RACING FOR RETURNS: HOW FORMULA ONE VICTORIES DRIVE TITLE SPONSOR STOCK PRICES

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ABSTRACT

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The FIA Formula One World Championship (F1) stands as the pinnacle of motorsports and a global platform for innovation and engineering excellence. Beyond the racetrack, F1's commercial dynamics, particularly its sponsorship ecosystem, have become a critical area of research. This thesis examines the impact of F1 Grand Prix victories on the stock prices of title sponsor companies, utilizing event study methodology. The study focuses on 73 races from the 2016–2019 seasons, analysing short-term abnormal stock price reactions to race victories, championship wins, and winning streaks by Mercedes, Ferrari, and Red Bull.

Key findings reveal that race victories generate varying financial impacts on sponsors, with Ferrari and Red Bull achieving significant abnormal returns, while Mercedes exhibited negligible market effects due to its consistent dominance. The results align with previous research and the semi-strong form of the Efficient Market Hypothesis, demonstrating that predictable outcomes result in diminished investor reactions. The results of winning streaks and championship-clinching races remained muted, and further emphasized the importance of unpredictability in driving market enthusiasm.

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FIA Formula One World Championship (F1) on moottoriurheilun huipentuma, sekä globaali alusta innovaatioille. Radan ulkopuolella F1:n kaupalliset dynamiikat, erityisesti sponsorointiekosysteemi, ovat nousseet merkittäväksi tutkimusalueeksi. Tämä kandidaatintutkielma tutkii F1-osakilpailuvoittojen vaikutusta pääsponsoriyritysten osakekursseihin hyödyntämällä tapahtumatutkimusmenetelmää. Tutkimus keskittyy 2016–2019 kausien 73 osakilpailuun Mercedes-, Ferrari- ja Red Bull -tallien osalta, tutkien lyhytaikaisia poikkeamia osakekursseissa kilpailuvoittojen, mestaruuden voittamisen ja voittoputkien yhteydessä.

Keskeiset havainnot osoittavat, että kilpailuvoitot vaikuttavat sponsoreiden taloudelliseen menestykseen vaihtelevasti: Ferrari ja Red Bull saavuttivat merkittäviä poikkeavia tuottoja, kun taas Mercedesin osalta markkinareaktiot olivat vähäisiä sen jatkuvan dominoinnin vuoksi. Tulokset vastaavat aiempien tutkimusten havaintoja ja tehokkaiden markkinoiden hypoteesia, mikä osoittaa, että ennakoitavat tulokset heikentävät sijoittajien reaktioita. Voittoputkien ja mestaruuksien ratkaisevien kilpailujen tulokset pysyivät vaimeina, mikä korostaa ennakoimattomuuden merkitystä sijoittajien innostuksen herättämisessä.

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1 Introduction

FIA Formula One World Championship (from now on F1, Formula 1, or Formula One) has been the pinnacle of motorsports for over 70 years. As the highest class of single-seater racing, it is a representation of engineering brilliance, serving as a canvas for automotive innovation and technological advancement. In F1, the drivers contend for the prestigious F1 Drivers' Championship, while teams are competing for the F1 Constructors' Championship (Formula One 2024), and the season is filled with excitement and chaos. However, beyond the thrilling races, Formula 1 has become a global commercial powerhouse, with the financial implications of success extending beyond the podium. The relationship between F1 victories and the economic outcomes for the sport's sponsors, particularly title sponsors, has become an increasingly valuable area of research. This thesis examines the impact of Formula 1 race victories on the stock prices of title sponsor companies. Understanding the relationship of Formula 1 victories and the financial success of sponsors is particularly important, as corporate sponsorships in Formula 1 have become a dominant marketing strategy. Over the past 15 years alone, F1 has secured $30 billion in sponsorship funding (Sylt 2019). Given these substantial financial commitments, investigating whether a team's victory translates into positive financial outcomes for its sponsors is essential. This question is especially relevant now, as digital marketing and global brand visibility are becoming central pillars of corporate strategy, and understanding the real financial returns of sports sponsorship is more vital than ever. By studying this connection, this study intends to provide perceptions into the financial implications of sponsorship in Formula 1.

1.1 Background of the thesis

Although prior studies have explored the economic dynamics of Formula 1, including the importance of sponsorship for team success and the broader marketing benefits of association with the sport (Schredelseker & Fidahic 2011), there remains an opening in understanding how a race victory specifically affects the financial performance of title sponsor companies. Research shows that national sporting success can generate substantial economic and emotional value, impacting metrics such as brand equity and corporate

reputation (Wicker et al. 2012). Yet, little research has been made on the short-term effects of individual race victories on sponsor stock prices.

While it is generally accepted that successful teams attract more profitable sponsorships (Norouzi Seyed hossini 2024), the short-term effects of individual race victories on sponsor stock prices are understudied. Evidence from other sports contexts, such as football leagues, stresses that financial performance and athletic success are connected, with revenue streams increasing following sportive achievements (Keleş 2020). Similarly, studies have demonstrated that sponsorship in high-profile sports significantly enhances brand equity and may influence market perceptions (Bauer et al. 2005).

Formula One sponsorships range from visible branding to technical partnerships, appealing to sectors such as automotive, technology, and luxury. The rise of digital media and sustainability initiatives has further diversified sponsorship opportunities, attracting non-automotive brands and supporting environmental goals (Cornwell 2020; Öztopcu 2023). These dynamics align with findings that countries with greater economic prosperity tend to excel in international sports due to superior sports infrastructure and funding (Belli & Saraçoğlu 2021). However, the immediate financial outcomes of such investments, particularly on stock prices, lack previous empirical analysis. This thesis seeks to fill this gap by studying how Formula 1 race victories influence title sponsor stock performance using event study methodology. The study aims to provide insights into the tangible short-term financial benefits of Formula One sponsorships and their potential as a strategic marketing tool.

1.2 Research objectives

The analysis of previous literature establishes the foundation for the empirical portion of this thesis, which investigates the financial impact of Formula One race outcomes on the stock performance of constructor title sponsors. Using event study methodology, as applied in prior studies (e.g., Schredelseker & Fidahic 2011; Cornwell, Pruitt & Van Ness 2001), this thesis studies the abnormal stock price returns of title sponsors following a Grand Prix victory. It also examines the effects of winning streaks and evaluates whether the impact varies when a victory secures a driver's or constructor's championship title. Each race victory carries significant financial implications for constructors, and this study seeks to

determine whether these benefits extend to the stock market performance of their title sponsors. Given the complex nature of stock market movements, this research assesses whether Formula One race outcomes trigger measurable reactions in sponsor stock prices, contributing to a greater understanding of F1's financial influence and its relationship with sports marketing and investor sentiment. The research objective will be addressed by answering the following primary research question:

1. What effect does a victory in a Formula One Grand Prix have on the constructor's title sponsor's stock price?

Additionally, the study includes two additional sub-questions to support the primary research question, and to explore the objective in a wider context. The sub-questions are:

1. How does a winning streak influence the stock price reaction?

2. How does the stock price reaction differ depending on whether the victory secures a championship or is part of a regular race?

1.3 Limitations

The time frame for this thesis includes the Formula One races from the 2016 to 2019 seasons, totalling 73 events. This period was selected because it reflects a time when teams had largely recovered from the financial crisis, and it predates the impact of the COVID-19 pandemic, which brought significant disruptions to the sport. The analysis is limited to the race victories of Mercedes, Red Bull, and Ferrari, as they are the only teams that have secured a victory in Formula One during this period.

One of the major limitations of this research is that Red Bull, the title sponsor of Red Bull Racing (hereafter Red Bull), despite being a highly successful company, is privately owned and lacks publicly available stock market data for analysis. To address this, the study will focus on analysing Red Bull's publicly traded sponsor Totalenergies SE for 2016, which was prominent in their livery. Red Bull's victories during the 2017–2019 seasons will be excluded from this analysis, as the associated sponsors either operate as subsidiaries of larger

corporations or are not publicly traded entities. For the Mercedes-AMG PETRONAS F1 Team (hereafter Mercedes), Petronas will be considered the title sponsor, as it served in this capacity throughout the entire period under study (Mercedes-AMG Petronas Formula One Team 2024).

Another limitation is the variation in title sponsors over the examined seasons. For example, Scuderia Ferrari (hereafter Ferrari) in 2016-2018 does not have an official title sponsor (Carp 2018), and thus Shell has been used as a proxy sponsor for the purpose of this study for the 2016-2018 seasons. This introduces a potential bias, as Shell's stock performance may not be directly influenced by Ferrari's race outcomes in the same way an official title sponsor would be. Ferrari made an agreement with Philip Morris in 2018, and it became Ferrari's title sponsor for the 2019 season (Dewhirst, Lee & Czaplicki 2023).

The stocks analysed in this thesis will include PETRONAS Gas Berhad (PGB), Totalenergies SE (TTE) for the 2016 season, Shell plc (SHEL) for the period of 2016 to 2018, and Philip Morris International Inc. (PM) for the year 2019.

1.4 Structure and implementation of the thesis

This thesis is separated into six sections, each with a specific focus. The first section introduces the topic, laying the foundation for the thesis. The second section presents the theoretical framework, which looks at key concepts such as the efficient market hypothesis. The third section extends the theoretical framework by examining existing literature on stock market reactions to events in both sports and motorsports sponsorship. It then examines the fundamental aspects of Formula 1 and the dynamics of sponsorship within the sport. The empirical part begins in the fourth section, introducing the methodology used in the research and data sources. The fourth chapter includes a thorough overview of the data utilized, along with the specific methods applied throughout the research process. The fifth section then presents the study's results, followed by the final sixth section, which summarizes the findings and draws conclusions based on the analysis. The last section also reflects on possible directions for future research and assesses the reliability of the study.

2 Efficient market hypothesis

In this section, the efficient market hypothesis (EMH) is introduced. The event study methodology—employed in this research and built on the efficient market hypothesis—will be detailed later, in the fourth chapter. The efficient market hypothesis is particularly relevant to this study as it suggests that stock prices reflect all publicly available information (Fama 1970), making it possible to measure the impact of Formula One victories on title sponsors' stock prices by analysing deviations from expected returns.

2.1 Fundamentals and the three forms of the efficient market hypothesis

The Efficient Market Hypothesis, formalized by Fama (1970), establishes that financial markets are "informationally efficient," meaning market prices reflect all publicly available information, as presented in Figure 1. As a result, no investor can regularly outperform the market via stock-picking or timing without taking on additional risk (Fama 1970). Since all participants act rationally, new information is immediately reflected in asset prices, making attempts to predict price movements based on existing information ineffective (Mishkin 2016).

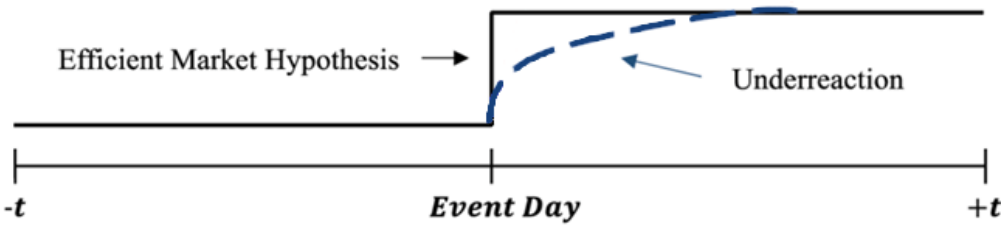

Figure 1. The reaction of efficient and inefficient markets. The horizontal axis represents time, while the vertical axis represents cumulative return. Adapted from Knüpfer and Puttonen (2018a, 168)

The Efficient Market Hypothesis is grounded in the rational expectations theory, which suggests that investors leverage all available information to make informed decisions, forming expectations about future price changes based on this data (Malkiel 2003).

Fama's (1970) model formalized the process by which investors form price expectations for securities:

$$E(p_{jt+1}|\phi_t) = [1 + E(r_{jt+1}|\phi_t)]p_{jt} \quad (1)$$

where, E symbolizes the anticipated value operator, p_{jt} represents the cost of security j at time t, and p_{jt+1} is its anticipated price at $t+1$. The term r_{jt+1} indicates the percentage return over one period, while ϕ_t refers to the set of information available and believed to be embedded within the price at t. According to the Efficient Market Hypothesis (EMH), this implies that all information, which is accessible, is already reflected in prices of securities, making it difficult to regularly attain returns that outperform the market average. (Fama 1970)

Fama (1970) also categorized market efficiency into three separate forms, each displaying a different level of information integration in asset prices: weak form efficiency, semi-strong form efficiency, and strong form efficiency. Weak form efficiency establishes that present asset prices reflect all historical market data, such as former prices and trading volumes (Knüpfer & Puttonen 2018b). Under this form of efficiency, it is impossible to forecast future price fluctuations by studying past price trends, rendering technical analysis ineffective (Malkiel 2003). The logic here is that if investors could consistently profit from patterns in past price data, such strategies would be widely adopted, and the resulting trading activity would eliminate any predictable patterns, making future price movements random.

Numerous studies have evaluated weak form efficiency by analysing whether historical price movements can predict future returns. For example, Fama (1991) found that stock price movements were mainly independent of earlier prices, lending support to the weak form of EMH. The "random walk" theory—suggesting that stock prices move unpredictably and are not influenced by their historical path—closely aligns with weak form efficiency (Malkiel 2003).

Semi-strong form efficiency continues the idea of weak form efficiency by signifying that stock prices not only reflect all past price information but also all publicly available information, such as earnings reports, economic data, and news announcements (Knüpfer & Puttonen 2018b). Hussin, Ahmed, and Ying (2010) highlight that, under semi-strong form efficiency, markets incorporate information such as dividend and earnings announcements almost immediately, thus reflecting an efficient adjustment process.

Event studies are a common method for testing semi-strong form efficiency. Event studies examine how stock prices react to new information, such as earnings announcements or macroeconomic news, to assess how quickly and accurately the market incorporates that information (MacKinlay 1997). Brown and Warner (1985) conducted a series of event studies, finding that stock prices generally adjusted almost immediately to new public information, supporting the semi-strong form of EMH.

Strong form efficiency suggests that stock prices reflect all available information, including both public and private (or insider). In a strong form efficient market, even those with access to confidential information, like company executives or insiders, are unable to consistently attain returns that outperform the market (Fama 1991). Strong form efficiency assumes that all relevant information, regardless of its source, is fully integrated into stock prices, meaning that no group of investors has an advantage. While the strong form of EMH is often considered idealistic, studies have shown that insider trading laws and regulations, as well as the efficient dissemination of information, contribute to highly efficient markets. However, evidence of insider trading scandals, such as the case of Raj Rajaratnam and the Galleon Group, challenges the feasibility of strong form efficiency in practice (Duignan 2024; Mishkin 2018, 197; Maverick 2022).

2.2 Empirical evidence supporting the EMH

Over the past few decades, numerous studies have supported the weak and semi-strong forms of EMH. One of the earliest empirical studies was made by Ball and Brown (1968), who investigated the relationship between earnings statements and stock price changes. Their study demonstrated that stock prices quickly adjusted to information regarding earnings and other news, leaving insignificant opportunity for investors to gain advantage using public financial data—a result consistent with semi-strong efficiency.

Similarly, Fama (1991) conducted a comprehensive review of empirical evidence, finding that stock prices generally incorporate both historical and public information, supporting the weak and semi-strong forms of the hypothesis. Additionally, Jensen (1978) argued that no empirical tests have convincingly rejected the efficient market hypothesis, further validating its core principles.

Another important area of study that has tested EMH is the event study methodology. Studies using event study methodology examine stock price reactions to major events, for instance mergers, acquisitions, and regulatory changes. Brown and Warner (1985) found that stock prices are likely to adjust almost instantly to the release of new information, with abnormal returns disappearing within a very short time frame. These findings provide further empirical support for the semi-strong form of EMH.

2.3 Criticisms and market anomalies

Despite substantial evidence in favour of EMH, the hypothesis has been subject to significant criticism, particularly regarding the strong form of efficiency. Critics argue that real-world markets demonstrate inefficiencies and anomalies, which the EMH is not able to explain. (Timmermann & Granger 2004)

Various market anomalies contest the perception of market efficiency. For example, the January effect describes the pattern where stock prices tend to increase more in January compared to other months, while the momentum effect indicates that stocks with strong past performance are likely to continue performing well. (Malkiel 2003). These anomalies seem to offer chances for investors to earn abnormal returns, which contradicts the theory that all information is already reflected in stock prices.

The field of behavioural finance challenges the theory that investors always act rationally, as theorized by EMH. It argues that psychological biases, including overconfidence, loss aversion, and herd behaviour, have the potential to cause mispricing in financial markets (Barberis & Thaler 2003). Malkiel (2003) argues that these biases result in pricing patterns incompatible with EMH, especially when investor sentiments significantly impact market behaviour. Dimson (1998) similarly finds that irrational actions by market participants

explain deviations from theoretical efficiency, highlighting the role of behavioural factors in creating market bubbles and inefficiencies.

Some empirical studies have found evidence of long-term return anomalies that challenge EMH. For example, Lakonishok, Shleifer, and Vishny (1994) found that value stocks (stocks with low price-to-earnings ratios) have the tendency to beat growth stocks over long periods, which suggests that some investment strategies may reliably generate additional returns, contrary to the EMH's prediction that no strategy can outperform the market consistently.

2.4 Balancing EMH with market variances

While the existence of anomalies and irrational behaviour challenges the EMH, many supporters argue that markets are still efficient enough to make it hard for investors to regularly outperform the market. Fama (1998) defended the hypothesis by noting that market overreactions and underreactions are equally common, and when adjusted for changes in expected returns and statistical models, many anomalies disappear. Furthermore, even if markets are always not perfectly efficient, the high level of competition among investors ensures that any inefficiencies are quickly corrected, supporting the wider applicability of EMH. As Malkiel (2003) notes, markets may not always be perfectly efficient, but they are efficient enough to prevent investors from consistently achieving abnormal returns without taking on significant risk.

3 Sports sponsoring and stock prices

Sponsorship in sports has emerged as a crucial revenue stream for teams and a strategic marketing avenue for corporations. As companies increasingly invest in high-profile sports sponsorships, the impact of sports events on corporate performance and stock market valuations has gained research attention. Sports sponsorship not only boosts brand visibility but also influences investor sentiment, potentially driving variations in stock prices following major events (Mazodier & Rezaee 2013). This chapter will continue with the theoretical background first with a more comprehensive examination of the relationship between sports sponsorship and stock markets to establish a general background. It then narrows its focus to study sponsorship dynamics specifically within motorsports. Following this, the fundamentals of Formula One are introduced, offering essential context for understanding the sport. Finally, this section explores how sponsorship in Formula One has evolved from a supplementary income source to a cornerstone of team financing, offering sponsors unparalleled visibility, opportunities for strategic partnerships, and alignment with values like innovation, speed, and sustainability.

3.1 Market reactions and sports sponsoring

Sports sponsoring and stock market reactions in general have been subjects of growing academic interest, with researchers identifying a versatile relationship influenced by visibility, performance, investor sentiment, and reputational risks. Filis and Spais (2012) offer an assessment by showing that victories or high-stakes performances in sports correlate positively with stock market gains for sponsors. Their research emphasizes the role of visibility, fanbase size, and media coverage in amplifying market returns. Kwon and Cornwell (2021) further refine this by highlighting the financial advantages of sponsorships linked to high-performance teams in key events, such as championships or rivalry matches. The studies collectively feature that enhanced media exposure and intensified fan engagement drive not only consumer recognition but also investor confidence in the value of these sponsorships.

However, the connection between sports outcomes and stock market reactions is not solely transactional; it is also connected with investor sentiment. Edmans, García, and Norli (2007) reveal that sports outcomes influence investor mood, where victories evoke optimism, while losses trigger market pessimism. These psychological dimensions affiliate strongly in emotionally exciting contexts like Formula One, where the prestige and intensity of consecutive wins or season titles magnify market impacts. The alignment between performance and investor sentiment adds a key layer to the understanding of sports sponsorship, suggesting that emotional factors strengthen financial outcomes as much as performance metrics do. Nevertheless, the dual nature of sponsorships—both as opportunities and risks—emerges notably in studies like those by Drivdal, Nordahl, and Rønes (2018). While successful sponsorships can enhance brand equity and stock market performance, adverse events such as doping scandals in cycling can wear down these gains, exhibiting the vulnerability of sponsorships to reputational risks. The risk-reward dynamic requires sponsors to apply strategic foresight and align with teams or events that minimize reputational exposure while maximizing financial and brand visibility.

Sponsorship announcements themselves introduce an additional layer of complexity. Cornwell, Pruitt, and Clark (2005) found that announcements tied to major leagues like the NBA and the NFL often trigger positive market responses due to heightened investor expectations and market optimism. Similarly, Reiser, Breuer and Wicker (2012) identified the "sponsorship effect," where such announcements yield short-term stock gains through increased visibility. Yet, Almashayekhi (2024) points out scenarios where these effects are neutral or negative, particularly when sponsorships misalign with the sponsor's brand or engage controversial sports sectors.

The reviewed literature presents sports sponsorships as tools that integrate visibility, emotional character, and strategic alignment to drive both immediate market benefits and long-term brand equity. Sponsorships provide brands with opportunities to associate strategically with popular teams and high-stakes events, generating substantial market attention. The financial potential of partnerships is significant, with stock markets often responding positively to sponsorship announcements. The reaction is primarily powered by anticipated brand exposure and the advantages of aligning with successful teams, particularly when these alignments are supported by strong performance outcomes.

The impact of sponsorships becomes even more evident when victories amplify the alignment between the sponsoring brand and the associated team or event. Major wins not only strengthen investor confidence but also enhance market perceptions, leading to abnormal returns for the sponsoring brand. However, the reverse is also true: mediocre performance or losses can reduce these benefits, emphasizing the inherent risks in sponsorship investments.

Beyond financial metrics, sports sponsorships leverage the emotive and performative power of sports to adopt deeper connections with audiences. The passion and loyalty of sports fans translate into heightened media exposure and intensified consumer engagement, further strengthening the sponsor's market presence. At the same time, sponsorships are subject to reputational concerns. Adverse events or controversies involving sponsored teams or events can quickly wear away both financial gains and brand equity, emphasizing the need for risk management.

3.2 Motorsports sponsoring and stock markets

The relationship between motorsports, and stock market performance is a collaboration of visibility, brand association, and investor sentiment. A review of the existing literature reveals that while race outcomes and sponsorships have measurable effects on stock prices, the significance of impact depends on factors such as team performance, industry alignment, and sponsorship visibility.

Numerous studies (e.g., Schredelseker & Fidahic 2011; Axelsson & Lindholm 2010; Cornwell, Pruitt & Van Ness 2001) have been conducted on the effects of motorsports events on stock markets. Studies have examined the extent to which race outcomes—such as victories, podium finishes, and championship wins—affect the stock prices of the sponsors and parent companies involved. The studies utilize various methodologies, most notably the event study approach, to isolate and analyse the abnormal stock returns associated with significant outcomes of races. This section outlines the essential findings from literature, highlighting how motorsport events influence sponsor visibility, brand perception, and shareholder value.

Schredelseker and Fidahic (2011) assessed the stock market responses to Formula One race results for prominent teams such as Ferrari, McLaren, and Renault over the 2005 to 2007 seasons. By examining race wins and losses, Schredelseker and Fidahic identified positive abnormal returns for Ferrari and McLaren following victories, suggesting that successful race outcomes can lead to improved investor confidence. On the contrary, Renault experienced a decline in stock prices following wins, possibly reflecting divergent investor expectations and brand associations with performance. Although the findings support a link between race performance and stock market reactions, the limited dataset indicates the need for further study with larger samples for generalizable results.

Axelsson and Lindholm (2010) conducted a study on the 2009 Formula One season, emphasizing the relationship between industry alignment and sponsorship visibility in affecting stock market outcomes. Their findings highlight that companies in the automotive or technology sectors experience more pronounced stock price increases following race victories. The observation is attributed to the natural compatibility between their products and the high-performance image of Formula One. On the contrary, sponsors from unrelated industries display muted stock price reactions, highlighting the importance of strategic alignment between the sponsor's industry and Formula One's technological status. Their findings align with Cornwell, Pruitt and Van Ness (2001), who demonstrated that sustained success in the IndyCar Series, such as winning streaks or championships, strengthens investor enthusiasm and brand reliability for automotive-linked sponsors. Both studies meet on the idea that the economic benefits of motorsport sponsorship are not equally distributed but are significantly enhanced by the sponsor's alignment with the sport's identity.

Furthermore, Cornwell et al. (2001) emphasize that the economic benefits are rooted in both the direct technological associations of the brand and the extensive narrative of excellence expressed through repeated successes. The perspective in question complements Axelsson and Lindholm's observation that sponsorship success depends on both race outcomes and the strategic correspondence of the sponsor's brand values with for example Formula One's competitive landscape. Combined, these studies provide a thorough context for examining the financial aspects of motorsport sponsorships, illustrating how sustained success and alignment with motorsport performance generate a reinforcing cycle that boosts investor confidence and enhances market value.

Beyond race outcomes, the announcement of sponsorship deals themselves can influence stock prices. Mazodier and Rezaee (2013) examined the impact of Formula One sponsorship announcements on stock prices, revealing that the market's reaction is dependent on specific sponsorship and event characteristics. Their analysis of a large sample of sponsorship announcements reveals that collaborations with high-profile and uniquely differentiated events frequently generate positive abnormal returns. The positive response rises from the anticipated increase in brand equity, prestige, and alignment with Formula One's reputation for technological excellence. The findings suggest that sponsorship success is not merely a function of visibility but also of the strategic compatibility between the sponsor's brand and the event's unique attributes. Interestingly, the study also identifies scenarios where the market response is muted or even negative. Factors such as the event's distinctiveness and the perceived alignment between the sponsor's industry and the event play critical roles in influencing investor sentiment. For example, highly commercial sponsorships may sometimes be viewed sceptically by investors, who weigh the substantial costs against uncertain returns. This emphasizes the balance for companies to align sponsorships with broader corporate narratives that resonate with shareholders. Through highlighting the importance of differentiation and strategic alignment, Mazodier and Rezaee raise the understanding of sponsorship-linked marketing, framing it as a powerful tool that exceeds traditional advertising to communicate a company's image, desire, and innovative potential.

3.3 The fundamentals of Formula One

Formula One represents the highest class of international single-seater, open-wheel motor racing, governed by the Fédération Internationale de l'Automobile (hereafter FIA) (FIA 2024). The origins of Formula One can be traced back to the European Grand Prix motor racing of the early 20th century, but the official F1 World Championship was inaugurated in 1950 with a race at Silverstone, United Kingdom (Codling 2017). The first championship established the stage for F1's evolution into one of the most prestigious sporting events globally, celebrated not only for its competitive racing but also for its technological innovation.

Initially confined to Europe, Formula One quickly expanded worldwide, reaching audiences across five continents, including venues in North America, Asia, and South America. The

global spread of F1 was vital in it transforming into a brand recognized and respected internationally, going beyond traditional national and regional boundaries (Gallagher 2014). Each season usually spans from March to December, containing a series of Grands Prix (races) held on specially designed circuits and city streets, creating a unique combination of sports and spectacle that attracts millions of fans annually (F1 Chronicle 2020).

Formula One has a strict set of rules all participants must follow, including drivers, teams, manufacturers, and event organizers. These regulations, developed and maintained by the FIA, ensure fairness and competitive balance within the sport. The rules are divided into four main categories: sporting, technical, financial, and general conduct regulations, each targeting a different aspect of the sport's integrity and sustainability (FIA 2018).

Sporting regulations govern the structure and progression of the championship, including race formats, qualifying criteria, and point allocation systems. Points are awarded to drivers and constructors based on their final positions in each race, with the driver and team accumulating the highest points over the season declared World Champions. Additional points are awarded for achievements such as the fastest lap, adding further competitiveness. (FIA 2018)

Formula One cars are among the most technologically sophisticated vehicles, pushing the boundaries of speed, aerodynamics, and safety. The FIA mandates strict technical specifications for components like engines, weight, and aerodynamics, ensuring that each car meets safety and performance standards while maintaining a level playing field among competitors (FIA 2018). Teams constantly innovate within these parameters, making F1 cars a showcase of cutting-edge automotive engineering.

Conduct regulations cover the general behaviour expected from teams, drivers, and officials, ensuring the sport maintains its professionalism. Specific rules dictate driver behaviour on the track, the responsibilities of team members, and operational standards during races, ensuring a consistent, fair, and professional experience for all participants (FIA 2018).

The Grand Prix events themselves adhere to standardized formats, with each race covering a minimum distance of 305 kilometres (except for Monaco, where the distance is shorter due to the circuit's unique layout). The average race lasts approximately two hours, with circuits varying in length and complexity, requiring drivers to complete numerous laps (FIA 2018).

F1 is not only a high stakes sporting event but also a complex business ecosystem. The financial structure of F1 involves revenue streams from sponsorships, broadcasting rights, prize money, and team investments. Teams rely heavily on sponsorship agreements, which can account for up to 75% of their annual income (Mourão 2017, 82). Sponsorship allows companies to associate their brands with F1's high-profile events, gaining visibility to a global audience and benefiting from the sport's glamour and technological innovation (Mazodier & Rezaee 2013).

According to Sylt (2018), a study of F1 team finances in 2016 revealed a significant variance in team budgets, highlighting the financial disparity between wealthier teams like Mercedes and Ferrari and smaller teams. High-budget teams have historically been more successful due to their ability to invest in superior car technology and driver talent (Mourão 2017, 83). The financial advantage of cash-heavy teams has translated into competitive success (Jenkins, Pasternak & West 2016), as evidenced by Mercedes' dominance, winning multiple Constructors' Championships consecutively since 2014.

However, the introduction of the Cost Cap in 2021 aims to reduce this advantage by limiting spending, thereby increasing competitive equality (Sylt 2018; FIA 2021). The financial ecosystem in F1 is further complicated by the unique ownership structures of teams. Some teams are manufacturer-owned, such as Ferrari and Mercedes, while others operate as private entities (Hardy 2024). Despite the differences, the Cost Cap applies uniformly, enforcing financial discipline across the board (FIA 2021).

3.4 Sponsorship in Formula One

Sponsorship has become a fundamental part of Formula One, transforming from a supplementary income source to a primary revenue stream that enables teams to compete at the highest level. With its vast global viewership and high-profile image, F1 provides sponsors with unmatched visibility and access to a diverse audience. Sponsorship deals in F1 range from prominent title sponsors displayed on team cars and driver uniforms to technical partnerships that allow sponsors to contribute to vehicle performance (Mazodier & Rezaee 2013). The information regarding the sponsorship costs in F1 are limited to the public, but estimations have been made for example by Markopoulos et al. (2019), which are shown on Table 1.

Table 1. Estimated costs of sponsorship placement on an F1 car. Derived from Markopoulos et al. (2019)

Position on Car	Estimated Annual Cost (USD)	Description
Rear Wing	$5 million - $25 million	Visible in rear shots, often targeted by brands focused on rear-view camera angles.
Sidepods	$1 million - $25 million	One of the most visible areas, usually attracting large sponsors due to side-view camera shots.
Nose and tub of Car	$3 million - $10 million	Smaller logo placement but often visible in front angles and close-up shots.
Wing mirrors	$5 million	Wing mirrors are small, but visible prominently in many still and moving shots.

Sponsorship in F1 is unique due to the sport's high brand value, frequent events, and the technological complexity of the vehicles. Companies that partner with F1 teams are not only investing in brand exposure but also associating themselves with values such as innovation, speed, and engineering excellence. This makes F1 an attractive platform for high-end brands, particularly in the automotive, technology, and luxury sectors. (Mourão 2017, 96-98) The intense media coverage and the extensive digital presence of F1 further increase its appeal to sponsors, as companies gain exposure across multiple platforms worldwide.

The approach to sponsorship in Formula One has evolved considerably over the past few decades. Traditionally, sponsorships were focused on simple branding and visibility; however, the modern view emphasizes strategic partnerships (Cornwell 2020, 53-54), where sponsors provide expertise, technology, or financial resources. For instance, companies in the tech industry often collaborate with F1 teams to develop data analytics, enhance aerodynamics, or improve engineering designs, positioning their sponsorship with actual team benefits (Mourão 2017, 97-98).

The rise of digital media has further transformed F1 sponsorship strategies. Social media and streaming platforms provide sponsors with additional channels to engage with fans, allowing for targeted marketing and real-time interaction during race weekends. Digital

engagement has become an essential component of sponsorships, as sponsors can reach global audiences beyond traditional television broadcasts, creating new revenue opportunities (Cornwell 2020). Also, F1 has increasingly attracted non-automotive sponsors as it diversifies its audience base. Brands in the lifestyle, fashion, and consumer electronics sectors have joined the sponsorship space, capitalizing on F1's appeal as a high-status, technologically advanced sport (Sturm 2014). The growing focus on sustainability and social responsibility has also influenced sponsorship dynamics. Brands are increasingly cautious about aligning with sports entities that reflect their own values. F1 has responded by promoting sustainability through initiatives like hybrid engines and net-zero carbon targets (FIA 2024), which has attracted environmentally conscious sponsors. The trend indicates a shift in F1's sponsorship landscape, as companies seek partnerships that align with their corporate social responsibility goals (Öztopcu 2023).

4 Research method and data

This chapter outlines the methodology employed to assess the short-term effect of Formula One Grand Prix wins on the stock values of affiliated companies. The main objective of this thesis is to analyse how the stock market responds to sporting successes, with Formula One race victories operating as events for the analysis. This research adopts the established event study methodology, which is designed to capture the effect of unexpected events on financial markets by isolating abnormal returns. This chapter draws upon MacKinlay's (1997) widely cited methodology, which provides a structured approach for estimating expected and abnormal returns. The initial sections explain the core methodology and associated mathematical formulas, followed by a description of the data sources, collection procedures, and pre-processing steps utilized in this study.

4.1 Event study methodology

The event study methodology is a critical tool in financial research for measuring the impact of specific events on stock prices. While Fama, Fisher, Jensen, and Roll (1969) conducted the first event study, Ball and Brown (1968) were the first to publish one. Event study methodology has since been refined to account for several types of events, from corporate announcements to political developments (Campbell, Lo & MacKinlay 1997). The core principle of event studies is to assess abnormal returns, which represent the deviation between the real return of a stock and the anticipated return over a defined period surrounding the event (MacKinlay 1997). By comparing the real returns with the estimated normal returns, the direct effect of the event on stock performance can be determined.

4.1.1 Defining the event and estimation windows

The initial step in performing an event study involves defining an event window, which is a specific timeframe surrounding the event date, which includes days both preceding and following the event. The event window captures any pre-event anticipation or post-event adjustments in the stock price (Binder 1998). The event date is denoted as $t = 0$, while the

event window, spanning from T_1 to T_2, captures the days of interest, as shown in Figure 2. For instance, a seven-day event window centred on the event date would set $T_1 = -3$ and $T_2 = +3$.

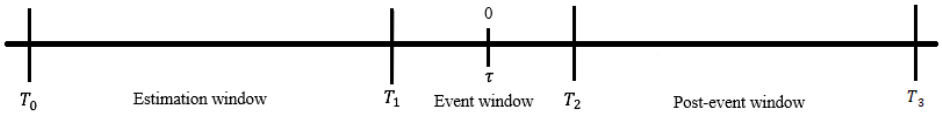

Figure 2. Timeline of an event study. Adapted from MacKinlay (1997)

For this study, an event window of seven trading days is used, which starts and ends three trading days before and after the event. A seven-day event window has been selected to account for the fact that most of the examined Formula One races are held on consecutive Sundays. The event window is intended to eliminate potential event overlap and ensure a clearer analysis of race-specific market reactions.

The estimation window precedes the event window (Figure 2) and serves as a baseline to calculate expected returns, unaffected by the event itself. The estimation window typically spans several months, allowing for stable coefficient estimation in the model used to predict expected returns. According to Brown and Warner (1985), the length of the estimation window varies, though it commonly ranges from 100 to 250 trading days to ensure statistical robustness. For this study, an estimation window of 130 trading days is adopted to derive accurate baseline parameters.

4.1.2 Calculating expected and abnormal returns

To isolate the impact of the event, it is necessary to calculate expected returns, which represent the stock's performance under normal market conditions. The market model is frequently used for this purpose, given its balance of simplicity and predictive power (Campbell et al. 1997). The market model assumes a linear relationship between the return of an individual stock and the overall market return, and is represented by:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \in_{it} \quad (2)$$

$$E(\in_{it} = 0) \qquad var(\in_{it}) = \sigma_{\in}^2$$

where R_{it} is the return of stock i at time t, α_i, β_i and $\sigma_{\in}^2$ are market model parameters, R_{mt} represents the market portfolio return at time t, $\in_{it}$ is the error term, representing abnormal returns not explained by market movements (MacKinlay 1997). The stock returns and market returns are calculated using the markets closing prices. The parameters of the market model are approximated using the ordinary least squares (OLS) method, after which, the abnormal returns can be calculated.

Abnormal returns (AR) quantify the effect of the event by measuring the deviation between actual returns and expected returns during the event window (Kothari & Warner 2006). For each day t in the event window, the abnormal return for stock i is calculated as:

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad (3)$$

where AR_{it} denotes the abnormal return of stock i on day t, R_{it} is the actual observed return on that day, and $\alpha_i - \beta_i R_{mt}$ is the expected return as per the market model. This formula isolates the portion of the return attributable specifically to the event by accounting for general market movement (MacKinlay 1997).

After determining the abnormal returns for each stock, the next step involves conducting hypothesis testing. This study focuses on assessing whether the abnormal returns on dates within the event window differ from zero on average, although there are various possible test variables to consider. To evaluate this, the average abnormal return (AAR) is calculated for each day within the examined period using the subsequent formula:

$$AAR_t = \frac{1}{N} \sum_{i=t}^{N} AR_{it} \quad (4)$$

where AAR_t is the calculated average abnormal return at time t, N represents the number of events, and AR_{it} denotes the abnormal return for each event. (MacKinlay 1997)

4.1.3 Testing for significance of abnormal returns

To determine if abnormal returns are statistically significant, hypothesis testing is applied to assess whether the abnormal returns during the event window differ from zero. The parametric t-test is generally preferred for this purpose, as it offers better-specified sampling distributions compared to nonparametric alternatives when using daily data (Brown & Warner 1985). This study follows this approach, using standardized t-tests to test the zero hypothesis that the event did not influence the stock price (Vaihekoski 2022, 248-249).

The statistical significance of the average abnormal return (AAR) can be calculated using the following t-test formula:

$$t = \frac{AAR_t}{\sqrt{\sigma^2(AAR_t)}} \sim N(0,1) \tag{5}$$

where AAR_t is the computed average abnormal return at time t, $\sigma^2(AR_{it})$ is the variance of abnormal returns, calculated as:

$$\sigma^2(AAR_t) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma^2(e_i) \tag{6}$$

In this formula, $\sigma^2(e_i)$ represents the variance of residuals from the market model during the estimation period, effectively capturing the variability of abnormal returns (Vaihekoski 2004).

4.1.4 Cumulative abnormal returns (CAR) and testing

To assess the aggregated effect Cumulative Abnormal Returns (CAR) are computed by aggregating the daily abnormal returns across the duration of the event window. (MacKinlay 1997). This approach enables the capture of compounding effects that unfold over several days around the event. For stock i, the CAR over the event window from T_1 to T_2 is given by:

$$CAR_i(T_1, T_2) = \sum_{t=T_1}^{T_2} AR_{it} \tag{7}$$

where CAR_i is the cumulative abnormal return over the event window for stock i, T_1 and T_2 denote the start and end of the event window (MacKinlay 1997).

The null hypothesis for CAR testing assumes that the cumulative abnormal returns are not significantly different from zero, indicating no impact from the event. The significance test statistic for CAR, J_1, is calculated as:

$$J_1 = \frac{CAR(T_1, T_2)}{\sqrt{\sigma^2(CAR(T_1, T_2))}} \sim N(0,1) \tag{8}$$

where J_1 is the test statistic for CAR, $\sigma^2\big(CAR(T_1, T_2)\big)$ is the variance of the cumulative abnormal returns, which can be derived from $\sigma^2(AAR_t)$ as:

$$\sigma^2\big(CAR(T_1, T_2)\big) = (T_2 - T_1 + 1)\sigma^2(AAR_t) \tag{9}$$

The testing approach presented, under the assumption that abnormal returns across companies are not correlated, enables the possibility to make inferences about the overall impact of the event by comparing the CAR value against the null hypothesis distribution (Sorescu, Warren & Ertekin 2017; MacKinlay 1997).

4.2 Data used in the study

The research data for this study spans Formula One races from the 2016 to 2019 seasons, including a total of 73 race events. The examined data utilized in this study includes Formula One Grand Prix results and stock market information, focusing on the relationship between race victories and stock prices. While each Formula One season typically involves ten to eleven teams, this analysis concentrates on three specific teams—Mercedes, Red Bull Racing, and Ferrari—as they were the only teams to secure race wins during the selected period from 2016 to 2019. The data of race wins for each team is represented in Figure 3, and found in Appendices 1, 2, 3 and 4.

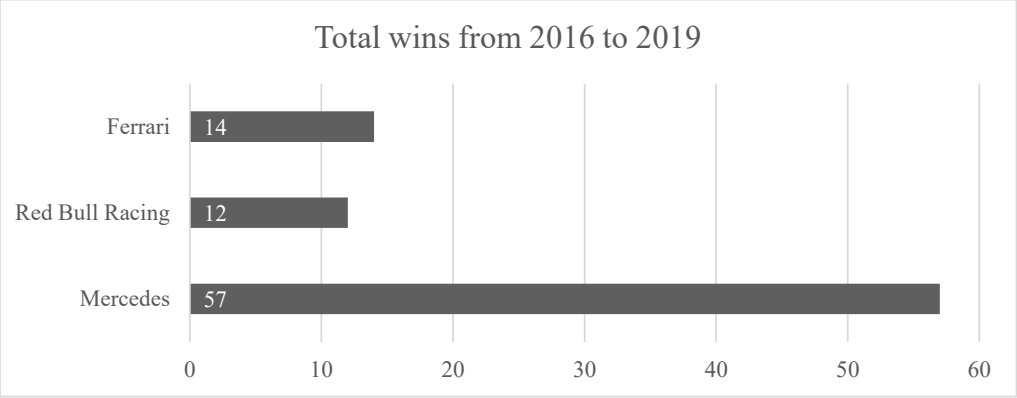

Figure 3. The total race wins of Mercedes, Ferrari, and Red Bull.

Out of Red Bull's 12 victories, only two will be included in the analysis, as these are the only instances where the associated sponsor's stock price can be examined. This decision was made because the remaining ten victories are associated with sponsors that are subsidiaries of exceptionally large corporations, where the stock price is unlikely to be significantly influenced by an individual victory.

In addition to the primary research question, this study examines two sub-questions presented earlier, each accompanied by specific hypotheses. The sub-questions aim to determine if the stock price impact of a championship-winning race or a winning streak is more substantial for the title sponsor.

Table 2. Championship-winning drivers and the specific races where they secured their titles. Derived from RacingNews365 (2024)

Drivers' Championships

Year	Driver	Race
2016	Nico Rosberg (Mercedes)	Abu Dhabi
2017	Lewis Hamilton (Mercedes)	Mexico
2018	Lewis Hamilton (Mercedes)	Mexico
2019	Lewis Hamilton (Mercedes)	United States

Table 2 presents the drivers who won the Formula One Drivers' Championship between 2016 and 2019, including the specific races where they clinched their titles. The period emphasizes the dominance of Mercedes drivers, with Nico Rosberg securing the title in Abu Dhabi in 2016 and Lewis Hamilton achieving consecutive championships from 2017 to 2019, with decisive races in Mexico and the United States.

Table 3. Constructors' Championship-winning teams and the specific races where they secured their titles. Derived from RacingNews365 (2024)

Constructor's Championships

Year	Constructor	Race
2016	Mercedes-AMG Petronas F1 Team	Japan
2017	Mercedes-AMG Petronas F1 Team	United States
2018	Mercedes-AMG Petronas F1 Team	Brazil
2019	Mercedes-AMG Petronas F1 Team	Japan

Table 3 provides the data on the Constructors' Championships, listing the races where the Mercedes-AMG Petronas F1 Team clinched the championship title each year from 2016 to 2019 showcasing dominance across the field. In this case, the sub-questions will be targeted towards Petronas, as it would be the only sponsor affected.

For the third sub-question, which investigates the impact of winning streaks on the title sponsor's stock price, this study examines races where a constructor achieved five or more consecutive victories. During the 2016-2019 period, as expected, Mercedes experienced the most noteworthy winning streaks, including five and ten consecutive wins in 2016 and eight in 2019 (Formula One 2016; Formula One 2019; Appendix 1; Appendix 4), which are examined in this study.

Red Bull Racing's most prominent sponsor and parent company Red Bull GmbH is privately held and does not have publicly available stock data. As an alternative, this study examines Totalenergies SE, which branding is prominently displayed on the team's car livery throughout the analysed period of 2016. The assumption here is that Totalenergies' public visibility through Red Bull Racing's success may indirectly influence its stock performance. Similarly, for Ferrari, Shell plc serves as the proxy sponsor from 2016 to 2018. In 2019, Philip Morris International Inc. reinstated its title sponsorship with the team, and it is used to represent Ferrari in the study for the year 2019 (Carp 2018).

The stocks used for these teams are PETRONAS Gas Berhad (PGB) representing Mercedes, Totalenergies SE (TTE) for Red Bull in 2016, and Shell plc (SHEL) for Ferrari during the 2016-2018 seasons. In 2019, Philip Morris International Inc. (PM) is examined in place of Shell, as Philip Morris became Ferrari's title sponsor that year following a renewed partnership (Dewhirst, Lee, & Czaplicki 2023). The indices selected correspond to the primary market for each associated stock, aligning them with regional market movements. The FTSE Bursa Malaysia KLCI is used for Petronas, the CAC 40 for Totalenergies SE, the FTSE 100 Index for Shell plc, and the S&P 500 Index for Philip Morris International Inc. The data was sourced from the LSEG database for stock and index information, while race results were acquired from the official Formula One website, confirming the accuracy of event dates and outcomes. All returns are adjusted for risk using the one-month market interest rates: EURIBOR for European securities Shell and Totalenergies, KLIBOR for Malaysia-based Petronas, and SOFR for the United States-based Philip Morris. By analysing a period of 73 events, this study exceeds the minimum requirement of 30 events needed for statistical reliability in event studies (MacKinlay 1997).

All the Formula One Grand Prix races analysed in this study were held on a Sunday, when the financial markets are closed. Therefore, Monday is selected as the event day for measuring stock price reactions. Additionally, due to the limited trading hours, the most

recent prices before the event are taken from the preceding trading day, which is Friday. As previously noted in Chapter 4.1.1, the calculations for abnormal returns are conducted within an event window spanning seven days. The event window is constructed to capture both a three-day pre-event and a three-day post-event market reaction. The basis for the event window is to not capture other events (former races and non-related events), which could impact the outcome of the analysis.

5 Research results

In this section, the empirical results of the event study will be presented and analysed. The event study was performed using Microsoft Excel, using the formulas outlined in Section 4 and its corresponding subsections. The analysis is divided into four subsections. The first subsection examines the effects across all teams and title sponsors. The second focuses on individual teams and their respective sponsors. The third examines the impact of a winning streak, while the fourth investigates the effects of a championship-winning race, including both Constructors' and Drivers' titles.

5.1 The reaction of the entire market

The analysis of average abnormal returns and cumulative abnormal returns provides a clear picture of how Formula One victories impact the stock performance of title sponsors. The findings indicate statistically significant and consistent patterns of positive abnormal returns during the event window, reflecting the market's acknowledgment of the financial and reputational value of victories.

Table 4. Average abnormal returns for all title sponsors.

	All teams		
t	**AAR**	**t-ratio**	**p-value**
-3	1.14 %	3.71	0.000
-2	1.21 %	3.94	0.000
-1	0.99 %	3.21	0.002
0	1.21 %	3.93	0.000
1	1.22 %	3.95	0.000
2	1.32 %	4.31	0.000
3	0.92 %	3.00	0.004

In terms of daily abnormal returns, the data shows a marked increase in stock prices beginning three days prior to the event (Table 4). On day -3, the average abnormal return is 1.14%, with a statistically significant t-ratio of 3.71 and a p-value of 0.000 (Table 4). The

early movement suggests that market contributors anticipate the event and adjust their expectations in response to pre-event information, such as media coverage or performance predictions. The upward trend continues on day -2, where the AAR reaches 1.21% with a similarly robust t-ratio of 3.94 (Table 4). The pre-event abnormal returns show the growing investor confidence in the potential future success of the sponsor's team.

The event day itself, indicated as day 0, shows an AAR of 1.21%, matching the highest pre-event return and indicating an immediate positive market reaction to the race outcome. The statistical significance of this figure, with a t-ratio of 3.93 and a p-value of 0.000, emphasizes the direct impact of the victory on sponsor stock performance (Table 4).

Post-event returns further support the sustained impact of Formula One victories. On day +1, the AAR increases slightly to 1.22%, reflecting continued investor interest. By day +2, the AAR reaches its peak at 1.32%, the highest recorded during the event window, signifying prolonged positive sentiment. Even on day +3, the AAR remains significant at 0.92%, suggesting that the market continues to respond positively to the victory. The consistent statistical significance of these returns, with p-values never exceeding 0.004, highlights the reliability of these findings and reinforces the hypothesis that victories generate substantial abnormal returns.

Cumulative abnormal returns provide a wider view of the market impact across multiple days. In the pre-event window, spanning from day -3 to day -1, the CAAR is 3.34%, with a variance of 0.00003 and a J1 test statistic of 6.28 (Table 5). The result shows the strong expectation leading up to the event, as investors position themselves in response to the expected positive outcome. The window from day -1 to day +1 shows an even higher CAAR of 3.41%, capturing both pre-event anticipation and the immediate reaction to the victory. On the event day alone, the CAAR is 1.21%, consistent with the individual abnormal return on that day, supporting its significance as the central point of the market reaction. (Table 5)

Table 5. The cumulative average abnormal returns of all securities.

$[t_1, t_2]$	CAAR	VAR	J1	p-value
[-3, -1]	3.34 %	0.00003	6.28	0.000
[-1, +1]	3.41 %	0.00003	6.41	0.000
[0,0]	1.21 %	0.00001	3.93	0.000
[0, +1]	2.43 %	0.00002	5.57	0.000
[+1, +3]	3.46 %	0.00003	6.50	0.000

Post-event windows further show the lasting market response. In the window from day 0 to day +1, the CAAR is 2.43% (Table 5), reflecting the immediate outcome of the victory. The window from day +1 to day +3 shows a sustained CAAR of 3.46% (Table 5), indicating the lasting positive impact of the event on stock performance. Across all windows, the results are statistically significant, with p-values of 0.000, and the low variance values indicate consistency in the market's pricing of event-related returns (Table 5).

Overall, the findings support that Formula One victories have a statistically significant impact on the stock prices of title sponsors. The results support the semi-strong form of the efficient market hypothesis (EMH), as markets swiftly and accurately reflect event-related information into stock prices.

5.2 Performance of individual teams and sponsors

The results for Mercedes, Ferrari, and Red Bull reveal significant differences in the degree and statistical significance of abnormal returns, indicating variations in market perception, sponsor visibility, and sample size.

A critical factor influencing the outcomes is the significant disparity in the number of race events analysed for each team. Mercedes accounts for 59 events, Ferrari for 12, and Red Bull for only two events. The variation in sample size has possible effects for the robustness and generalizability of the findings. Larger sample sizes, such as that for Mercedes, provide more reliable statistical estimates, reducing the likelihood of results being influenced by outliers or chance occurrences. On the contrary, the small sample size for Red Bull (2 events) makes

the findings highly sensitive to individual event outcomes and limits the ability to generalize the results to broader patterns.

Table 6. The AARs of Mercedes and Petronas.

t	AAR	t-ratio	p-value
-3	0.08 %	0.61	0.544
-2	-0.02 %	-0.14	0.891
-1	-0.01 %	-0.05	0.960
0	-0.14 %	-1.00	0.322
1	0.19 %	1.36	0.178
2	-0.03 %	-0.24	0.810
3	-0.10 %	-0.74	0.462

For Mercedes, the results imply modest and statistically insignificant abnormal returns. On the event day (t = 0), the AAR is -0.14%, with a p-value of 0.322 (Table 6), indicating that the market response to race victories is negligible.

Table 7. The CAARs of Mercedes and Petronas.

$[t_1, t_2]$	CAAR	VAR	J1	p-value
[-3, -1]	0.06 %	0.00003	0.11	0.456
[-1, +1]	0.04 %	0.00003	0.08	0.467
[0, 0]	-0.14 %	0.00001	-0.45	0.326
[0, +1]	0.05 %	0.00002	0.12	0.453
[+1, +3]	0.05 %	0.00003	0.10	0.460

The CAAR across all event windows, including [-3, -1] and [-1, +1], is similarly low and statistically insignificant, with p-values exceeding 0.4 (Table 7). The muted results may reflect the market's efficient pricing of Mercedes' consistent dominance during the study period, as investors might have already anticipated positive outcomes. Additionally, with 59 events in the dataset, the results are less prone to being skewed by individual race outcomes, which strengthens the reliability of these findings.

Table 8. The AARs of Ferrari and Shell/Philip Morris.

t	AAR	t-ratio	p-value
-3	5.60 %	3.24	0.007
-2	6.41 %	3.70	0.003
-1	5.18 %	3.00	0.011
0	6.89 %	3.99	0.000
1	5.54 %	3.20	0.008
2	7.05 %	4.08	0.002
3	5.25 %	3.04	0.010

In contrast, Ferrari shows significantly higher AAR and CAAR values, which reflect more pronounced market reactions. On the event day, Ferrari's AAR peaks at 6.89%, with a highly significant p-value of 0.000 (Table 8).

Table 9. The CAARs of Ferrari and Shell/Philip Morris.

$[t_1, t_2]$	CAAR	VAR	J1	p-value
[-3, -1]	17.19 %	0.00003	32.26	0.000
[-1, +1]	17.62 %	0.00003	33.06	0.000
[0, 0]	6.89 %	0.00001	22.41	0.000
[0, +1]	12.43 %	0.00002	28.57	0.000
[+1, +3]	17.84 %	0.00003	33.48	0.000

The positive response extends to the CAAR, with values of 17.19% for [-3, -1] and 17.62% for [-1, +1] (Table 9), both statistically significant at the 0.000 level. Ferrari's relatively small sample size of 12 events may amplify the observed effects, as each race carries more weight in the overall analysis. The concentration could make the results more sensitive to variability, meaning the findings may not fully capture Ferrari's average market impact over a larger dataset. However, Ferrari's strong brand image and its historic association with Formula One likely contribute to the substantial market reaction, as victories increase investor confidence and support Ferrari's positioning as a symbol of luxury and performance.

Table 10. The AARs of Red Bull and Totalenergies.

t	AAR	t-ratio	p-value
-3	19.30 %	15.95	0.004
-2	20.75 %	17.16	0.003
-1	17.71 %	14.65	0.005
0	19.20 %	15.88	0.004
1	19.55 %	16.16	0.004
2	18.40 %	15.21	0.004
3	17.76 %	14.68	0.005

Red Bull displays the most substantial abnormal and cumulative returns, with the AAR on the event day reaching 19.20% and a p-value of 0.004 (Table 10). The CAAR for [-3, -1] is an extraordinary 57.76%, while for [-1, +1], it is 56.47% (Table 11), both statistically significant at the 0.000 level.

Table 11. The CAARs of Red Bull and Totalenergies.

$[t_1, t_2]$	CAAR	VAR	J1	p-value
[-3, -1]	57.76 %	0.00003	108.38	0.000
[-1, +1]	56.47 %	0.00003	105.95	0.000
[0, 0]	19.20 %	0.00001	62.41	0.000
[0, +1]	38.75 %	0.00002	89.06	0.000
[+1, +3]	55.71 %	0.00003	104.53	0.000

However, Red Bull's results must be interpreted with caution due to the extremely limited sample size of only two events. With such a small dataset, individual race outcomes disproportionately influence the findings, increasing the likelihood that the results are driven by chance or other rather than representing a consistent pattern. Also, the sample size does not allow for meaningful analysis of variability or potential outliers, which limits the generalizability of the findings to other Red Bull-sponsored events. Red Bull's dual role as both a racing team and a globally recognized consumer brand likely amplifies the market impact of its victories, but these results should be validated with a larger dataset to ensure reliability.

The significant differences in sample sizes among the teams emphasize the importance of considering data limitations when interpreting event study results. While Mercedes' large dataset provides a reliable baseline for understanding its market impact, the smaller sample sizes for Ferrari and Red Bull introduce potential biases that could overstate the significance or magnitude of their returns. Overall, the findings suggest that Formula One victories have varying impacts on sponsor stock performance, possibly influenced by team characteristics, brand reputation, and sample size. While the results for Ferrari and Red Bull show stronger market reactions, they are also more vulnerable to overstatement due to smaller sample sizes.

5.3 The influence of a winning streak

The analysis of winning streaks offers a unique perspective on the stock market reactions to prolonged periods of dominance in Formula One, particularly focusing on Mercedes during the 2016-2019 period. Mercedes' performance included remarkable achievements such as ten consecutive wins in 2016 and eight consecutive wins in 2019, making it an ideal case to examine whether sustained success enhances abnormal stock returns and cumulative returns for title sponsors. Despite the high expectations associated with winning streaks, the findings reveal limited evidence of significant abnormal returns during these periods.

Table 12. The AARs of races part of the win streaks.

t	AAR	t-ratio	p-value
-3	0.11 %	0.38	0.711
-2	0.02 %	0.06	0.951
-1	-0.27 %	-0.92	0.374
0	-0.11 %	-0.39	0.704
1	0.06 %	0.20	0.844
2	0.02 %	0.07	0.945
3	0.06 %	0.20	0.843

The data on average abnormal returns during winning streaks show no statistically significant changes in stock prices across the event window. On the event day (t = 0), the AAR is -0.11%, with a t-ratio of -0.39 and a p-value of 0.704 (Table 12), indicating that the market reaction to individual wins during a streak is muted. Similarly, the surrounding days

in the event window show negligible abnormal returns, with AAR values ranging from -0.27% on t = -1 to 0.06% on t = +1 (Table 12). The lack of statistical significance across these observations, as shown by consistently high p-values, suggests that victories during a streak do not cause notable investor reactions. The average abnormal returns and cumulative average abnormal returns show only marginal differences when compared to those observed in regular race victories.

Table 13. The CAARs of races part of the win streaks.

$[t_1, t_2]$	CAAR	VAR	J1	p-value
[-3, -1]	-0.14 %	0.00003	-0.26	0.396
[-1, +1]	-0.32 %	0.00003	-0.61	0.272
[0, 0]	-0.11 %	0.00001	-0.37	0.356
[0, +1]	-0.05 %	0.00002	-0.13	0.450
[+1, +3]	0.14 %	0.00003	0.26	0.397

The cumulative average abnormal returns further support this finding. For the pre-event window [-3, -1], the CAAR is -0.14% with a p-value of 0.396 (Table 13), indicating no significant anticipation effect before victories. Similarly, the CAAR for the event window [-1, +1] is -0.32%, which, despite being slightly larger in magnitude, remains statistically insignificant with a p-value of 0.272 (Table 13). Even when considering post-event windows, such as [0, +1] and [+1, +3], the CAAR remains close to zero, further indicating a lack of persistent positive market reactions (Table 13). The largest observed CAAR, 0.14% in the [+1, +3] window, is insignificant with a p-value of 0.397 (Table 13), reinforcing the conclusion that winning streaks do not lead to pronounced cumulative effects on stock prices.

The muted market response to winning streaks contrasts with the stronger reactions observed for isolated victories by Ferrari and Red Bull. The difference may be attributed to several factors. Mercedes' sustained dominance during the study period might have resulted in market saturation, where victories became routine and thus failed to generate excitement among investors. The findings affiliate with the efficient market hypothesis, which suggests that stock prices quickly incorporate all publicly accessible information (Fama, 1970). For

Mercedes, the expectation of success may have already been priced into the stock, reducing the incremental impact of additional wins during a streak. Second, the focus on winning streaks may hide the individual significance of specific events within the streak. However, the aggregation of data for consecutive wins dilutes these unique effects, making it challenging to isolate the market impact of particularly notable races. Additionally, the consistency of Mercedes' success might have led investors to view the team's performance as a reflection of broader operational efficiency and long-term brand value, rather than as a source of short-term abnormal returns.

5.4 Stock market reactions to championship wins

Championship victories represent the pinnacle of success in Formula One and hold the potential to generate significant market reactions for sponsors due to their elevated visibility and prestige. During the period from 2016 to 2019, Mercedes achieved unequalled dominance, securing both the Drivers' and Constructors' Championships each year. Nico Rosberg won the Drivers' Championship in 2016, followed by Lewis Hamilton from 2017 to 2019 (RacingNews365 2024).

Table 14. AARs of championship winning races.

t	AAR	t-ratio	p-value
-3	-0.11 %	-0.27	0.796
-2	-0.36 %	-0.89	0.407
-1	-0.24 %	-0.60	0.572
0	0.56 %	1.41	0.209
1	-0.14 %	-0.34	0.743
2	-0.08 %	-0.20	0.847
3	-0.49 %	-1.23	0.265

The results from the event study reveal that while championship victories do result in abnormal returns, the scale and statistical significance of these effects are limited. On the event day (t = 0), the average abnormal return is 0.56%, with a t-ratio of 1.41 and a p-value of 0.209 (Table 14), indicating that the market response is positive but not statistically significant. Similarly, the AAR values for the days surrounding the event remain close to zero, with slight negative values on days t = -1 and t = +1 (Table 14). None of these returns

present statistical significance, as shown by high p-values (e.g., 0.572 for t = -1 and 0.743 for t = +1) (Table 14). The results imply that championship victories, while celebrated, do not consistently produce sharp abnormalities from expected stock price performance.

Table 15. CAARs of championship winning races.

$[t_1, t_2]$	CAAR	VAR	J1	p-value
[-3, -1]	-0.71 %	0.00003	-1.32	0.093
[-1, +1]	0.19 %	0.00003	0.35	0.363
[0, 0]	0.56 %	0.00001	1.83	0.033
[0, +1]	0.43 %	0.00002	0.98	0.163
[+1, +3]	-0.71 %	0.00003	-1.33	0.091

The cumulative average abnormal returns provide further insights into the market impact of championship wins over a broader time frame. For the event day window [0, 0], the CAAR is 0.56%, with a p-value of 0.033 (Table 15), indicating a marginally significant positive market reaction. The reaction suggests that, on the day of the championship victory, there is a small but noticeable improvement in stock prices for the title sponsor. However, this effect does not extend to the surrounding periods. The CAAR for the [-1, +1] window is 0.19%, with a p-value of 0.363 (Table 15), indicating a lack of significance in the whole event window. Similarly, the pre-event window [-3, -1] shows a negative CAAR of -0.71%, with a p-value of 0.093 (Table 15), indicating no significant anticipation effect prior to the championship win.

The lack of strong and consistent abnormal returns associated with championship wins may be attributed to several factors. Mercedes' consistent dominance during the 2016-2019 period likely led to market expectations aligning with their victories. Investors may have already priced in the likelihood of championship wins, thereby reducing the potential for significant abnormal returns upon confirmation. Championship victories, while symbolically significant, may not directly translate into immediate financial gains for sponsors in a manner that affects stock prices. Unlike race victories, which may provide a short-term boost in visibility, championships represent cumulative success over a season and may have a more diffuse impact on brand equity and market performance. The benefits of championship wins may cumulate over a longer time horizon through increased consumer perception, increased

sponsorship value, and stronger global brand positioning rather than immediate financial returns.

While the findings indicate limited short-term financial impacts, the strategic value of championship wins should not be underestimated. Championship-clinching victories strengthen the association of sponsors with excellence, innovation, and high performance, attributes that enhance brand equity and consumer loyalty over time. Also, the lasting success of Lewis Hamilton and Nico Rosberg during the study period set Mercedes' reputation as a dominant force in Formula One, elevating the observed value of its sponsorship.

6 Conclusions

This thesis set out to study the relationship between Formula One victories and the stock market performance of title sponsors during the 2016-2019 seasons. Using event study methodology, 73 race events were analysed to evaluate how race victories, winning streaks, and championship wins influence sponsor stock prices. The research achieved its objectives by addressing the three core research questions and providing insights into market reactions. The main research question was:

1. What effect does a victory in a Formula One Grand Prix have on the constructor's title sponsor's stock price?

The findings reveal that Formula One victories can lead to positive abnormal returns for the stock prices of title sponsors, with significant variations influenced by team performance, the nature of the victory, and its extensive context. For instance, isolated victories by Ferrari and Red Bull produced distinct abnormal returns, with Ferrari achieving an average of 6.89% and Red Bull reaching 19.20% on event days. The results support earlier studies, such as Axelsson and Lindholm (2010), and Schredelseker and Fidahic (2011), which determined that high-profile, unexpected victories generate greater investor enthusiasm and stronger market confidence. However, the muted and statistically insignificant stock market responses observed for Mercedes—despite its domination of the analysed seasons with 59 victories—indicate that consistent success may saturate the market. This aligns with the Efficient Market Hypothesis (Fama 1970), particularly its semi-strong form, which suggests that publicly available information, including expected outcomes like recurring victories, is already embedded in stock valuations. As described in the theoretical framework, markets adjust almost instantly to new public information, leaving little room for unexpected abnormal returns when outcomes align with prior investor expectations.

From a wider perspective, the findings provide insights into the relationship between sports sponsorships and financial markets. Sponsors of teams like Ferrari and Red Bull, whose victories were less frequent but more unexpected, appear to benefit from heightened investor enthusiasm and market reactions. This aligns with research by Martinez and Janney (2015),

who highlighted that sponsorship success often relies on a combination of team performance and the alignment of event outcomes with brand narratives. On the contrary, for dominant teams like Mercedes, which consistently achieve victories, the financial returns from sponsorships appear to be rooted more in long-term branding and consumer loyalty than immediate stock market reactions (Mazodier & Rezaee 2013).

To study the objective in a wider context, two sub-questions were constructed. The sub-questions were:

1. How does a winning streak influence the stock price reaction?

2. How does the stock price reaction differ depending on whether the victory secures a championship or is part of a regular race?

The analysis of the first sub-question revealed that winning streaks, such as Mercedes' five and ten consecutive wins in 2016 and eight consecutive wins in 2019, failed to generate substantial abnormal returns. Event-day AARs during these streaks peaked at -0.11%, and cumulative abnormal returns across all event windows were statistically insignificant. The muted responses suggest that sustained success, while valuable for long-term brand equity, does not have a significant short-term financial impact due to reduced investor anticipation of continued performance. The results align with the findings of Cornwell, Pruitt and Van Ness (2001), that teams consistently expected to win generated lower financial returns, while underdog victories sparked significant abnormal returns. The results contrast with the stronger market reactions observed for individual victories by Ferrari and Red Bull, indicating that the unpredictability of isolated wins holds greater market impact.

Regarding the second sub-question, the analysis of championship-clinching races also displayed differences between them and regular race wins. Victories that secured a Drivers' or Constructors' Championship for Mercedes yielded slightly higher average abnormal returns than regular wins, but the reactions remained statistically insignificant, reflecting pre-existing market expectations. Regular race victories, particularly for Ferrari, revealed stronger abnormal returns, suggesting that unexpected or individual successes provide new information to investors, generating enthusiasm. The findings highlight the financial and psychological significance of unexpected successes, which align with the sponsorship value

models proposed by Abril et al. (2018). Their study highlights the psychological and economic factors that drive investor responses, particularly the heightened value placed on strategic sponsorships during unexpected successes.

The findings also offer practical implications for companies and investors considering sponsorship in sports. For companies, the results emphasize the strategic importance of aligning sponsorships with teams or events likely to generate high-profile, unexpected victories, which tend to maximize market visibility and financial impact. Investors, on the other hand, may find better short-term opportunities by focusing on sponsorships associated with teams capable of achieving less predictable successes. The results also show the wider value of sponsorships in enhancing brand visibility and associating sponsors with innovation and excellence, which can lead to long-term consumer loyalty.

From a behavioural finance perspective, unexpected or high-profile victories by Formula One teams evoke pride, boosting investor confidence and generating positive market sentiment. This is evident in the abnormal returns observed following such wins. Emotional responses like pride align with the findings of Tuckett and Taffler (2012), who studied the emotional dimensions of financial markets, demonstrating how excitement and optimism drive decision-making during positive events. Contrarywise, predictable outcomes or underwhelming performances can lead to disappointment, reducing enthusiasm and impacting market reactions negatively (Shefrin 2002). These dynamics align with behavioural finance theories, particularly prospect theory (Kahneman & Tversky 1979), which suggests that losses and unmet expectations have a disproportionate psychological impact compared to equivalent gains. The perceptions in question emphasize the asymmetry in investor behaviour, where disappointment from predictable sponsorship outcomes or failures can lead to diminished market returns. The findings are upheld by Statman (2017), who identified that emotional factors, including pride and regret, influence both retail and institutional investor strategies.

The role of sponsorship strategies is critical in mitigating emotional risks and enhancing market impact. Sponsors can tailor their campaigns to maximize the visibility and narrative value of victories, warranting sustained engagement. By leveraging digital platforms and storytelling, sponsors can prompt positive emotions, amplifying the psychological significance of their victories and managing potential disappointment in periods of underperformance (Kim et al. 2020).

From a theoretical perspective, this thesis contributes to research on sports finance by applying event study methodology to evaluate Formula One sponsorships. It provides empirical confirmation that supports the semi-strong form of the efficient market hypothesis, implying how market expectations and sponsor characteristics shape stock price reactions. On a practical level, the findings offer valuable insights in sports sponsoring, highlighting the importance of lining up sponsorship strategies with events that maximize market impact. The study also emphasizes the societal significance of Formula One sponsorships, which extend beyond immediate financial returns. By associating brands with values such as innovation, speed, and excellence, sponsorships enhance global visibility and contribute to long-term consumer loyalty.

6.1 Reliability of the study

The reliability of this study rises from the application of event study methodology and the use of well-defined data collection and analysis. By focusing on 73 Formula One Grand Prix victories across the 2016–2019 seasons, the study utilizes a strong framework for analysing abnormal and cumulative abnormal stock returns. The chosen approach warrants a systematic evaluation of stock price reactions, minimizing biases and increasing the consistency of results.

However, the reliability of the findings is influenced by several factors. The difference in sample sizes across teams presents a challenge. Mercedes, with 59 events, provides a large and statistically robust dataset, while Ferrari and Red Bull, with 12 and two events respectively, have smaller datasets that are more susceptible to variability and outliers. The small sample size for Red Bull may overstate the observed effects, as individual event outcomes disproportionately impact the overall results. The application of event study methodology relies on the assumption that the market operates efficiently and that no confounding events, such as macroeconomic developments or industry-specific news, significantly impact the stock prices during the event windows.

Despite the limitations, the study contributes reliable and intuitive findings. The consistency of results across multiple event windows, combined with the observations with prior research (e.g. Axelsson & Lindholm 2010; Schredelseker & Fidahic 2011), reinforces the credibility of the conclusions.

6.2 Future research

This study contributes to the literature on the financial implications of Formula One sponsorships by analysing the short-term stock market reactions to race victories, winning streaks, and championship-clinching performances. However, its findings also bring up several areas for future research that could further develop the understanding of sponsorship dynamics in motorsport and beyond.

Future research could address the limitations posed by sample size disparities. While this study analysed 73 race events, the unequal distribution across teams—59 for Mercedes, 12 for Ferrari, and only two for Red Bull—exposes the need for more balanced datasets. Expanding the analysis to include a larger number of events and teams over multiple seasons or using a similar number of wins for every team examined, rather than a fixed time period, could improve the robustness of the findings and allow for more generalized conclusions.

Another area of research involves examining the long-term financial and strategic impacts of Formula One sponsorships. While this study focused on short-term stock market reactions, future studies could investigate how sponsorships influence brand equity, customer loyalty, and revenue growth over extended periods. Studies incorporating metrics such as consumer outlook, sponsorship renewal rates, and global market share shifts could offer a more comprehensive estimation of the value derived from Formula One partnerships.

Future research could also explore the relationship between Formula One sponsorships and digital marketing strategies. With the rise of social media and digital streaming platforms, sponsors now have additional channels to engage with fans and increase the impact of race victories. Studying how digital engagement metrics, such as social media interactions and online brand sentiment, correlate with financial market responses could provide valuable insights into the sponsorship landscape. Also, expanding the scale of research beyond Formula One to include other high-profile sports, such as soccer, tennis, golf, or eSports, could reveal whether the patterns observed in this study are unique to motorsport or applicable across different areas. Comparative studies could clarify how the structure and audience demographics of various sports influence the financial returns on sponsorship investments. Future research could also dive deeper into investor behaviour, studying how sponsorship outcomes are observed by different types of investors, such as institutional

investors versus retail investors. Understanding the differences could offer insights into how market reactions are driven by diverse investor priorities and expectations.

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Appendices

Appendix 1. 2016 Grand Prix data

2016 RACE RESULTS				
Grand Prix	**Date**	**Winner**	**Winning constructor**	**Title sponsor**
Australia	20.marras.16	Nico Rosberg	Mercedes	Petronas
Bahrain	03 Apr 2016	Nico Rosberg	Mercedes	Petronas
China	17 Apr 2016	Nico Rosberg	Mercedes	Petronas
Russia	01 May 2016	Nico Rosberg	Mercedes	Petronas
Spain	15 May 2016	Max Verstappen	Red Bull Racing TAG Heuer	Totalenergies SE
Monaco	29 May 2016	Lewis Hamilton	Mercedes	Petronas
Canada	12 Jun 2016	Lewis Hamilton	Mercedes	Petronas
Europe	19 Jun 2016	Nico Rosberg	Mercedes	Petronas
Austria	03 Jul 2016	Lewis Hamilton	Mercedes	Petronas
Great Britain	10 Jul 2016	Lewis Hamilton	Mercedes	Petronas
Hungary	24 Jul 2016	Lewis Hamilton	Mercedes	Petronas
Germany	31 Jul 2016	Lewis Hamilton	Mercedes	Petronas
Belgium	28 Aug 2016	Nico Rosberg	Mercedes	Petronas
Italy	04 Sep 2016	Nico Rosberg	Mercedes	Petronas
Singapore	18 Sep 2016	Nico Rosberg	Mercedes	Petronas
Malaysia	02 Oct 2016	Daniel Ricciardo	Red Bull Racing TAG Heuer	Totalenergies SE
Japan	09 Oct 2016	Nico Rosberg	Mercedes	Petronas
United States	23 Oct 2016	Lewis Hamilton	Mercedes	Petronas
Mexico	30 Oct 2016	Lewis Hamilton	Mercedes	Petronas
Brazil	13 Nov 2016	Lewis Hamilton	Mercedes	Petronas
Abu Dhabi	27 Nov 2016	Lewis Hamilton	Mercedes	Petronas

Appendix 2. 2017 Grand Prix data

2017 RACE RESULTS				
Grand Prix	**Date**	**Winner**	**Winning constructor**	**Title sponsor**
Australia	26.marras.17	Sebastian Vettel	Ferrari	Shell
China	09 Apr 2017	Lewis Hamilton	Mercedes	Petronas
Bahrain	16 Apr 2017	Sebastian Vettel	Ferrari	Shell
Russia	30 Apr 2017	Valtteri Bottas	Mercedes	Petronas
Spain	14 May 2017	Lewis Hamilton	Mercedes	Petronas
Monaco	28 May 2017	Sebastian Vettel	Ferrari	Shell
Canada	11 Jun 2017	Lewis Hamilton	Mercedes	Petronas
Azerbaijan	25 Jun 2017	Daniel Ricciardo	Red Bull Racing TAG Heuer	
Austria	09 Jul 2017	Valtteri Bottas	Mercedes	Petronas
Great Britain	16 Jul 2017	Lewis Hamilton	Mercedes	Petronas
Hungary	30 Jul 2017	Sebastian Vettel	Ferrari	Shell
Belgium	27 Aug 2017	Lewis Hamilton	Mercedes	Petronas
Italy	03 Sep 2017	Lewis Hamilton	Mercedes	Petronas
Singapore	17 Sep 2017	Lewis Hamilton	Mercedes	Petronas
Malaysia	01 Oct 2017	Max Verstappen	Red Bull Racing TAG Heuer	
Japan	08 Oct 2017	Lewis Hamilton	Mercedes	Petronas
United States	22 Oct 2017	Lewis Hamilton	Mercedes	Petronas
Mexico	29 Oct 2017	Max Verstappen	Red Bull Racing TAG Heuer	
Brazil	12 Nov 2017	Sebastian Vettel	Ferrari	Shell
Abu Dhabi	26 Nov 2017	Valtteri Bottas	Mercedes	Petronas

Appendix 3. 2018 Grand Prix data

2018 RACE RESULTS				
Grand Prix	**Date**	**Winner**	**Winning constructor**	**Title sponsor**
Australia	25.marras.18	Sebastian Vettel	Ferrari	Petronas
Bahrain	08 Apr 2018	Sebastian Vettel	Ferrari	Petronas
China	15 Apr 2018	Daniel Ricciardo	Red Bull Racing TAG Heuer	
Azerbaijan	29 Apr 2018	Lewis Hamilton	Mercedes	Petronas
Spain	13 May 2018	Lewis Hamilton	Mercedes	Petronas
Monaco	27 May 2018	Daniel Ricciardo	Red Bull Racing TAG Heuer	
Canada	10 Jun 2018	Sebastian Vettel	Ferrari	Shell
France	24 Jun 2018	Lewis Hamilton	Mercedes	Petronas
Austria	01 Jul 2018	Max Verstappen	Red Bull Racing TAG Heuer	
Great Britain	08 Jul 2018	Sebastian Vettel	Ferrari	Shell
Germany	22 Jul 2018	Lewis Hamilton	Mercedes	Petronas
Hungary	29 Jul 2018	Lewis Hamilton	Mercedes	Petronas
Belgium	26 Aug 2018	Sebastian Vettel	Ferrari	Shell
Italy	02 Sep 2018	Lewis Hamilton	Mercedes	Petronas
Singapore	16 Sep 2018	Lewis Hamilton	Mercedes	Petronas
Russia	30 Sep 2018	Lewis Hamilton	Mercedes	Petronas
Japan	07 Oct 2018	Lewis Hamilton	Mercedes	Petronas
United States	21 Oct 2018	Kimi Räikkönen	Ferrari	Shell
Mexico	28 Oct 2018	Max Verstappen	Red Bull Racing TAG Heuer	
Brazil	11 Nov 2018	Lewis Hamilton	Mercedes	Petronas
Abu Dhabi	25 Nov 2018	Lewis Hamilton	Mercedes	Petronas

Appendix 4. 2019 Grand Prix data

2019 RACE RESULTS

Grand Prix	Date	Winner	Winning constructor	Title sponsor
Australia	17.3.2019	Valtteri Bottas	Mercedes	Petronas
Bahrain	31 Mar 2019	Lewis Hamilton	Mercedes	Petronas
China	14 Apr 2019	Lewis Hamilton	Mercedes	Petronas
Azerbaijan	28 Apr 2019	Valtteri Bottas	Mercedes	Petronas
Spain	12 May 2019	Lewis Hamilton	Mercedes	Petronas
Monaco	26 May 2019	Lewis Hamilton	Mercedes	Petronas
Canada	09 Jun 2019	Lewis Hamilton	Mercedes	Petronas
France	23 Jun 2019	Lewis Hamilton	Mercedes	Petronas
Austria	30 Jun 2019	Max Verstappen	Red Bull Racing Honda	
Great Britain	14 Jul 2019	Lewis Hamilton	Mercedes	Petronas
Germany	28 Jul 2019	Max Verstappen	Red Bull Racing Honda	
Hungary	04 Aug 2019	Lewis Hamilton	Mercedes	Petronas
Belgium	01 Sep 2019	Charles Leclerc	Ferrari	Philip Morris
Italy	08 Sep 2019	Charles Leclerc	Ferrari	Philip Morris
Singapore	22 Sep 2019	Sebastian Vettel	Ferrari	Philip Morris
Russia	29 Sep 2019	Lewis Hamilton	Mercedes	Petronas
Japan	13 Oct 2019	Valtteri Bottas	Mercedes	Petronas
Mexico	27 Oct 2019	Lewis Hamilton	Mercedes	Petronas
United States	03 Nov 2019	Valtteri Bottas	Mercedes	Petronas
Brazil	17 Nov 2019	Max Verstappen	Red Bull Racing Honda	
Abu Dhabi	01 Dec 2019	Lewis Hamilton	Mercedes	Petronas