



# The divorce of FCA and Ferrari: the short-term impacts on shareholders' wealth

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Financial Analysis of Corporate Events

Sérgio Emanuel Ladeira Pires

152415033

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## **Abstract**

This dissertation presents a study on the impacts of Ferrari's separation from FCA on shareholders' wealth, on firms that are partially or totally owned by the Agnelli family and on FCA's direct competitors. We consider two relevant events during this separation, the announcement of Ferrari's spin-off and Ferrari's initial public offering. We test the impacts of both of these events separately using typical event study methodology and then we validate our assumptions. Our results show that the spin-off announcement has a positive impact on FCA's stock price, while the IPO has a negative impact on FCA's stock price and a positive effect on the stock prices of firms owned by the Agnelli family. FCA's direct competitors don't seem to be affected by any of the events. Our outcomes confirm the results of past research on the effects on parent companies' stock prices but deny some of the past research made on the impacts on industry rivals.

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## **Resumo**

A presente dissertação estuda o impacto da separação da Ferrari por parte do grupo FCA na riqueza dos accionistas, em empresas parcialmente ou totalmente detidas pela família Agnelli e nos concorrentes directos do grupo FCA. É tido em consideração dois eventos durante esta separação, o anúncio do *spin-off* e a *initial public offering* da Ferrari. É testado o impacto de ambos os eventos separadamente usando metodologia de estudos de eventos, do qual posteriormente validamos as suas suposições. Os resultados demonstram que o anúncio do *spin-off* tem um impacto positivo na acção do grupo FCA, enquanto que a *IPO* tem um efeito negativo no preço da acção do grupo FCA e um efeito positivo nas empresas detidas pela família Agnelli. Os concorrentes directos do grupo FCA não parecem ser afetados por nenhum dos eventos que foram tidos em consideração. Os nossos resultados confirmam a literatura existente dos efeitos nas acções das empresas-mãe mas rejeitam pesquisas feitas relacionadas com o impacto nos concorrentes da indústria.

**Título:** O divórcio entre FCA e Ferrari: os impactos de curto prazo no valor dos acionistas

**Autor:** Sérgio Emanuel Ladeira Pires

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## **1. Introduction**

The automotive industry is nowadays one of the most important industries. It includes some of the largest multinational groups around the world and several countries are actually quite dependent on them. The great attractiveness and growth of the industry have created space for new firms to enter it. However, in the past decades, its intense competition has led to low profit margins and therefore the need to follow strategies that innovate and create economies of scale. Acquiring other firms and spinning off businesses have been common techniques in this dynamic industry.

In this dissertation, we concentrate on the corporate decision of FCA, one of the largest automotive groups in Europe, on spinning off one of its most profitable and valuable brands, Ferrari. The management team of the FCA group believed that the value of its businesses standing alone would exceed the value of the joint company due to the elimination of negative synergies. This separation was performed in two main steps. First, by selling part of FCA's ownership of Ferrari in an initial public offering and afterward by spinning off the rest to its current shareholders.

Several authors like (Miles and Rosenfeld, 1983), (Hite and Owers, 1983) and (Cusatis, 1993) have examined the effects of corporate spin-offs on shareholder's wealth and proved that on average this corporate decision turns out to be successful and its announcement to deliver positive abnormal returns for the parent companies in the short- and long-terms. Initial public offering carve-outs generate cash for the parent company and usually yield positive returns for the new shareholders in the short- and long-term as well (Ritter and Welch, 2002). The IPO carve out aims on generating proceeds to FCA in order to reduce its net debt and help on financing a massive investment of \$48 billion proposed by FCA's CEO, Sergio Marchionne.

This dissertation will focus on understanding how these two ways of divesting a business impact shareholders' value. Firstly, we are going to see the impacts on FCA's stock price. Further, we are going to understand if there is a positive impact on firms related to FCA, by being partially or totally owned by the Agnelli family, its dominant shareholder. Lastly, we are going to check if the IPO and the announcement of the spin-off have an impact on FCA's competitors in Europe.

We use typical event study methodology that estimates the abnormal returns using four different models: two statistical models used in (MacKinlay, 2003), the constant mean return model and the market model, and two economic models, the CAPM and the Fama & French Three-factor model. We perform parametric tests and nonparametric tests on these models. The T-test is developed for the existence of abnormal returns and for the existence of cumulative abnormal returns statistically significantly different from zero. We compute three nonparametric tests: the sign test and the rank test, from (MacKinlay, 2003) and the Wilcoxon signed-rank test (McWilliams and Siegel, 1997).

Our results suggest that the announcement of Ferrari's spin-off has a strong positive effect on FCA's stock price, which indicates that shareholders and other investors consider this separation beneficial both for FCA and Ferrari. The listed firms partially or totally owned by the Agnelli family and FCA's largest competitors don't seem to be affected by this announcement. We find that the market model is the model that provides the best estimations of the abnormal returns out of the four models computed. We determine that the Volkswagen emissions scandal might be a confounding event for the initial public offering, despite being almost one month prior to it. We suspect that the constant mean return model is severely affected by this event. The market model finds statistically significant abnormal returns for the impact of the initial public offering on FCA's stock price, while the other models show opposite results. We also report a statistically significant positive abnormal return on the day of the IPO for the firms related to FCA by having the Agnelli family as an important shareholder, but not significant with the hypothesis of the cumulative abnormal returns being different from zero during its event window. Similarly to the spin-off announcement, the IPO doesn't seem to have an impact on the stock prices of FCA's competitors either.

This study is relevant academically because it takes into account several corporate finance topics, such as spin-offs and initial public offerings. Not much research has been done on corporate spin-offs when compared to research made on mergers and acquisitions, but it is actually a common strategy used by managers of large firms. Managers can also benefit from our research since it provides quantitative results for a well-known case and delivers insights on the procedures used. The financial decision of spinning off can be hard to make because it involves reducing the value of its firm but it can actually be beneficial for the firm and consequently increase shareholders' wealth.

This dissertation will now continue with a short literature review on the related topics, which includes the relevant results on similar research made on spin-offs and initial public offerings. Afterward, details about the methodology used will be provided. The sources of our data and an explanation how it was treated can be seen in the following section. Then, the relevant findings of the conducted tests will be presented, which will confirm or not our hypothesis and expectations. A validation of the assumptions that we follow on our event study methodology will also be developed. Lastly, conclusions will be made by discussing the results exhibited with past findings from other authors, and an idea for further research will be provided.

## **2. Literature Review**

### **2.1. Forms of divestiture**

Research has revealed three main forms of divestiture of corporate assets: sell-offs, spin-offs and IPO carve-outs. A sell-off is characterized by the sale of assets in exchange for cash. It has the advantage (or disadvantage) of avoiding the issuance of public securities. A spin-off happens when a firm decides to split into two separate businesses, which will decrease the value of the divesting firm and create a new firm in the market. The original shareholders of the divesting firm will maintain its value invested and its ownerships unchanged but the firm will not raise any additional funds as in the other two forms of divestiture. The third possibility for the divestiture of assets from a firm is through an initial public offering, in which the current shareholders sell part or the totality of its shares of the firm in the market for the first time to new shareholders. This form is usually called IPO carve-out and it is characterized by creating a new set of shareholders. It has the advantage of generating proceeds for the firm but it has some drawbacks as well, like losing control/ownership of the firm (old shareholders) and incurring on higher out-of-pockets expenses due to being subject to severe disclosure requirements by the regulatory bodies (Michaely and Shaw, 1995).

In this literature review, we will focus on understanding the reasons for using a spin-off and an IPO carve-out, which are the types of divestiture associated with Ferrari's separation from FCA.

## **2.2. Reasons for spin-offs**

As previously said, the parent company spins-off a division by giving to its shareholders equivalent shares of a newborn firm. In efficient markets, the parent firm would see its share price decrease but compensated by the value of the shares created in the newborn firm. In reality, it isn't a costless transaction and investors' expectations of the future can actually lead to huge gains or losses. The number of mergers and acquisitions have been decreasing a lot in the last decade and alternatively, downsizing firms have become more popular mainly to focus on each business core competences (Krishnaswami and Subramaniam, 1999). Hite and Owers (1983) report that the equity values of parent companies usually increase with the spin-off announcement of one of its businesses, while bondholders do not suffer any gains or losses. The same article illustrates an exception, in which a firm with financial, legal or regulatory difficulties perform a spin-off of one of its businesses. In this case, it normally leads to negative effects on stock prices. Additionally, Cusatis (1993) report positive abnormal returns in the long-term (up to three years) for parent companies as well.

Empirical literature has found many different valid reasons for the equity values to increase when managers use spin-offs. The need to follow different paths to increase future cash flows by eliminating negative synergies is clearly the most evident and common reason (Chemmanur, 2004). However, other reasons have been proved to be statistically relevant. Krishnaswami and Subramaniam (1999) state that spin-offs mitigate information asymmetry and Hakanson (1982) says that the increase in investors' flexibility to choose between capital gains or dividends is significant. Galai and Masulis (1976) argue that spin-offs reduce the power of the bondholders in favor of the shareholders and conclude that spin-offs perform better when the firm has risky debt. The benefits that arise with the elimination of negative synergies or other corporate advantages lead on average to an increase in equity prices and subsequently positive abnormal returns. Veld and Veld-Merkoulova (2009) found that the announcement of corporate spin-off yields on average 3.02% abnormal returns based on a sample of 26 historical spin-offs in Europe and Miles and Rosenfeld (1983) reached similar abnormal returns while proving that spin-offs provide higher returns for large firms than for small firms.

### **2.3. Reasons for IPO carve-outs**

Initial public offering is a type of public offering in which a private firm issues shares for the first time in the public market. Ritter and Welch (2002) report returns on the first day of trading of approximately 19% and a positive long-term performance of 22.6% for holding the shares during three years for all the documented IPOs in the United States from 1980 to 2001. For most cases, this corporate action yields positive returns on the first day of trading but it can be partially justified by the underpricing phenomena (Ibbotson and Ritter, 1995). It is also relevant to understand why CFOs decide to do an initial public offering. The most important motivation for going public is the creation of public shares for acquisitions (Fawcett, 2006). Additionally, IPOs can be performed by CFOs of parent firms with the purpose of selling assets to public shareholders and consequently decrease its share and investment in the subsidiary firm. This last type of initial public offering is usually called IPO carve-out. Research has been conducted on this matter and presents results on the attractiveness of this corporate action, both for new investors and for the sellers, as well as the reasons to undertake it. In one hand, Klein, Rosenfeld, and Beranek (1991) suggest that IPO carve-outs are usually underpriced and with large positive returns for the new shareholders. On the other hand, Pagano, Panetta, and Zingales (1998) found that the main reason firms in Italy do carve-outs of subsidiaries is to maximize the proceeds of parent firms due to high industry valuations. Other reasons have been found to justify the reduction in equity of the current shareholders. Vijn (2002) presents results, which indicate that efficiency concerns matter the most with statistically significant results on focus improvements and raising equity capital to repay debt or other financial contingencies of the parent's firm or the subsidiary's firm. The same author suggests that generating cash to invest on subsidiary's new projects is another relevant justifications. Allen and McConnell (1998) also get significant results for the use of IPO carve-outs to pay special dividends to its shareholders. Additionally, Powers (2003) reached results that suggest cumulative abnormal returns are reduced with the percentage of the firm sold in the IPO.

Both forms of divestiture that we focus, can clearly increase the value of the firm or be beneficial in some other way for the firm. However, the success of this corporate actions depends a lot on important details and that need a serious reflection, like understanding which underwriters can achieve better results or the timing of the action. For example, an IPO usually gets better results when the market is on a peak (Loughran and Ritter, 1995).

Also, Michaely and Shaw (1995) argue that the use of a spin-off or IPO carve-out depends on the firm's access to the capital markets, which makes spin-offs more attractive for smaller and less profitable firms, and IPOs more attractive for larger and profitable firms. The reputation of the brand can also be very important to attract investors according to (Rindova, Pollock, Hayward, 2006), and the amount of media coverage impacts the outcomes of an IPO (Pollock and Rindova, 2003). Brau, Francis and Kohers (2003) argue that investors' enthusiasm concerning IPOs depends on the industry in which the firm going public belongs, and proves by showing greater enthusiasm with high-tech firms going public during the technological boom.

#### **2.4. Divestiture effects on competitors**

Many studies have been conducted on the effects of firms' corporate decisions on its industry, with some achieving significant results and others not. For instance, Cheng and McDonald (1996) found statistically significant abnormal returns on firms related to the announcement of bankruptcy of a firm in the same industry, while Akhigbe, Madura, and Whyte (1997) show negative effects on firms due to the downgrade of bond ratings of a competitor. In contrast, Hertzell (1991) find no connections between the stock price of a firm and the announcement of stock repurchase by an industry rival. Akhigbe, Borde and Whyte (2003) point out two main reasons for achieving significance when testing if IPOs have an impact on the valuation of firms in the industry. First, it could indicate that changes are expected in the industry in the future. Second, it could result in reexaminations by investors of the competitiveness of each firm in the industry since the firm that went public has now more cash to invest in profitable projects. Slovin, Sushka and Ferraro (1995) get significant results, meaning that competitors respond negatively to the announcement of an IPO by an industry rival. However, Akhigbe, Borde and Whyte (2003) get insignificant results and argue that the competitiveness negative effect is offset by a positive information effect, associated with being the first IPO in the industry. Concerning spin-offs, Slovin, Sushka and Ferraro (1995) suggest that there is a positive impact on rivals' stock price due to the positive signal of the industry value.

### 3. Companies, industry and event overview

Fiat Chrysler Automobiles (FCA) is an Italian-owned corporation and currently the 7th largest automobile manufacturer in the world. The group operates in 40 countries and sales in over 140 around the world. For tax advantages, the firm is incorporated under the laws of the Netherlands and its headquarters are located in London, United Kingdom. It is listed on the New York Stock Exchange and on Borsa Italiana. It has several well-known brands in the mass-market segment including Alfa Romeo, Chrysler, Dodge, Fiat, Jeep, Lancia or Ram Trucks, in the luxurious segment with Maserati and Ferrari (at the time) and also in the components segment with Magneti Marelli. The largest owner of FCA is an investment company called Exor N.V., which is nowadays the second largest Italian company in terms of revenue, only after the oil and gas producer, Eni S.p.A. Exor N.V. is controlled by the Agnelli Family and it holds 29,19% of FCA's shares and 44,31% of its voting rights through a loyalty voting mechanism. Fiat (*Fabbrica Italiana Automobili Torino*) is one of the oldest automobile manufacturers in the world. It was founded in 1899 in Turin by Giovanni Agnelli. Later on, in 2014, before the announcement of Ferrari's spin-off, its board of directors decided to purchase the rest of the ownership in the Chrysler group. Subsequently, they pursued a corporate reorganization that would create FCA, the parent company of the group.

**Figure 1 - FCA's stock performance**

This figure presents FCA's stock performance in comparison to the benchmark, the FTSE MIB. We use daily returns from March 2014 to December 2016. These returns are normalized to a common starting point on the 3<sup>rd</sup> of March, 2014.

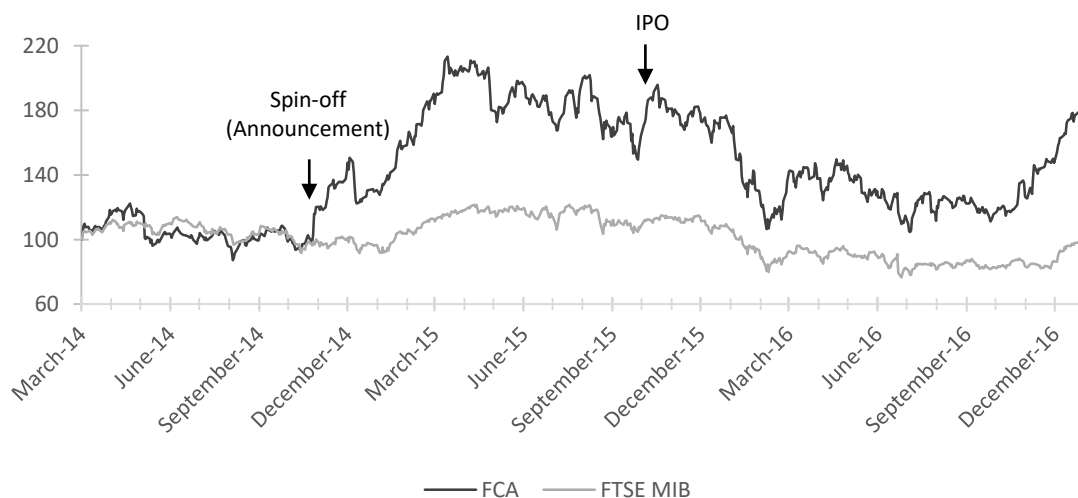
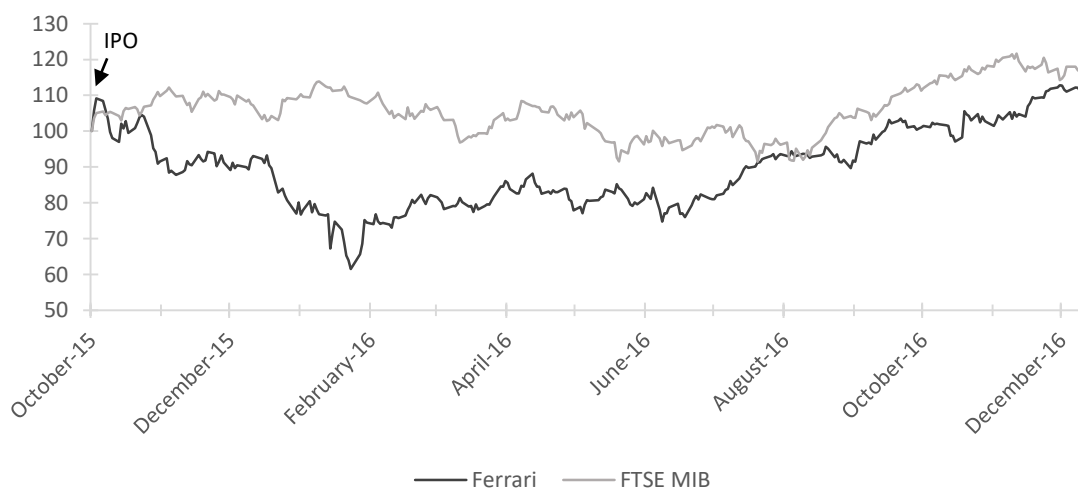


Figure 1 reports FCA's stock performance on Borsa Italiana in comparison to the benchmark, the FTSE MIB. FCA's share price on 2014 was traded at around \$5 and on the day of the announcement, it rose more than 12%. After the announcement, the stock price continued rising until the 16<sup>th</sup> of March, 2015, despite a significant loss in December, 2014.

Ferrari is currently one of the most reputable car companies in the world. It is incorporated under the Dutch laws and listed on the NYSE and on Borsa Italiana. Although the initial name of the company was Auto Avio Costruzioni, it was later renamed Ferrari after the company's founder, Enzo Ferrari. The production of Ferrari cars started in 1947 with a racing car and one year later it started producing its first road car. At the time, the firm was already well-known for its great performance in racing, which led the Fiat Group to buy a 50% stake in Ferrari in 1969. Even though its foundation was the creation of racing cars to compete in the most important racing competitions, the company had already created a strong brand in the road cars market as well by representing exclusivity in the automobile market, due to its expensiveness, but also by selling the fastest and most stylish cars in the marketplace. Before the spin-off, the shareholders of FCA controlled already 90% of the shares of Ferrari and the remaining 10% were owned by the son of Enzo Ferrari. Ferrari's stock price started trading on the 21<sup>st</sup> of October, 2015. 17.2 million shares were issued with an initial public offering price of \$52.

**Figure 2 - Ferrari's stock performance**

This figure presents Ferrari's stock performance in comparison to the benchmark, the FTSE MIB. We use daily returns from the 21st of October 2015 (first day as a listed company) to December 2016. These returns are normalized to a common starting point, the day of the initial public offering.

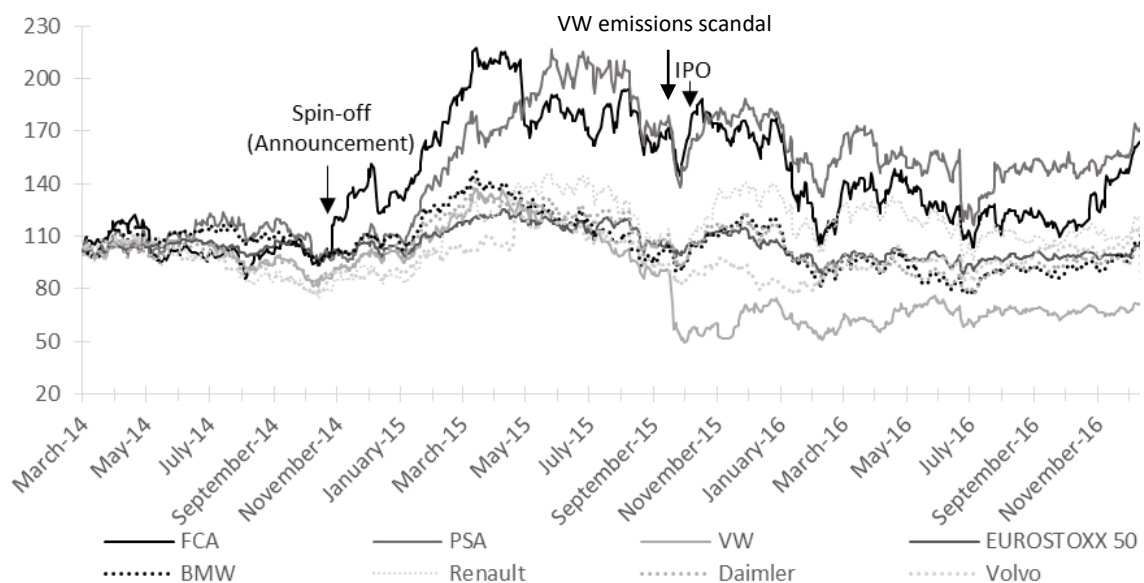


On the first trading day, investors had gains of approximately 6%, which translates to an \$11 billion valuation at the end of the day (from \$10 billion before the IPO). However, after the second day, it started dropping for six consecutive days. The stock price reached a minimum of \$32 in February before starting rising again to prices of almost \$60 at the end of 2016. The stock performance of Ferrari since its first trading day to the last trading day of 2016 can be seen in figure 2.

The automotive industry began at the end of the XIX century in the United States of America and it includes the design, development and production of motor vehicles. It has already become one of the world’s most important industries in terms of revenue and it has been growing strongly over the past few decades, despite the huge losses during the global financial crisis between 2008 and 2010. The current largest producers of motor vehicles are Toyota, Volkswagen and General Motors. In Europe, the market is quite competitive with a few large producers. The stock performance of the largest producers from Europe can be seen in figure 3. Two companies strongly outperformed the market: FCA and PSA. Volkswagen (VW) clearly underperformed the benchmark due to a corporate scandal that we will address later on in this dissertation. The other firms had similar performances when compared to the EUROSTOXX 50.

**Figure 3 - FCA competitor’s stock performance**

This figure reports FCA competitor’s stock performance in comparison to the benchmark, the EUROSTOXX 50. We use daily returns from March 2014 to December 2016. These returns are normalized to a common starting point on the 3<sup>rd</sup> of March, 2014.



On 29<sup>th</sup> of October, 2014, Fiat Chrysler Automobiles announced its intention to spin-off Ferrari. One month before the announcement, the CEO of FCA Sergio Marchionne publicly criticized Ferrari's Formula 1 racing team performance and the work of Luca Montezemolo, the CEO of the Ferrari group. The press had been claiming that disagreements had occurred between both CEOs about Ferrari's production level, which led to the step out of Luca Montezemolo from the company. As seen in the literature review, spin-offs might lead to the elimination of negative synergies and consequently create value for the shareholders. The shareholders of FCA expected the sum of each firm separately to exceed the value of the firm as a whole due to the existence of negative aspects of working together. In one hand, Ferrari would get financial and operational independence. On the other hand, FCA would see its balance sheet strengthened and would easily accomplish its funding requirements. Marchionne in May, 2014 presented an ambitious business plan to grow FCA by 2018. In this plan, a \$48 billion investment would be made to turn three of its brands (Alfa Romeo, Jeep and Maserati) into global brands and then search for a partner to merge and share the costs of developing more technologic and cleaner cars. This plan was afterward updated with the announcement of Ferrari's spin-off that would help the firm on accomplishing its objectives by strengthening FCA's balance sheet. Moreover, both firms would have the possibility to follow different growth strategies and achieve better results in the long-term.

The board of directors of FCA decided to do this separation using an IPO and a spin-off and making it in different moments in time. This way, not only they would benefit by eliminating negative synergies, but also generate proceeds that would allow a net debt reduction and finance the \$48 billion investment. In order to facilitate this initial public offering, a restructuring of the firm was performed by establishing Ferrari N.V. (or "Predecessor Ferrari"), a holding company that fully owned Ferrari S.p.A. The IPO was made by publicly offering approximately 10% of Ferrari N.V. in the New York Stock Exchange with the "sexy" sticker RACE. To complete the separation, the remaining 80% of FCA shares was spun off to its current shareholders. Each shareholder of FCA was entitled to receive one share of Ferrari for every 10 of FCA and one special voting share of Ferrari for every 10 of FCA. Additionally, each holder of MCSs (Mandatory Convertible Securities) would receive around 0.78 common shares of Ferrari for each MCS that they hold of FCA. The spin-off was completed on the 3<sup>rd</sup> of January 2016 and investors until the last trading day of 2015 would be entitled to receive Ferrari's shares.

Right after the spin-off, “Predecessor Ferrari” merged with Ferrari. Each shareholder of “Predecessor Ferrari” was entitled to receive one share of Ferrari for each share of “Predecessor”. The same ratio was applied for the special voting rights. The shares of “Predecessor Ferrari” were canceled following the merger.

In Italy, it is still very common for families to run multi-company groups through holding companies (Barca, 1995). The Agnelli family via Exor S.p.A. controls a large share of Ferrari as well, and together with the son of Enzo Ferrari control 51% of the voting rights of the latest after the separation due to a loyalty voting mechanism. Apart from the FCA group, Exor N.V., has also other large investments, namely the control of Juventus F.C and PartnerRE and significant shares of the Economist Group and CNH Industrial. The impact of the separation on the listed firms that the Agnelli Family has an important stake, specifically Juventus F.C and CNH Industrial, are also analyzed in this dissertation.

#### **4. Empirical Methodology**

Event studies measure the impact of a specific event on security prices of firms or on financial markets. This type of methodology has already been extensively used in finance. Fama et al., (1969) performed the first event study by testing the effects of stock splits on equity prices. Up to date, many topics have been researched in this field, in order to determine the effects of external events, such as terrorism, elections or environmental disasters, and also the effects of internal events, i.e., of corporate actions directly related to the firm, such as earnings announcement, capital structure changes and CEO turnover.

Event studies have three main assumptions based on (McWilliams and Siegel, 1997): the market is efficient enough to see a reflection on security prices immediately after the event; the event is totally unanticipated and announced by the press; and confounding effects do not impact the event, i.e., other events that may have happened do not affect the outcomes of the event being studied. In this dissertation, we follow the methodology used by (MacKinlay, 2003). Additionally, more complex tests are developed for comparison.

## 4.1. Abnormal returns calculation

Abnormal returns can be calculated using the following formula:

$$AR_{it} = R_{it} - E(R_{it}|X_t) \quad (1)$$

where  $R_{it}$  is the actual return and  $E(R_{it}|X_t)$  the estimated returns for security  $i$  at period  $t$ . When we have samples with multiple securities we perform an average of the abnormal returns as follows:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it} \quad (2)$$

where  $N$  represents the number of securities in the sample.

MacKinlay (2003) performed two statistical models to estimate the “normal returns”, the Constant Mean Return Model and the Market Model. On top of that, we perform two economic models, the CAPM model and the Fama & French three factor model, in order to get results that are not exclusively based on statistical assumptions, but also on investor’s behavior.

### 4.1.1. Models estimating normal performance

#### 4.1.1.1. Constant Mean Return Model

It is the simplest model known but sometimes one of the most successful. It can be estimated by:

$$R_{it} = \mu_i + \zeta_{it} \quad (3)$$

$$E(\zeta_{it}) = 0 \quad \text{var}(\zeta_{it}) = \sigma_{it}^2$$

where  $\mu_i$  is the average return during the estimation window for security  $i$  and  $\zeta_{it}$  is the disturbance term for security  $i$  at period  $t$ .

#### 4.1.1.2. Market Model

This model uses the market portfolio as a predictor of the returns of a security and can be defined as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (4)$$

$$E(\varepsilon_{it}) = 0 \quad \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

where  $R_{mt}$  is the return on the market portfolio at period  $t$ .  $\varepsilon_{it}$  is the disturbance term which is expected to be zero, while  $\alpha$ ,  $\beta$  and  $\sigma_{\varepsilon_i}^2$  are the parameters of the model.

#### 4.1.1.3. Capital Asset Pricing Model (CAPM)

Additionally, we perform the CAPM model. This one-factor model was developed by (Sharpe, 1964), (Lintner, 1965), (Treynor, 1965) and (Mossin, 1966) and imposes restrictions on statistical models by achieving an equilibrium where the expected returns of the assets vary linearly with its covariance with the market portfolio. Although it has been discovered questionable deviations on the constraints imposed on the market portfolio and its use in the event study methodology have decreased substantially, we believe it's the basis to perform a more complex model, such as the Fama & French three-factor model. For any security  $i$  the CAPM model is:

$$R_{it} = r_{ft} + \beta_i(R_{mt} - r_{ft}) + \varepsilon_{it} \quad (5)$$

$$E(\varepsilon_{it}) = 0 \quad \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

where  $r_{ft}$  and  $R_{mt} - r_{ft}$  are the period  $t$  risk-free rate and market risk, respectively.

#### 4.1.1.4. Fama & French three-factor model

We also perform a multifactor model to see if by adding factors to the CAPM model we can improve the estimation of our results. However, most of the times the gains of using additional factors in event studies are not significant due to the small reduction in the variance of abnormal returns. The Fama & French three-factor model can be seen below:

$$R_{it} = r_{ft} + \alpha_i + \beta_1(R_{mt} - r_{ft}) + \beta_2 SMB + \beta_3 HML + \varepsilon_{it} \quad (6)$$

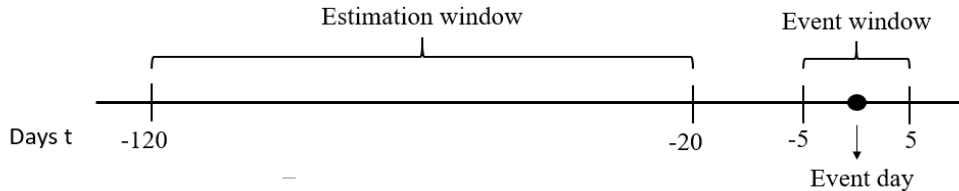
$$E(\varepsilon_{it}) = 0 \quad \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

where SMB is the size factor, HML is the value factor,  $R_{mt} - r_{ft}$  is the market risk premium and  $\alpha_i$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\sigma_{\varepsilon_i}^2$  are parameters of the model.

## 4.1.2. Estimation and event windows

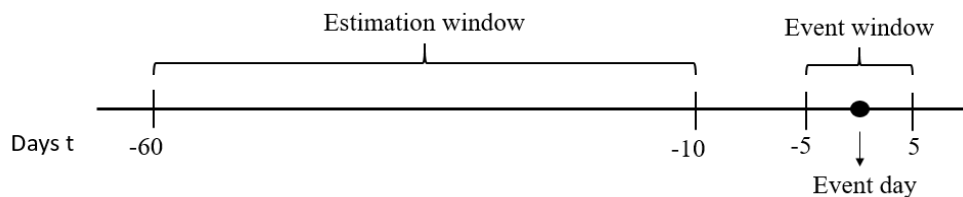
### 4.1.2.1. Spin-off announcement

The estimation and event windows for the announcement of the spin-off can be defined as:



Our estimation window has 100 observations, i.e., 100 days, starting 125 days before the event date. The event window comprises 11 days: 5 days before the event to include inside trading and speculation in the changes of the stock price; the event day, October 29<sup>th</sup>, 2014; and 5 days after the event, to avoid problems of liquidity and possible slow reactions of the market to the event. In the validation section, we extend our event windows ( $t = -20$  to 1) and ( $t = 1$  to 20) to see if there are statistically significant abnormal returns before and after the event, but we guarantee there is no overlapping of the estimation and event windows.

### 4.1.2.2. Initial Public Offering



For the IPO event, its estimation window has 60 observations, i.e., 60 days, starting 70 days before the event date. It has fewer observations when compared with the other event we are analyzing (the spin-off announcement) due to the overlapping concern between both events. The event window has 11 days, similarly to the spin-off announcement, which includes: 5 days before the event; the event day October 21<sup>st</sup>, 2015; and 5 days after the event. For the validation section, we test the existence of abnormal returns for extended event windows ( $t = -10$  to 1) and ( $t = 1$  to 10).

In order to test the impact on FCA's stock price and on the related firms, we use the number observations stated before. However, to test the impact on FCA's competitors, the number of observations in the estimation window for each firm might be different. This situation can be justified by the direct competitors of FCA being from different countries in Europe, which have different holidays, e.g. national holidays or religious holidays. As a way to solve this problem, we decided to keep the starting point the same for every firm and have fewer observations for some securities during the estimation window. The event windows are not affected by holidays in both events.

### 4.1.3. Aggregation of abnormal returns

To solve the problem of the abnormal returns being stochastic, an aggregation of these returns is necessary by summing the differences that exist between the actual and the estimated returns through time and across securities. This aggregation is usually called average cumulative abnormal return (CAAR) and can be calculated as follows:

$$CAAR(t_1, t_2) = \sum_{t=t_1}^{t_2} CAAR_t \quad (7)$$

where  $t_1$  and  $t_2$  are the starting and ending days of the event window, respectively.

## 4.2. Parametric tests

Parametric tests assume that the distribution is normal. The parameters of the models are estimated using ordinary least squares (OLS). We compute the t-test for the abnormal returns and for the cumulative abnormal returns. The t-test for the abnormal returns can be done, under the null hypothesis,  $H_0$ , that the event has no impact on returns ( $AAR_{it} = 0$ ), in terms of mean or variance. The null hypothesis is tested using:

$$t_{AAR_t} = \frac{AAR_t}{\sqrt{VAR(AAR_t)}} \quad (8)$$

where for a large estimation window:

$$VAR(AAR_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{\varepsilon_i}^2 \quad (9)$$

We also compute the t-test for the cumulative abnormal returns. Under the null hypothesis,  $H_0$ , the cumulative abnormal returns are not different from zero, which is the same to say that the event has no impact on stock prices ( $CAAR_{it} = 0$ )

$$t_{CAAR_t} = \frac{CAAR(t_1, t_2)}{\sqrt{VAR(CAAR(t_1, t_2))}} \quad (10)$$

where

$$VAR(CAAR(t_1, t_2)) = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(t_1, t_2) \quad (11)$$

and asymptotically for large estimation windows:

$$\sigma_i^2(t_1, t_2) = (t_2 - t_1 + 1)\sigma_{\varepsilon_i}^2 \quad (12)$$

### 4.3. Nonparametric tests

The previous tests make assumptions about the probability distribution of the abnormal returns. Nonparametric tests are alternative approaches that don't make any assumption about it and are extremely valuable for small samples event studies. Small samples tend to be more sensitive to the existence of outliers and nonparametric tests have the ability to identify them. It also provides a robustness check for the parametric tests. In this dissertation, we apply the sign test and the rank test used in (MacKinlay, 2003). Additionally, we perform the Wilcoxon signed-rank test which takes into consideration both the sign and the size of the abnormal returns estimated.

#### 4.3.1. Sign test

The sign test was developed by (Cowan, 1992) and it is today one of the most widely used nonparametric tests. It tests if the probability of having a positive or a negative CAR is equally likely. For that, it is determined the sign (positive or negative) for each of the abnormal returns of the event window. Under the null hypothesis, it expects 0.5 to be the proportion of positive abnormal returns in the event window. The test can be done as follows:

$$t_{sign} = \left[ \frac{N^+}{N} - 0.5 \right] \frac{\sqrt{N}}{0.5} \quad (13)$$

where  $N$  is the total number of observations and  $N^+$  the number of positive observations. However, this test has some drawbacks. First, it does not take into consideration the skewness of the abnormal returns, i.e., the magnitude of the abnormal returns is totally ignored, only the sign is considered. Second, as the sample increases, the test loses power.

#### 4.3.2. Rank test

As opposed to the sign test, (Corrado, 1989) proposed the rank test which tests the existence of abnormal returns based on a ranking comprising the abnormal returns during the event window and ignoring the sign of the observation

$$t_{rank} = \frac{\frac{1}{N} \sum_{i=1}^N \left( K_{i0} - \frac{t_2 - t_1 + 1}{2} \right)}{s(K)} \quad (14)$$

with

$$s(K) = \sqrt{\frac{1}{L2} \sum_{t_2=T_1+1}^{T_2} \left( \frac{1}{N} \sum_{i=1}^N \left( K_{it} - \frac{t_2 - t_1 + 1}{2} \right) \right)^2} \quad (15)$$

#### 4.3.3. Wilcoxon signed-rank test

This test comprises the characteristics of both the sign test and the rank test. It ranks the absolute values of the abnormal returns and takes the sign into the equation. The value of the test for small samples ( $N < 10$ ) can be calculated as following:

$$W = \left| \sum_{i=1}^N [sgn(AR_{it})R_{it}] \right| \quad (16)$$

The null hypothesis of no abnormal returns is rejected when  $W < W_{critical\ value}$ .  $W_{critical\ value}$  is based on the sample size and on the significance level, and it is presented on the Wilcoxon signed-rank test table. As the sign test, this test loses power with a larger sample but it doesn't work with samples too small either ( $N < 5$ ).

## 5. Data and Variables

For the purpose of our study, we started by defining the most appropriate firms for our samples. We determined the declared shareholdings of Exor N.V. at the time of the spin-off announcement, which is controlled by the Agnelli family. Exor N.V. had significant ownership in 7 different firms. From those, we excluded 4 for not being listed on any stock exchange and of course, FCA. We ended up with only 2 firms, as our sample of “related firms”, Juventus F.C. and CNH Industrial. Additionally, we identified a sample of 6 competitors of FCA in the automotive industry in Europe: Volkswagen, Daimler, BMW, PSA, Renault and Volvo. Given that FCA is one of the largest firms in the industry, we decided to do the sample using the firms that have comparable levels of consolidated revenue and restrict it to European firms.

Then, we obtained from Thompson Reuters Eikon the daily closing prices and percentage change of the stock prices of: FCA; the “related firms”; and the six largest competitors of FCA in Europe. Our sample periods comprise the prices and returns for the estimation and event windows. For the spin-off announcement our sample is from 6<sup>th</sup> of May, 2014 to 5<sup>th</sup> of November, 2014, while for the initial public offering is from 15<sup>th</sup> of July, 2015 to 28<sup>th</sup> of October, 2015. Moreover, to plot the stock performances in section 3, we retrieve the daily changes in the stock prices from the 3<sup>rd</sup> of March, 2014 to the 30<sup>th</sup> of December, 2016.

For the market portfolio used in the Market Model, we selected two different stock indices: the FTSE MIB, the benchmark stock index of Borsa Italiana stock exchange that is used in the tests concerning the impacts on FCA’s stock price and on the related firms; and the EURO STOXX 50 that includes the fifty largest and most liquid firms in the Eurozone and that will be used to test the impacts on FCA’s direct competitors. The index prices and changes were retrieved from Thompson Reuters Eikon as well and for the same period as for the stock prices.

To run the Fama & French three-factor model, we extracted from the Kenneth French Data Library the data for the three relevant factors: SMB (Small minus Big), HML (High minus Low) and MRP (market risk premium). SMB is the difference between the average returns on three small portfolios and three big portfolios based on market capitalization, while HML is the difference between the average returns of two value portfolios and two

growth portfolios. The MRP is the excess return on the market, i.e., the difference between a market portfolio comprising the equity prices of the largest stock exchanges in the United States (NYSE, AMEX and NASDAQ) and the one-month Treasury bill rate. The market risk premium and the risk-free rate used in the CAPM model were also obtained from the dataset used in the Fama & French three-factor model.

## 6. Main Results

### 6.1. Spin-off announcement

#### 6.1.1. FCA's stock price

Table 1 shows the abnormal returns and cumulative abnormal returns for FCA's stock price during our event window. During this observation period, it reached a cumulative abnormal return between 15.93% and 21.15%, depending on the model. The average cumulative abnormal returns can be seen in figure 4. The t-tests support the idea that the announcement of Ferrari's spin-off has a positive impact on its parent company's stock price. We can see t-stats over 3 for most models which reject the null hypothesis of the CARs being equal to zero. Additionally, we get several days in our event window, using different models, which reject the hypothesis of no abnormal returns at the 5% significance level.

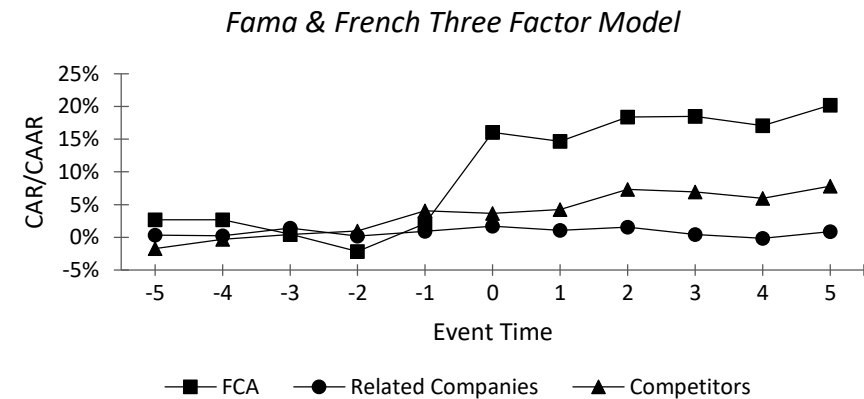
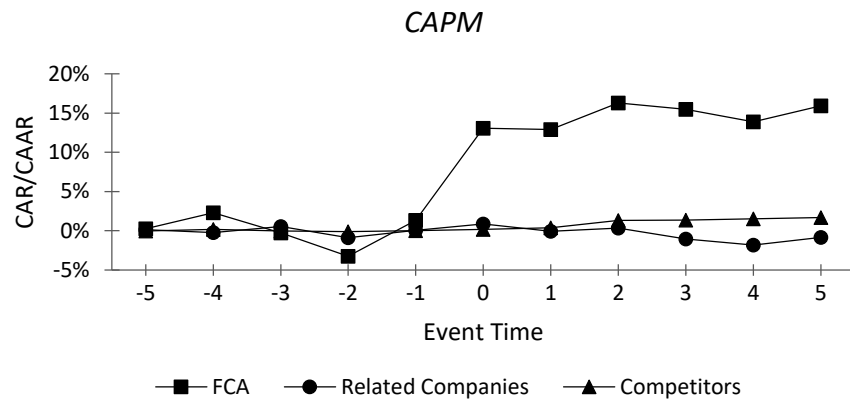
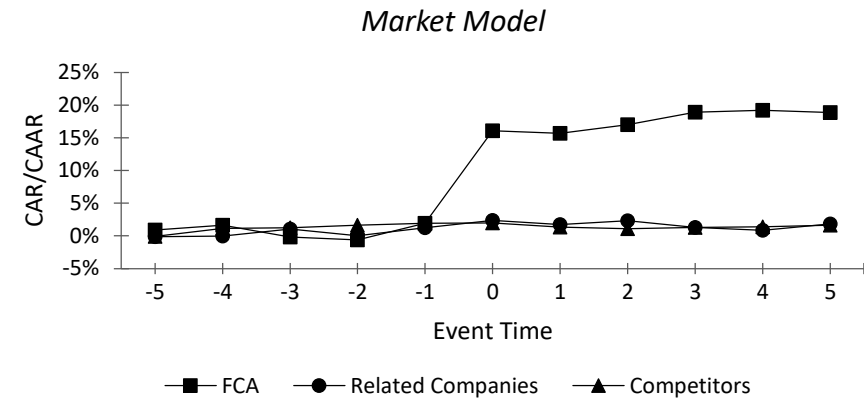
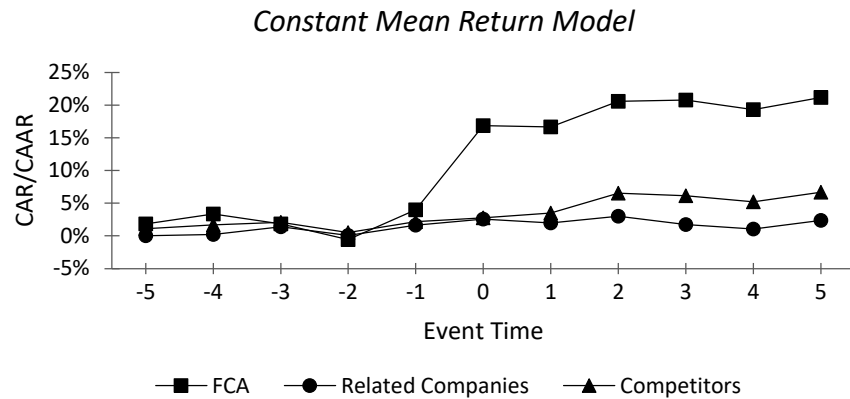
The Constant Mean Return Model gets an expected return of -0.08% that the model makes static during the event window. We can see positive abnormal returns in 3 of the 5 days before the event day but statistically significant only on the last one. The event day faces a huge rise in the stock price, which corresponds to a 12.87% abnormal return and an unsurprising t-value of 6.36. This abnormal return clearly rejects the null hypothesis of the event having no impact on the stock price of FCA.

Using the market model, we even get a higher abnormal return on the event day of approximately 14%. This model actually increases precision when compared to the constant model because. The standard errors decrease from 2.02% to 1.74% by using this model and  $H_0$  is strongly rejected with a t-value of 8.15.

Similar results are provided by the economic models. Both the CAPM and the Fama & French regressions evidently reject the null hypothesis. In addition, these models reject

**Figure 4 - Average cumulative abnormal returns for the spin-off announcement**

This figure plots the cumulative abnormal returns/average cumulative abnormal returns in percentage for the announcement of the spin-offs on FCA's stock price, related companies and on competitors from event day -5 to event day 5. These returns are computed using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model.



**Table 1 - Results for the impacts of Ferrari's spin-off announcement on FCA's stock price**

Event day	Constant Mean Return				Market Model				CAPM				Fama & French Three-Factor Model			
	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat
-5	1.85%	0.91	1.85%	0.28	0.90%	0.52	0.90%	0.16	0.24%	0.12	0.24%	0.04	2.69%	1.33	2.69%	0.40
-4	1.48%	0.73	3.33%	0.50	0.72%	0.41	1.61%	0.28	2.05%	1.02	2.29%	0.34	0.01%	0.00	2.70%	0.40
-3	-1.49%	-0.74	1.84%	0.27	-1.80%	-1.03	-0.18%	-0.03	-2.57%	-1.28	-0.28%	-0.04	-2.20%	-1.09	0.49%	0.07
-2	-2.39%	-1.18	-0.55%	-0.08	-0.46%	-0.26	-0.64%	-0.11	-2.98%	-1.48	-3.26%	-0.49	-2.67%	-1.32	-2.18%	-0.32
-1	4.54%	2.24**	3.99%	0.59	2.55%	1.46	1.91%	0.33	4.58%	2.28**	1.33%	0.20	4.29%	2.11**	2.11%	0.31
0	12.87%	6.36**	16.86%	2.51**	14.18%	8.15**	16.09%	2.79**	11.73%	5.84**	13.06%	1.96	13.95%	6.87**	16.05%	2.38**
1	-0.21%	-0.10	16.65%	2.48**	-0.41%	-0.24	15.67%	2.72**	-0.15%	-0.08	12.91%	1.94**	-1.39%	-0.69	14.66%	2.18**
2	3.93%	1.94*	20.59%	3.07**	1.35%	0.78	17.02%	2.95**	3.39%	1.69	16.29%	2.45**	3.73%	1.84	18.39%	2.73**
3	0.20%	0.10	20.78%	3.10**	1.88%	1.08	18.91%	3.28**	-0.83%	-0.42	15.46%	2.32**	0.09%	0.05	18.49%	2.75**
4	-1.49%	-0.73	19.30%	2.88**	0.32%	0.18	19.23%	3.33**	-1.56%	-0.78	13.89%	2.09**	-1.41%	-0.69	17.08%	2.54**
5	1.85%	0.91	21.15%	3.15**	-0.35%	-0.20	18.88%	3.27**	2.04%	1.01	15.93%	2.39**	3.13%	1.54	20.20%	3.00**

This table reports the abnormal returns (AR) and cumulative abnormal returns (CAR) of the impacts of the spin-off announcement on FCA's stock price from event day -5 to event day 5. The normal returns are calculated using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model. The t-stat values determine whether the null hypothesis of no abnormal returns or cumulative abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level

\*\* Rejects the null hypothesis at the 5% significance level

$H_0$  in the day before the event at the 5% significance level and a t-stat between 2.1 and 2.3.

Nonparametric tests show opposite results between each other (Table 2). The sign test does not go along with the parametric tests used, mainly because it does not consider the magnitude of the abnormal returns. The rank test seems to achieve better results in this case. The day of the announcement of the spin-off is top ranked in the four models used which strongly rejects the null hypotheses of no abnormal returns with a t-stat of 7.91 for the four models.

**Table 2 - Results of the impacts on FCA’s stock price using nonparametric tests**

This table reports the results of the sign test and rank test for the impacts of the spin-off announcement and IPO on FCA’s stock price using four models for the estimation of the abnormal returns: constant mean return model (CMR), market model (MM), CAPM and Fama & French three-factor model (FF3FM). The t-stat values determine whether the null hypothesis of equally probable that CAR is positive or negative (Sign test) and no abnormal return for event day 0 (Rank test).

\* Rejects the null hypothesis at the 10% significance level and \*\* Rejects the null hypothesis at the 5% significance level

Tests	Spin-off (Announcement)				IPO			
	CMR	MM	CAPM	FF3FM	CMR	MM	CAPM	FF3FM
<b>Sign Test</b>	0.90	0.90	0.30	0.90	-0.30	0.30	-0.30	-0.30
<b>Rank Test</b>	7.91**	7.91**	7.91**	7.91**	7.91**	7.91**	7.91**	5.06**

### 6.1.2. Related firms and Competitors

For the firms related to FCA by being partially owned by its largest shareholder, results are very similar between the four models. These results are presented in Table 3. As we expected, the null hypothesis isn’t rejected in any of the days, i.e., the results are consistent with the possibility of the event having no impact on stock prices. Actually, both firms being analyzed, Juventus FC and CNH Industrial achieve cumulative abnormal returns with opposite signs, with the first having a negative CAR and the second a positive CAR, during its event window. Even though the standard errors are fairly small (approximately 1%), the existence of a small sample and abnormal returns with opposite signs in some of the days in our event window, it leads to a low average abnormal return and consequently to a low t-statistic.

**Table 3 - Results for the impacts of Ferrari's spin-off announcement on related companies**

Event day	Constant Mean Return				Market Model				CAPM				Fama & French Three-Factor Model			
	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat
-5	0.02%	0.02	0.02%	0.01	-0.14%	-0.15	-0.14%	-0.05	0.15%	0.15	0.15%	0.04	0.35%	0.35	0.35%	0.10
-4	0.22%	0.22	0.24%	0.07	-0.05%	0.10	-0.05%	-0.02	-0.38%	-0.39	-0.24%	-0.07	-0.11%	-0.11	0.23%	0.07
-3	1.18%	1.16	1.42%	0.42	1.07%	1.25	1.07%	0.36	0.79%	0.81	0.55%	0.17	1.17%	1.17	1.41%	0.42
-2	-1.33%	-1.32	0.08%	0.02	0.00%	-1.20	0.00%	0.00	-1.44%	-1.47	-0.89%	-0.27	-1.22%	-1.22	0.19%	0.06
-1	1.58%	1.56	1.66%	0.49	1.27%	1.42	1.27%	0.43	0.95%	0.97	0.06%	0.02	0.72%	0.72	0.91%	0.27
0	0.92%	0.91	2.58%	0.77	2.36%	1.22	2.36%	0.80	0.82%	0.83	0.88%	0.27	0.80%	0.80	1.71%	0.52
1	-0.59%	-0.58	1.99%	0.59	1.72%	-0.71	1.72%	0.58	-0.96%	-0.98	-0.08%	-0.02	-0.64%	-0.64	1.07%	0.32
2	0.99%	0.98	2.98%	0.89	2.32%	0.67	2.32%	0.79	0.41%	0.42	0.33%	0.10	0.49%	0.49	1.56%	0.47
3	-1.23%	-1.22	1.75%	0.52	1.32%	-1.13	1.32%	0.45	-1.39%	-1.42	-1.06%	-0.33	-1.13%	-1.13	0.42%	0.13
4	-0.72%	-0.71	1.03%	0.31	0.85%	-0.53	0.85%	0.29	-0.76%	-0.78	-1.82%	-0.56	-0.57%	-0.57	-0.14%	-0.04
5	1.32%	1.30	2.36%	0.70	1.83%	1.10	1.83%	0.62	0.99%	1.02	-0.83%	-0.25	1.02%	1.02	0.88%	0.27

This table reports the average abnormal returns (AAR) and average cumulative abnormal returns (CAAR) of the impacts of the spin-off announcement on the related companies' stock price from event day -5 to event day 5. The normal returns are calculated using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model. The t-stat values determine whether the null hypothesis of no average abnormal returns or average cumulative abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level

\*\* Rejects the null hypothesis at the 5% significance level

**Table 4 - Results for the impacts of Ferrari's spin-off announcement on competitors**

Event day	Constant Mean Return				Market Model				CAPM				Fama & French Three-Factor Model			
	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat
-5	1.11%	1.60	1.11%	0.48	-0.07%	-0.14	-0.07%	-0.04	-0.04%	-0.08	-0.04%	-0.02	-1.72%	-3.01**	-1.72%	-0.91
-4	0.56%	0.80	1.67%	0.72	1.22%	2.61**	1.15%	0.74	0.23%	0.43	0.19%	0.11	1.42%	2.49**	-0.29%	-0.15
-3	0.39%	0.56	2.06%	0.89	0.08%	0.17	1.23%	0.79	-0.21%	-0.39	-0.02%	-0.01	0.72%	1.26	0.43%	0.23
-2	-1.56%	-2.24**	0.50%	0.22	0.43%	0.93	1.66%	1.07	-0.09%	-0.16	-0.10%	-0.06	0.52%	0.92	0.95%	0.50
-1	1.70%	2.43**	2.20%	0.95	0.26%	0.55	1.92%	1.24	0.14%	0.25	0.03%	0.02	3.12%	5.47**	4.07%	2.15**
0	0.55%	0.79	2.74%	1.19	0.05%	0.10	1.96%	1.27	0.16%	0.29	0.19%	0.11	-0.40%	-0.71	3.67%	1.94*
1	0.75%	1.08	3.50%	1.51	-0.60%	-1.29	1.36%	0.88	0.21%	0.38	0.39%	0.22	0.56%	0.98	4.23%	2.23**
2	3.06%	4.38**	6.55%	2.83**	-0.25%	-0.54	1.11%	0.72	0.93%	1.74*	1.33%	0.75	3.12%	5.46**	7.34%	3.88**
3	-0.42%	-0.61	6.13%	2.65**	0.20%	0.42	1.31%	0.84	0.03%	0.05	1.35%	0.76	-0.40%	-0.69	6.95%	3.67**
4	-0.93%	-1.33	5.20%	2.25**	0.10%	0.21	1.40%	0.91	0.17%	0.32	1.52%	0.86	-0.98%	-1.72*	5.96%	3.15**
5	1.46%	2.09**	6.66%	2.88**	0.22%	0.47	1.62%	1.05	0.14%	0.26	1.66%	0.93	1.86%	3.26**	7.82%	4.13**

This table reports the average abnormal returns (AAR) and average cumulative abnormal returns (CAAR) of the impacts of the spin-off announcement on competitors' stock prices from event day -5 to event day 5. The normal returns are calculated using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model. The t-stat values determine whether the null hypothesis of no average abnormal returns or average cumulative abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level

\*\* Rejects the null hypothesis at the 5% significance level

The sign test and the rank test achieve the same results as the t-tests at the 5% significance level. Certainly, the tests fail to reject the null hypothesis and it is possible to say that no impact exists on the listed firms partially or totally owned by the Agnelli family with a 95% confidence interval. These results can be seen in Table 5.

**Table 5 – Results of the impacts on related companies using nonparametric tests**

This table reports the results of the sign test and rank test for the impacts of the spin-off announcement and initial public offering using four different models for the estimation of the abnormal returns: constant mean return model (CMR), market model (MM), CAPM and Fama & French three-factor model (FF3FM). The t-stat values determine whether the null hypothesis of equally probable that CAR is positive or negative (Sign test) and no abnormal return for event day 0 (Rank test).

\* Rejects the null hypothesis at the 10% significance level and \*\* Rejects the null hypothesis at the 5% significance level

Tests	Spin-off (Announcement)				IPO			
	CMR	MM	CAPM	FF3FM	CMR	MM	CAPM	FF3FM
Sign Test	0.00	0.43	-0.43	-0.85	1.28	1.28	0.85	0.85
Rank Test	0.50	1.34	1.17	1.19	6.92**	3.31**	11.91**	10.89**

Ferrari’s announcement of the spin-off does not seem to have an impact on the share prices of direct competitors of FCA either, as it can be seen in Table 4. The null hypothesis is rejected in every day of the event window for both models that give a greater importance to the market when predicting the expected returns, the market model and the CAPM. The other two models reject the null hypothesis two days after the event and in addition, the Fama & French rejects it on the day preceding the event day as well. To analyze the impact on competitors, i.e., on the European automotive industry, the models that exclusively use the market as a predictor get much lower abnormal returns, i.e., these present higher accuracy in predicting the stock prices of these firms. The market model should be considered a better model in this case because it uses as benchmark and predictor, the European market, while the CAPM and Fama & French use an American market as its benchmark.

Nonparametric tests report similar results to those from the t-tests (Table 6). The rank test and Wilcoxon signed-rank test don’t reject the null hypothesis for any of the models used. The sign test sees the constant mean return and the CAPM not rejecting the null

hypothesis, while the CAPM and the Fama & French three-factor model reject it with a t-stat of 2.22 at the 5% significance level.

**Table 6 - Results of the impacts on competitors using nonparametric tests**

This table reports the results of the sign test, rank test and wilcoxon signed-rank test for the impacts of the spin-off announcement and initial public offering using four different models for the estimation of the abnormal returns: constant mean return model (CMR), market model (MM), CAPM and Fama & French three-factor model (FF3FM). The t-stat values determine whether the null hypothesis of equally probable that CAR is positive or negative (Sign test) and no abnormal return for event day 0 (Rank test and wilcoxon signed-rank test).

\* Rejects the null hypothesis at the 10% significance level and \*\* Rejects the null hypothesis at the 5% significance level

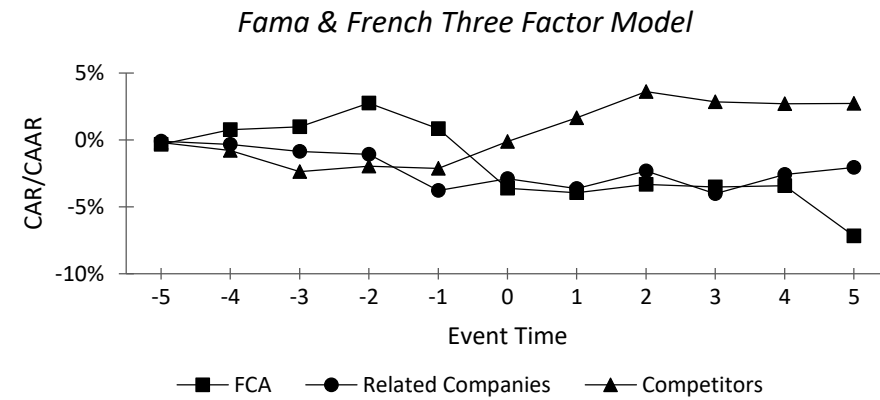
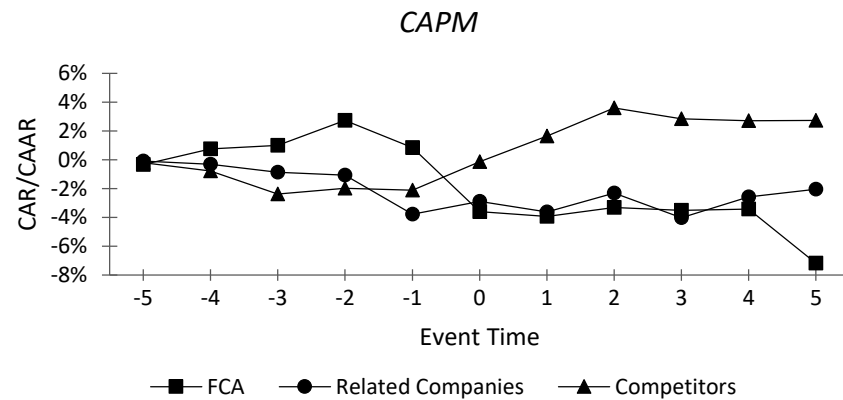
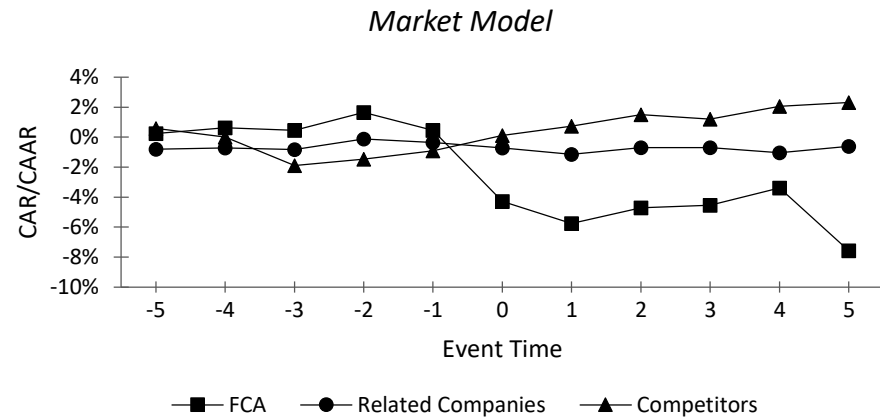
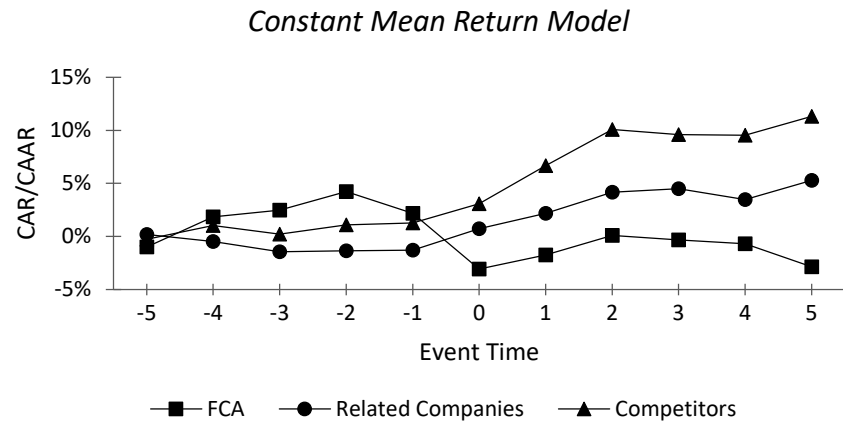
Tests	Spin-off (Announcement)				IPO			
	CMR	MM	CAPM	FF3FM	CMR	MM	CAPM	FF3FM
Sign Test	1.48	2.22**	0.00	2.22**	2.46**	1.72	0.49	2.46**
Rank Test	0.09	0.13	1.71	1.69*	1.52	2.60**	6.46**	8.33**
Wilcoxon Signed-Rank Test	17	19	14	17	17	19	14	17

## 6.2. Initial Public Offering

Before analyzing the impact of the Initial Public Offering on stock prices, it is important to analyze the behavior of Ferrari's share price in the first days as a listed firm. Each share issued on the 21<sup>st</sup> of October, 2015 in the market, more specifically on the New York Stock Exchange, was priced at \$52. In the first two days of trading, Ferrari's share price increased to \$56.75 (a 9.37% growth). Following this initial growth, Ferrari's shareholders saw their stocks fall during the rest of the first week and reaching 51.87\$ at the end of the fifth day of trading (the last day of the event window). Figure 6 reports the movements of the stock price during the first week of trading and Figure 5 shows the average cumulative abnormal returns using the four different models.

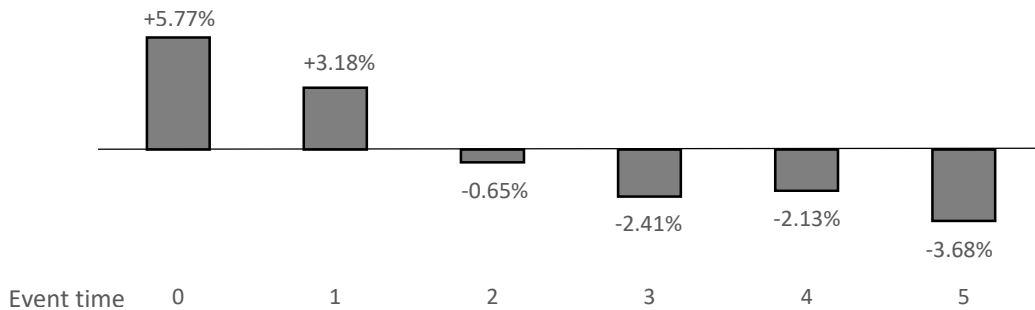
**Figure 5 - Average cumulative abnormal returns for the Initial Public Offering**

This figure plots the cumulative abnormal returns/average cumulative abnormal returns in percentage for the announcement of the spin-offs on FCA's stock price, related companies and on competitors from event day -5 to event day 5. These returns are computed using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model.



### Figure 6 - Changes in Ferrari's stock price during its first week of trading

This figure reports the changes in Ferrari's stock price during its first week of trading (after the initial public offering). Event day 0 represents the day of the initial public offering, the first trading of Ferrari's stock in the public market.



#### 6.2.1. FCA's stock price

During the established event window for the IPO, FCA's stock price decreased strongly and with cumulative abnormal returns of around -7.5%, according to three of the four models (with the exception of the constant mean return). On the day of the event, its share price dropped approximately 5% but on the day before, it had already decreased 2%. It continued falling for the remaining days of the event window, i.e., after the day of the event. Table 7 shows the results for the impact of this event on FCA's stock price.

The constant mean return model does not seem to be a good predictor of the returns due to the high volatility of the returns of FCA during the estimation period. Although the CARs are strongly negative for the three other models, only the market model rejects the null hypothesis at the 5% significance level, which means that only this model rejects the hypothesis of the IPO having no impact on FCA's stock price. The CAPM and Fama & French also see negative abnormal returns but not enough to see  $H_0$  rejected due to a higher variance of its errors (2,8% for both models) when compared to only 1,5% of the market model. This difference could be justified by the market model using an Italian index for the market portfolio, instead of an American index, which the CAPM and the Fama & French use as its benchmark. More specifically, the market model reports a 4.73% negative abnormal return on the day of the initial public offering which corresponds to a t-stat of -3.07. The rank test clearly rejects the null hypothesis as well with a t-stat of 7.91 for all the models used, including the market model, as it can reported in Table 2. These irregular results can be justified by the event day being bottom ranked

**Table 7 - Results for the impacts of Ferrari's IPO on FCA's stock price**

Event day	Constant Mean Return				Market Model				CAPM				Fama & French Three-Factor Model			
	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat	AR	T-stat	CAR	T-stat	AR	CAR	T-stat	T-stat
-5	-1.00%	-0.32	-1.00%	-0.10	0.25%	0.16	0.25%	0.05	-0.34%	-0.12	-0.34%	-0.04	-0.36%	-0.13	-0.36%	-0.04
-4	2.84%	0.90	1.84%	0.18	0.39%	0.25	0.63%	0.12	1.10%	0.39	0.76%	0.08	0.52%	0.19	0.16%	0.02
-3	0.64%	0.20	2.48%	0.24	-0.16%	-0.11	0.47%	0.09	0.24%	0.08	0.99%	0.11	0.25%	0.09	0.41%	0.04
-2	1.76%	0.56	4.24%	0.41	1.19%	0.77	1.66%	0.32	1.75%	0.63	2.75%	0.30	1.50%	0.54	1.91%	0.21
-1	-2.06%	-0.66	2.18%	0.21	-1.21%	-0.78	0.45%	0.09	-1.90%	-0.68	0.85%	0.09	-2.08%	-0.75	-0.17%	-0.02
0	-5.27%	-1.68*	-3.09%	-0.30	-4.73%	-3.07**	-4.28%	-0.84	-4.45%	-1.59	-3.61%	-0.39	-4.17%	-1.50	-4.34%	-0.47
1	1.34%	0.43	-1.75%	-0.17	-1.47%	-0.96	-5.76%	-1.13	-0.33%	-0.12	-3.93%	-0.42	-0.25%	-0.09	-4.59%	-0.50
2	1.84%	0.59	0.09%	0.01	1.05%	0.68	-4.71%	-0.92	0.62%	0.22	-3.31%	-0.36	0.38%	0.14	-4.21%	-0.46
3	-0.42%	-0.14	-0.33%	-0.03	0.16%	0.10	-4.55%	-0.89	-0.21%	-0.07	-3.52%	-0.38	-0.24%	-0.09	-4.45%	-0.48
4	-0.35%	-0.11	-0.69%	-0.07	1.16%	0.75	-3.40%	-0.66	0.10%	0.04	-3.42%	-0.37	0.35%	0.12	-4.10%	-0.44
5	-2.17%	-0.69	-2.85%	-0.27	-4.17%	-2.71**	-7.57%	-1.48	-3.76%	-1.34	-7.18%	-0.77	-4.67%	-1.68*	-8.78%	-0.95

This table reports the abnormal returns (AR) and cumulative abnormal returns (CAR) of the impacts of the spin-off announcement on FCA's stock price from event day -5 to event day 5. The normal returns are calculated using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model. The t-stat values determine whether the null hypothesis of no abnormal returns or cumulative abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level

\*\* Rejects the null hypothesis at the 5% significance level

**Table 8 - Results for the impacts of Ferrari's IPO on related companies**

Event day	Constant Mean Return				Market Model				CAPM				Fama & French Three-Factor Model			
	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat
-5	0.18%	0.10	0.18%	0.03	1.10%	1.22	1.10%	0.37	0.28%	0.23	0.28%	0.07	0.57%	0.48	0.57%	0.14
-4	-0.67%	-0.37	-0.49%	-0.08	-1.06%	-1.17	0.05%	0.02	-2.09%	-1.70*	-1.81%	-0.44	-2.01%	-1.68*	-1.44%	-0.36
-3	-0.94%	-0.52	-1.43%	-0.24	0.47%	0.52	0.52%	0.17	-1.52%	-1.24	-3.33%	-0.82	-1.16%	-0.96	-2.59%	-0.65
-2	0.07%	0.04	-1.36%	-0.22	0.36%	0.40	0.88%	0.29	-0.25%	-0.20	-3.58%	-0.88	0.08%	0.07	-2.51%	-0.63
-1	0.08%	0.04	-1.28%	-0.21	0.90%	0.99	1.78%	0.59	-0.14%	-0.11	-3.71%	-0.91	-0.15%	-0.12	-2.66%	-0.67
0	2.00%	1.10	0.72%	0.12	1.57%	1.73*	3.25%	1.08	2.20%	1.79*	-1.51%	-0.37	2.64%	2.20**	-0.02%	0.00
1	1.45%	0.79	2.17%	0.36	-2.09%	-2.31	1.16%	0.38	0.07%	0.06	-1.44%	-0.35	0.29%	0.25	0.27%	0.07
2	1.99%	1.09	4.17%	0.69	0.45%	0.49	1.60%	0.53	0.91%	0.74	-0.53%	-0.13	1.20%	1.00	1.48%	0.37
3	0.33%	0.18	4.50%	0.74	1.20%	1.33	2.81%	0.93	0.15%	0.12	-0.39%	-0.09	0.57%	0.47	2.04%	0.51
4	-1.01%	-0.56	3.48%	0.58	1.28%	1.41	4.09%	1.36	-1.04%	-0.85	-1.43%	-0.35	-0.48%	-0.40	1.57%	0.39
5	1.79%	0.98	5.27%	0.87	-1.01%	-1.12	3.08%	1.02	0.47%	0.38	-0.96%	-0.24	0.26%	0.21	1.82%	0.46

This table reports the average abnormal returns (AAR) and average cumulative abnormal returns (CAAR) of the impacts of the spin-off announcement on the related companies' stock prices from event day -5 to event day 5. The normal returns are calculated using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model. The t-stat values determine whether the null hypothesis of no average abnormal returns or average cumulative abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level

\*\* Rejects the null hypothesis at the 5% significance level

**Table 9 - Results for the impacts of Ferrari's IPO on competitors**

Event day	Constant Mean Return				Market Model				CAPM				Fama & French Three-Factor Model			
	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat	AAR	T-stat	CAAR	T-stat
-5	-0.26%	-0.19	-0.26%	-0.06	0.58%	0.56	0.58%	0.17	-0.20%	-0.15	-0.20%	-0.05	0.39%	0.19	0.39%	0.06
-4	1.28%	0.91	1.02%	0.22	-0.58%	-0.56	0.00%	0.00	-0.58%	-0.45	-0.78%	-0.18	-0.99%	-0.48	-0.60%	-0.09
-3	-0.79%	-0.56	0.22%	0.05	-1.90%	-1.81*	-1.90%	-0.55	-1.59%	-1.23	-2.37%	-0.55	-0.86%	-0.42	-1.46%	-0.21
-2	0.87%	0.62	1.09%	0.23	0.43%	0.41	-1.47%	-0.42	0.40%	0.31	-1.97%	-0.46	0.76%	0.37	-0.70%	-0.10
-1	0.19%	0.13	1.28%	0.27	0.56%	0.53	-0.91%	-0.26	-0.15%	-0.11	-2.11%	-0.49	-0.20%	-0.10	-0.90%	-0.13
0	1.80%	1.28	3.08%	0.66	1.04%	0.99	0.12%	0.04	1.99%	1.54	-0.12%	-0.03	3.14%	1.51	2.24%	0.33
1	3.59%	2.54**	6.67%	1.43	0.61%	0.58	0.73%	0.21	1.78%	1.38	1.65%	0.39	2.36%	1.14	4.60%	0.67
2	3.40%	2.41**	10.07%	2.15	0.77%	0.73	1.50%	0.43	1.96%	1.52	3.61%	0.84	2.28%	1.10	6.89%	1.00
3	-0.48%	-0.34	9.60%	2.05	-0.30%	-0.29	1.20%	0.35	-0.77%	-0.59	2.85%	0.66	-0.01%	-0.01	6.87%	1.00
4	-0.04%	-0.03	9.55%	2.04	0.87%	0.83	2.07%	0.60	-0.14%	-0.11	2.71%	0.63	1.15%	0.55	8.02%	1.17
5	1.77%	1.26	11.33%	2.42	0.25%	0.24	2.31%	0.67	0.03%	0.02	2.73%	0.64	-1.18%	-0.57	6.84%	0.99

This table reports the average abnormal returns (AAR) and average cumulative abnormal returns (CAAR) of the impacts of the spin-off announcement on competitors' stock price. The normal returns are calculated using four different models: the constant mean return model, market model, CAPM and Fama & French three-factor model. The t-stat values determine whether the null hypothesis of no average abnormal returns or average cumulative abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level

\*\* Rejects the null hypothesis at the 5% significance level

for all the models. On the other hand, the sign test absolutely fails to reject the null hypothesis due to a similar number of observations of positive and negative abnormal returns. This test that does not take into consideration the size of the abnormal returns that are much higher in the negative observations.

### **6.2.2. Related firms and Competitors**

Regarding the related firms, one could expect its share price to increase due to FCA receiving proceeds with the IPO. Consequently, that cash could be used to fund other businesses or companies of the Agnelli family. In spite of the average cumulative abnormal returns being positive for three of the four models, the results are not consistent with what we expected. The t-test for the hypothesis of cumulative returns being equal to zero is not rejected for any of the models. The final results are reported in Table 8. However, we see that the Fama & French reject the null hypothesis of no impact on the related firms with a t-stat of 2.2 at the 5% significance level and the market model and the CAPM are able to reject it with a significance level of 10% and t-stats of 1.73 and 1.79 respectively. The sign test does not reject the null hypothesis since there is a similar number of positive and negative abnormal returns during the days of the event window. In contrast, the rank test achieves significance for the four models due to the event day being one of the top ranked during the 11 days of the event window (see Table 5).

Concerning FCA's direct competitors, we see positive abnormal returns between 1% and 3% (see Table 9) at the event day but none of the models used in the t-test confirm the existence of statistically significant abnormal returns at that day. Three of the models don't get significant results to reject the hypothesis of the average cumulative abnormal returns being different from zero, but the constant mean return model does it at the 5% level of significance, t-test of 2.42 and average cumulative abnormal returns of 11.33% during the event window. This large CAR is mainly driven by two observations, the two days following the event day, which get statistically significant average abnormal returns.

In contrast, nonparametric tests show different results between models and between tests (see Table 6). The sign test rejects the null using two models, while the other two models that give more importance to the market as a parameter (market model and CAPM) don't

reject it. The rank test rejects the null hypothesis in all models except for the constant mean return model. The Wilcoxon signed-rank test doesn't reject the null in any of the models.

## **7. Validation**

As we have seen in the methodology section, our event study methodology follows the foundations and assumptions of market efficiency, unanticipated events and inexistence of confounding effects provided by (McWilliams and Siegel, 1997) . However, in reality, these assumptions are violated, which consequently can affect event study's results partially or even totally. In this section, we try to validate these assumptions and understand how efficient the market really is, in respect to the impacts of spin-off announcement and an initial public offering of Ferrari on shareholders' value.

### **7.1. Anticipation**

In a perfect financial world, an event would be announced by the press and no one would have the access to the information before it has been released. Nevertheless, two common things might happen, which lead to inefficiencies in the market before the day of the event: the event might be anticipated; and/or it might suffer changes in the price of securities due to inside trading. When an event arises from corporative actions of its executives, it leads to the existence of individuals who have knowledge that the event will happen before it really happens, which can consequently create inside trading. Based on our results, the most significant change on FCA's stock price during our event window for the spin-off announcement happens on the day of the event with a 12.79% increase. Table 10 reports abnormal returns and t-stats for an extended event window with 20 days before the event (from -20 to -1) using the market model. We also see an increase between 2.5% and 4.5% on the stock price on the day before ( $t = -1$ ), which is statistically significant at the 5% level for three of the four models used with the alternative hypothesis of the event actually having an impact on the stock price. This is a clear sign that there was anticipation of the event or inside trading related to the announcement of the spin-off.

**Table 10 - Results for the impacts on FCA’s stock price before and after the spin-off announcement**

This table reports average abnormal returns (AAR) and average cumulative abnormal returns (CAAR) of the impacts of the spin-off announcement on FCA’ stock price. The normal returns are calculated using the market model. The t-stat values determine whether the null hypothesis of no average abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level and \*\* Rejects the null hypothesis at the 5% significance level

Before the announcement				After the announcement			
Event day	AR	T-stat	CAR	Event day	AR	T-stat	CAR
-20	-1.78%	-1.02	-1.78%	1	-0.41%	-0.24	-0.41%
-19	1.59%	0.92	-0.19%	2	1.35%	0.78	0.94%
-18	0.48%	0.27	0.29%	3	1.88%	1.08	2.82%
-17	-0.24%	-0.14	0.06%	4	0.32%	0.18	3.14%
-16	-0.63%	-0.36	-0.57%	5	-0.35%	-0.20	2.79%
-15	0.57%	0.32	-0.01%	6	-0.31%	-0.18	2.48%
-14	-1.00%	-0.57	-1.00%	7	0.01%	0.00	2.49%
-13	-1.30%	-0.75	-2.31%	8	0.64%	0.37	3.13%
-12	1.53%	0.88	-0.78%	9	3.03%	1.74	6.17%
-11	0.75%	0.43	-0.03%	10	4.60%	2.64**	10.76%
-10	0.81%	0.47	0.78%	11	4.44%	2.55**	15.21%
-9	1.33%	0.76	2.11%	12	0.05%	0.03	15.26%
-8	1.71%	0.98	3.82%	13	0.01%	0.00	15.26%
-7	1.10%	0.63	4.92%	14	1.16%	0.66	16.42%
-6	-0.33%	-0.19	4.59%	15	-3.97%	-2.28**	12.45%
-5	0.90%	0.52	5.49%	16	0.87%	0.50	13.32%
-4	0.72%	0.41	6.20%	17	-1.58%	-0.91	11.74%
-3	-1.80%	-1.03	4.40%	18	1.57%	0.90	13.31%
-2	-0.46%	-0.26	3.95%	19	-0.31%	-0.18	13.00%
-1	2.55%	1.46	6.50%	20	0.13%	0.08	13.13%

Concerning the IPO, we see no signs of anticipation of the results of the event. There are abnormal returns that might have arisen from speculation regarding the IPO success but most of them are not statistically significant at the 5% level. The only day that is statistically significant is 9 trading days preceding the event, which doesn’t seem to be related to the IPO (Table 11).

**Table 11 - Results for the impacts on FCA's stock price before and after the IPO**

This table reports average abnormal returns (AAR) and average cumulative abnormal returns (CAAR) of the impacts of the initial public offering on FCA's stock price. The normal returns are calculated using the market model. The t-stat values determine whether the null hypothesis of no average abnormal returns equal to zero is rejected or not.

\* Rejects the null hypothesis at the 10% significance level and \*\* Rejects the null hypothesis at the 5% significance level

Before the IPO				After the IPO			
Event day	AR	T-stat	CAR	Event day	AR	T-stat	CAR
-10	2.44%	1.58	2.44%	1	-1.47%	-0.96	-1.47%
-9	2.95%	1.91**	5.38%	2	1.05%	0.68	-0.43%
-8	1.92%	1.24	7.30%	3	0.16%	0.10	-0.27%
-7	1.84%	1.19	9.14%	4	1.16%	0.75	0.89%
-6	0.21%	0.13	9.35%	5	-4.17%	-2.71**	-3.29%
-5	0.25%	0.16	9.59%	6	-0.29%	-0.19	-3.58%
-4	0.39%	0.25	9.98%	7	1.15%	0.75	-2.43%
-3	-0.16%	-0.11	9.81%	8	-0.45%	-0.29	-2.88%
-2	1.19%	0.77	11.00%	9	0.31%	0.20	-2.57%
-1	-1.21%	-0.78	9.79%	10	-1.84%	-1.20	-4.41%

## 7.2. Late adjustment of the Market

As opposed to inefficiencies resulting from anticipation or inside trading, it is also important to determine if the market was immediate to incorporate the event into security prices or if investors reacted slowly. In case the market was slow or illiquid, some of the changes due to the event would be included in days after the event. The use of post-event days in the event window is to include the changes due to the event that were not recognized at the event day. As for the anticipation topic, we decided to create a window comprising 20 days after the event that is reported in Table 10. We can see positive abnormal returns in the days following the spin-off announcement. Using the market model, the CARs are approximately 3% in the 5 days following the event and 13% if we include 20 days after the spin-off announcement. This increase suggests that some of it should come from the event. We achieve significant results to reject the null hypothesis at the 5% significance level on 3 days of the extended window.

Regarding the IPO event, after the negative impact on FCA's stock price at the day of the event, we see its stock price continually dropping throughout the 10 trading days that succeed the IPO (see Table 11), which is an indicator that the market was slow to react to the outcomes of the initial public offering.

### **7.3. Confounding events**

The announcement of Ferrari's spin-off happened on the 29<sup>th</sup> of October, 2015. During our study's event and estimation windows, we haven't found any confounding events. Some price changes due to earning announcements and management changes during the estimation window have been found but not relevant enough to interfere with our event study. However, for the initial public offering (21<sup>st</sup> of October, 2015) we have found an event that might have an impact on our study. On the 21<sup>st</sup> of September, 2015, the Environmental Protection Agency announced that Volkswagen had been violating intentionally the Clean Air Act (CAA) for several years. Volkswagen, one of the strongest competitors of FCA, saw its stock price fall almost 40% in the two weeks following the announcement. Its competitors also saw its price drop during these weeks due to the fears of being punished for the same reason. The industry started recovering in the week of the 5<sup>th</sup> of October and our event window starts on the 14<sup>th</sup> of October. It doesn't seem to be a great concern as the market looks stable during the event window period, except for Volkswagen that had price changes over 3% in 4 of the days. On top of that, we can see that the estimation window faces higher abnormal returns and volatility than what would be expected in this market. This has a large importance for the constant mean return model, which estimates returns based on an average of the estimation window's abnormal returns. This might be the reason for the high abnormal returns and statistical significance on some of the days. Nevertheless, we believe that this event didn't have much importance in our tests, except when using constant mean return model.

## 8. Conclusion

This dissertation presents evidence of the impacts of Ferrari's split-off from the FCA on three different types of shareholders: on FCA's stock price; on the stock prices of firms partially owned by FCA's largest shareholders; and on the shareholders of its industry peers. More specifically, we test the impacts of the two most relevant actions concerning this separation, the spin-off announcement and the initial public offering carve-out. According to our results using four different models to estimate normal performance of stock prices, we conclude that the market model is the strongest due to the estimation of lower errors and lower variance of the errors. The Wilcoxon signed-rank test doesn't seem to have much power in our study when testing for the effects on competitors given that we have an extremely small sample. This test for a sample size of 6 has a critical value of 0, which makes it quite difficult to reject the null hypothesis at the 5% significance level. The sign test shows opposite results of the other tests used in several cases. This lack of accuracy can be justified by its strong limitation of not considering the magnitude of the abnormal returns.

Our findings on the impact of the announcement of the spin-off on FCA's stock price suggest that investors consider this separation to be beneficial for them by generating additional future cash flows. This evidence confirms what was suggested by (Hite and Owers, 1983). The market model reports an 18.88% CAR during our event window of 11 days and a t-stat of 8.15 for the event day. As we expected, we observe no significant abnormal returns, when considering the impact on the firms that the Agnelli family has significant ownership. Regarding the impact on FCA's competitors in which we use a sample of the 6 largest automotive groups in Europe, we achieve different results for the models used. Although we have found statistically significant results to support the idea of cumulative abnormal returns being different from zero using the constant mean return and the Fama & French three-factor model, we consider the CAPM and the market model to be better predictors of the impact on an industry that is a reflection of the overall market. These models do not reject the hypothesis of the abnormal returns being equal to zero which suggests that FCA's competitors don't seem to have suffered with the announcement of the spin-off of one of its largest peers. These results differ from those of (Slovin, Sushka and Ferraro, 1995) on spin-offs.

Concerning the initial public offering carve-out, we report a confounding event, the Volkswagen emission scandal approximately one month prior to the event and that might affect especially the constant mean return model. The other models deliver different results for the impact on FCA's stock price but the market model (the strongest) shows statistically significant abnormal returns at the 5% level on the day of the event, even though it does not reject the hypothesis of cumulative abnormal returns being equal to zero on the 11 days of the event window. For the related companies, we report positive abnormal returns and t-stats that reject the null hypothesis when using the Fama & French at the 5% significance level, while the market model and CAPM reject it at the 10% significance level. For FCA's competitors, our results show that the IPO didn't have an impact on their stock prices by not rejecting the null hypothesis in any of the models used in the t-test. These results go along with the findings in (Akhigbe, Borde and Whyte, 2003), which suggested that the impacts of the IPO on the industry are offset, by a positive competitiveness effect and a negative information effect.

We have seen the impacts of the separation of FCA and Ferrari on shareholder's wealth on the short-term. Our conclusion are based on the reactions of investors but we do not see the real impacts on the firm. We propose for further research, an analysis of the long-term impacts of this separation on the value of shareholders.

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