automotive industry [4]. Ricci and Smyth used a quantitative approach to show that people usually get their preferences by considering a single attribute of a tuple in the automotive industry. More people prefer and buy a Ferrari over a Toyota when they can afford it, even if the Toyota has a preferable price [5].

### 1.3 Objective

This study aims to analyze whether conventional vehicle companies are worthy to invest in. Three companies, Ferrari, Mercedes, and Toyota which major in different groups of customers are chosen to present the conventional vehicles market.

## 2. Description of the listed companies

The Ferrari company is an Italian manufacturer of supercars whose primary target market is extremely wealthy individuals. All its products are customized and produced in Italy. Ferrari offered hybrid cars last year and plans to offer SUVs soon [6]. This measure may substantially increase the company's sales in the future. In addition, Ferrari plans to achieve carbon neutrality by 2030 [7]. In 2021, Ferrari had double-digit growth in all its main financial indicators [6]. They also got some achievements in championships last year.

In terms of Mercedes, it is a German luxury and commercial vehicle automotive brand established in 1926, specializing in the production of passenger cars and vans. It means that Mercedes is targeted primarily at wealthy individuals and companies. According to its annual report, 2.3 million cars or vans were purchased in 2021 [8]. In 2025, Mercedes plans to increase the sale of electronic vehicles to 50% of its total revenue [8]. As of the end of this decade, Mercedes intends to switch to a completely electric vehicle fleet. As a result, Mercedes has paid close attention to the development of technology related to electric vehicles.

Toyota is a Japanese multinational automotive manufacturer. Besides producing cars, Toyota also produces and sells car and electronic components. Many businesses and factories in the Toyota Corporation form an ecosystem of companies. Toyota was negatively affected by COVID-19 last year, as its net sales decreased by 2%, which is approximately 392.2 million dollars [9]. The net operating profit in the Chinese automobile market decreased by 72% or about 92.5 million dollars [9]. However, the Asian economy is experiencing recovery, and its net sales remain at 16.193 billion dollars [9]. Meanwhile, its net sales of electronic parts and other businesses increased by approximately 455.84 million [9].

## 3. Data Analysis

As shown in Table 1, some key financial data are calculated for Ferrari, Mercedes and Toyota. These data will be used to demonstrate the different response intensities of the three companies to market fluctuations, represented by Equity beta Business risk and Weighted average cost of capital (WACC).

**Table 1.** Financial data from Ferrari, Mercedes and Toyota

| | Ferrari | Mercedes | Toyota |
|---|---|---|---|
| Market value of equity (millions USD) | 36383.88 | 59353.63 | 219627.01 |
| Book value of debt (millions USD) | 3143.27 | 123542.69 | 229756.57 |
| Total Equity (million USD) | 2942.00 | 115290.00 | 223452.00 |
| Total Debt (millions USD) | 2568.00 | 85063.00 | 221340.00 |
| Leverage and debt-to-equity ratio | 1.14 | 1.36 | 1.01 |
| Marginal corporate tax rate (2021) | 29.74% | 29.94% | 27.81% |
| risk-free rate | 3.63% | 1.45% | 0.23% |
| market risk premium | 6.00% | 6.00% | 6.00% |
| Equity beta | 0.82 | 1.4 | 0.43 |
| Expected cost of equity capital (rE) | 8.55% | 9.85% | 2.81% |
| Expected cost of debt capital (rD) | 1.38% | 0.35% | 0.12% |
| Weighted average cost of capital (WACC) | 7.95% | 3.36% | 1.41% |
| Business risk (βA) | 0.77 | 0.53 | 0.24 |
| Business risk (βA) * | 0.46 | 0.72 | 0.25 |
| all-equity expected return on assets (rA) | 0.08 | 0.04 | 0.017 |
| D/A: debt/ market capitalisation + debt (percent) | 0.08 | 0.70 | 0.51 |

Since the market is the benchmark, the beta of the market is always 1.

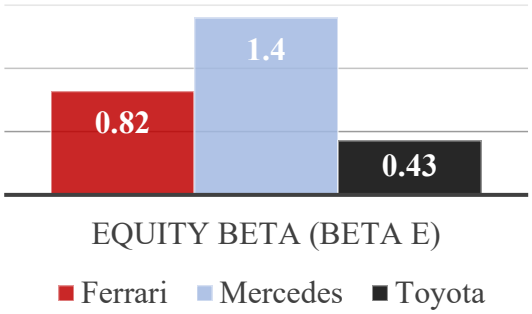


**Fig 1.** Equity Beta from Ferrari, Mercedes and Toyota

According to Figure 1, the equity beta of Ferrari and Toyota are 0.82 and 0.43 respectively, both is less than 1. It means that the stock of these two companies will rise less than the market when the market rises. In other words, the volatility of these two stocks is lower than the volatility of the whole market. In contrast, Mercedes has an equity beta of about 1.4, which is greater than 1, thus Mercedes has higher volatility than the market volatility.

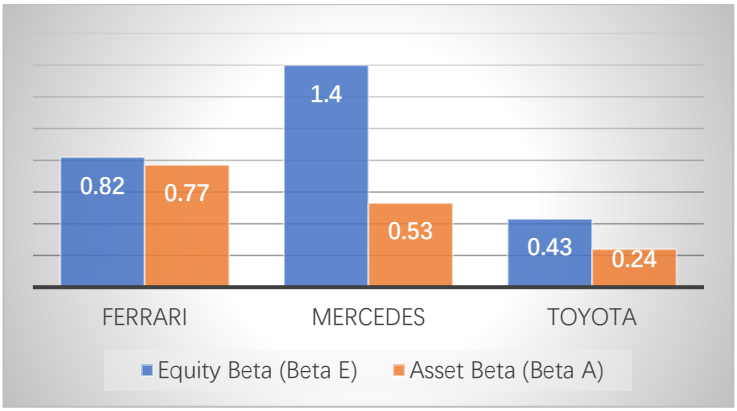


**Fig. 2** Equity Beta and Asset Beta from Ferrari, Mercedes and Toyota

Equity beta is also known as leveraged beta, which reflects the fact that the company includes financial risk associated with the level of debt. If avoid debt-related risk and focus mainly on equity risk, it needs to calculate Beta A, also called unleveraged beta or asset beta (Figure 2). **From this figure,** it is easy to find that all three companies have a lower beta A compared to beta E, indicating that none of the three companies has negative or zero net debt.

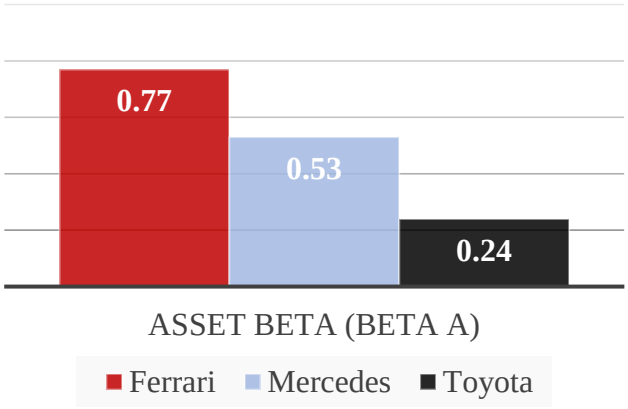


**Fig. 3** Assets Beta and Asset Beta from Ferrari, Mercedes and Toyota

It can be seen that Toyota's beta A is still the lowest of the three companies at about 0.24. The main change is that Mercedes has the highest beta E, but Ferrari does have the highest beta A around 0.77, which is more significant than Mercedes' beta A value (0.53). Mercedes' beta A value 'reduces' more from its beta E after calculation compared to the other two companies. It is potentially due to Mercedes' higher debt-to-equity ratio, around 1.51 as shown in Figure 3, affecting the company's leverage, much higher than that of Ferrari and Toyota. Hence, Mercedes has a significantly larger degree of debt, and the financial risk that comes with debt increases the company's leverage beta to a greater extent.

Overall, all three companies have high debt-to-equity ratios, so their financial risk is still a concern. For Toyota, both equity beta and asset beta are relatively low, whereas Mercedes' beta E and beta A are higher, which may imply that Mercedes has a more considerable investment risk.

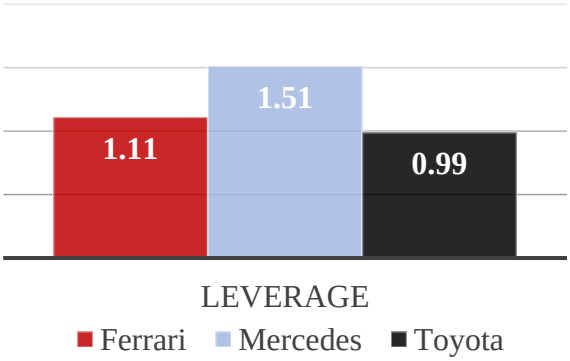


**Fig. 4** Leverage from Ferrari, Mercedes and Toyota

As a result, Ferrari reacts more strongly to market fluctuations, while Toyota does not respond much to them. For Ferrari, it will spend a majority of its $13 billion in capital expenditures this decade to help develop battery-powered electric vehicles. Ferrari's R&D spending is already higher than its rivals at about 20 per cent of its sales. In contrast, its sales volumes are much lower (Figure 4). to fund expensive electrification programs, Mercedes pushes luxury car lines that reap extravagant profits through the pandemic. For Toyota, it plans to sell $3.5 million in electric vehicles a year by 2030. However, it is still hedging its risks by focusing on hybrids that combine electricity with traditional internal combustion engines.

# 4. Discussion

## 4.1 Luxury Vehicles vs Commercial Vehicles

According to the information of Ferrari, Mercedes, and Toyota, these three companies represent typical companies that divide the automotive industry into three parts by the customer base they serve. As Table 1 represents, Ferrari has the highest asset beta and business risk. According to the charts below, A clear pattern can be seen in the stock value fluctuation of Ferrari, followed by Mercedes and Toyota.

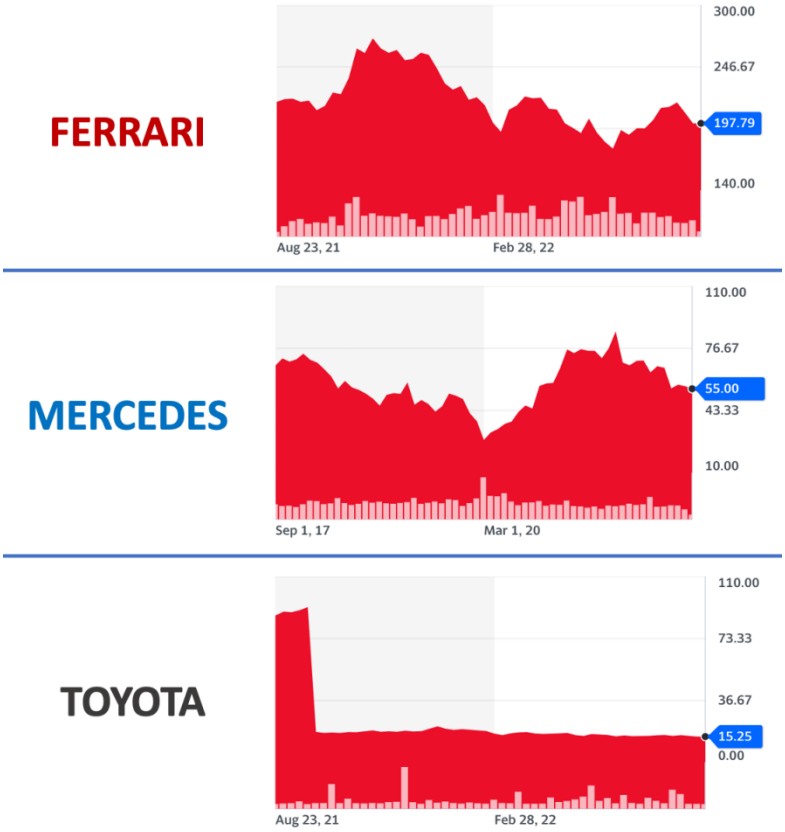


**Fig. 4** Stoke Value from Ferrari, Mercedes and Toyota

Assets Beta compares an unleveraged company's risk to the market's risk. As Toyota's stock value is very stable, why does Ferrari react to market fluctuations most dramatically? There is no doubt that the Ferrari is a symbol of luxury. Customisation is a hallmark of Ferrari cars; even the mass-produced models are not in large numbers, which contributes to high purchase restrictions. In this manner, Ferrari buyers are automatically screened as wealthy and socially privileged individuals. The Mercedes brand relies on the disposable income of middle-class consumers. The price indicates that it can only be afforded by people from the upper middle class. On the other hand, Toyota is a mass-market and commercial vehicle. As a transportation device, Toyota vehicles are more affordable and practical for the public. Therefore, the number of people who purchase it tends to be higher than that of Ferrari and Mercedes. In the event of a downturn in the economy, I would like to emphasize that Toyota is not considerably affected, as can be seen from the table that its market value is very stable. This may be due to the lower cost of Toyota vehicles compared to Ferraris and Mercedes. A reduction in income will result in a reduction in the amount of money available for the purchase of high-end and mid-range cars. Hence, a Toyota vehicle would be a more suitable choice during a recession than its counterparts if a family or company needed a car as a necessity.

After all, all three companies' cars can be used to transport people from one place to another. As a result, Ferrari reacts more strongly to market fluctuations, while Toyota does not react much to them.

### 4.2 Electric Cars vs Diesel Cars

Another possible reason could be the electric car revolution, where three companies plan to invest an enormous amount of money. For Ferrari, it will spend a majority of its $13 billion in capital expenditures this decade to help develop battery-powered electric vehicles [11]. However, the first fully electric model won't arrive until 2025, and even by 2030, the company expects hybrid and fully fossil-fuelled vehicles to represent 60% of its model line-up [11]. Therefore, there's a risk that faster-moving rivals may redefine what a luxury electric car looks like. In addition, the lift of research and development spending could impair profit growth. Ferrari's R&D spending is already higher than its rivals at about 20 per cent of its sales, while its sales volumes are much lower.

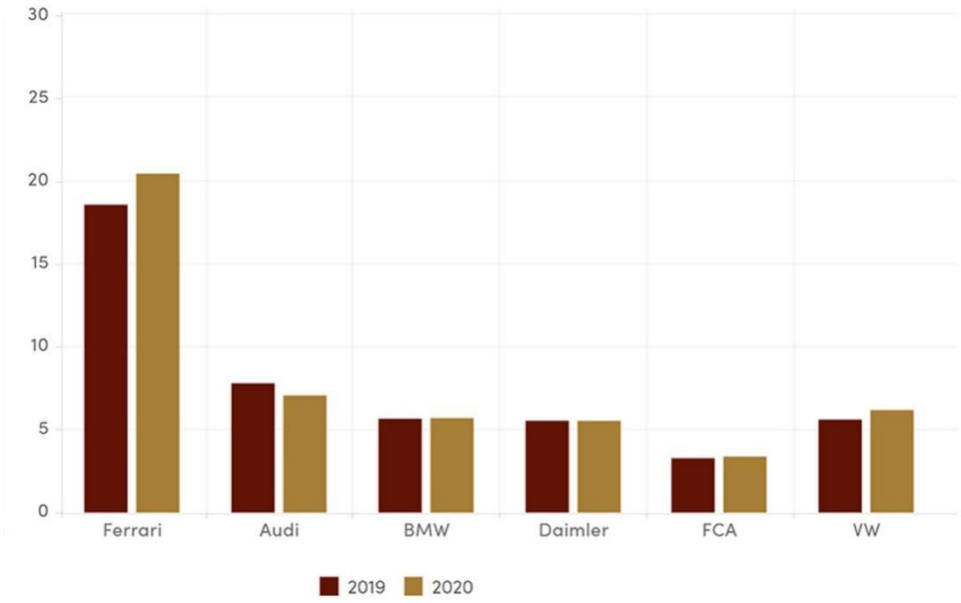


**Fig. 5** Automotive Companies R&D Expenditure as A % of Net Revenue (2019-2020)

For Mercedes, it plans to invest more than $47 billion, between 2022 and 2030 in battery electric vehicles [12]. All newly launched vehicle platforms will be electric-only from 2025 [12]. Similarly, its profit growth would be dampened by spending on new technologies. The "electric-only" plan could also impose risk on Mercedes because the success of the development and sale of an electric car is not guaranteed [13]. On the other hand, to fund expensive electrification programs, Mercedes pushes luxury car lines that reap extravagant profits through the pandemic [8]. However, relying on predicting that the number of wealthy could backfire if the economy shrinks.

For Toyota, it plans to sell $3.5 million in electric vehicles a year by 2030, but it is still hedging its risks by focusing on hybrids that combine electricity with traditional internal combustion engines [14]. The strategy of slowing down and not going 'all in' on electric cars comes with its own set of risks because while Toyota is hedging its bets, its competitors are not. If the other major automakers are right, electric vehicles will account for roughly half of all sales by 2030.

## 5. Conclusion

The study analyzes the difference in business risk and beta between the three companies in terms of the different types of vehicles and the percentage of investment in electric cars. To conclude, Ferrari has the highest business risk and assets beta, which indicates that it is the most reactive to market fluctuations. The next two reasons are presented. By comparing the nature of Ferrari and Toyota's cars and the different customer groups they serve, Ferrari's customers are usually an upper-class group whose preference for cars reacts very sharply to economic fluctuations. In a downturn of the economy, they will choose Mercedes and Toyota, with the same mobility features and cheaper.

Toyota, on the other hand, serves the broadest group of consumers and will be taken into account by any family that considers a car a necessity. Another possible reason is the electric car revolution, it is shown that Ferrari as well has invested more in R&D spending than its competitors but has not gained the desired sales. For Mercedes, it has also invested a lot of capital in electric cars. This plan also poses a risk for Mercedes, as the success of electric car development and sales is not guaranteed, and sales will drop significantly when the economy shrinks. Instead, Toyota decided to slow down and not go "all in" on its electric car strategy. While Toyota is hedging its bets, its competitors are not, thus creating the lowest risk factor of the three companies. As an investor seeking high risk and high return with a shrewd investment vision, Ferrari is undoubtedly the best choice. On the contrary, Toyota is the least risky choice with the most stable share price.

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