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BACHELOR THESIS

Are Companies Abusing Their Dominance Profitable?

Author:
Louis Reyes

Supervisor:
Dr. Andrea Günster

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Supervisor 1:
Dr. Andrea Günster
Zurich University of Applied Sciences
Web: Link

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I, Louis Reyes, declare that this thesis titled, " Are Companies Abusing Their Dominance Profitable?" and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at the Zurich University of Applied Sciences.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this university or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
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Management summary

In 2024, the European commission is rolling out one of the most potent new policies when it comes to antitrust regulation: The Digital Market Act (DMA). Indeed, this is the consequence resulting from a global trend, where companies have enjoyed increased market dominance and market power in the recent years. This can also be observed when analysing the European Commission (EC) cases, as the number of investigations and fines has grown substantially.

Our analysis focuses on researching this trend and its potential effects on companies which have been investigated and their stocks returns. After setting the scene for a brief understanding of the European Antitrust system, and an overview of the impact of collusion on stock markets, we look in detail for all the case decisions issued by the European Commission from 1980-2022, which infringed solely article 102 of The Treaty on the Functioning of the EU (TFEU).

After some adjustments, we analyse 32 EC case decisions stemming from 26 companies, present in 10 sectors and spread out across 10 countries. We provide an extensive summary of the cases, companies and the reasoning behind cases which needed to be excluded. The cases are defined either as commitment decisions, where companies must commit in written to changing their dominant positions, or infringement decisions which usually entail a fine to punish the anti-competitive behaviour of the company.

We create a panel-like data structure, defined by company and by trading day, to put in relation the stock returns with their respective main index returns and key explanatory variables from the cases retrieved. We run three different models, all based on the assumptions of the Capital Asset Pricing Model (CAPM), including time and company fixed effects, to better understand the relation between abuse of dominance and stock returns. Interestingly, we observe three key results. Firstly, we find companies which received an infringement decision, performed significantly better (nearly 5 bps positive) before the

period of abuse started. Secondly, companies which needed to commit to reducing or changing their dominant position exhibit no significant positive nor negative returns. We find these results to be in line with previous studies describing the lack of incentive to become more efficient as soon as one company has reached a position of power. Lastly, we observe that commitment decisions have a significantly negative return (roughly 4 bps negative) compared to other periods when the companies committed to change. This finding is by far the most surprising as it goes against the Market Efficiency Theory and could be interpreted as a potential short strategy for investors.

Policy makers and researchers in future studies could replicate our study once the Digital Market Act has been implemented. Furthermore, investors could also build on our results to create new trading strategies.

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Contents

Declaration of Authorship iii

Management summary iv

Acknowledgements vi

List of Abbreviations ix

1 Introduction 1

2 Literature & Theoretical Overview 3
- 2.1 European Competition Policy . . . 3
  - 2.1.1 Historical Background . . . 3
  - 2.1.2 Investigation process . . . 5
  - 2.1.3 The Digital Market Act . . . 6
- 2.2 Monopolies & dominant positions . . . 8
  - 2.2.1 Collusion . . . 8
  - 2.2.2 Dominance and impact on the stock market . . . 11

3 Methodology & Data 15
- 3.1 Data . . . 15
  - 3.1.1 European Commission Cases Data . . . 15
  - 3.1.2 Companies In Scope . . . 19
  - 3.1.3 Data Cleaning . . . 20
- 3.2 Methodology . . . 21
  - 3.2.1 Data Structure . . . 21
  - 3.2.2 CAPM . . . 24
  - 3.2.3 Regression model . . . 24

4 Regression Results & Findings 27
- 4.1 Results . . . 27
- 4.2 Limitations . . . 34

4.3 Future Research 35

5 Conclusion **36**

A Tables **38**

B Figures **42**

Bibliography **43**

List of Abbreviations

bps	**b**asis **p**oints
CAPM	**C**apital **A**sset **P**ricing **M**odel
CD	**C**ase **D**ecisions
DMA	**D**gital **M**arket **A**ct
DOJ	**D**epartment **O**f **J**ustice
EC	**E**uropean **C**ommission
ECJ	**E**uropean **C**ourt of **J**ustice
EU	**E**uropean **U**nion
SO	**S**tatement of **O**bjections
TFEU	**T**he **T**reaty on the **F**unctioning of the EU

Chapter 1

Introduction

Despite abuse of dominance and anti-competitive behaviour being illegal, the EC has increased scrutiny over big companies and amplified the number of investigations they conduct, confirming the pattern in rising monopolies and collusions (De Loecker et al., 2020). In 2024 for example the DMA, which started as a project in 2020, will enter into force (European Commission, 2020). This new regulation is the first one of its kind to target big technological companies. Indeed, it has been established that abuse of dominance and anti-competitive market behaviour diminishes consumer welfare and impairs new innovation (Schumpeter, 1942), (Arrow et al., 1962), (Baumol, 1992) and (Günster et al., 2011).

Several previous studies observe the impact of antitrust policy around the decision dates and the impact on stock returns (Bosch and Eckard Jr, 1991), (Aguzzoni et al., 2013) and (Günster and van Dijk, 2016). While other studies attempt to measure and observe the deterrence effect of regulation on companies having abused or wanting to abuse their dominant position (Ellert, 1976) and (Eckbo, 1992). Yet, it remains unclear what happens to the stock returns of these firms during the period market power abuse.

Therefore, the goal of this thesis is to answer the question *Are Companies Abusing Their Dominance Profitable?*. This study will focus on empirically measuring the abuse of dominant position and its significance on the companies' stock returns, which have been investigated by the EC during the 1980-2022 period. We will only analyse companies that have infringed article 102 of the TFEU, which leads to either a commitment decision or an infringement decision.

To put our results into perspective, we leverage the traditional CAPM approach from Sharpe (1963), and add specific case variables to build our models. We choose to run a panel regression which includes all trading days during the observed period of 1980-2022. Our definitive sample of companies is 26, present in 10 different countries and operating in 10 different sectors. While we find no significant effect during the abuse periods per se, we find a significantly negative effect (approx. -4 bps) once the commitment decisions have been published. Furthermore, we observe a significantly positive effect (approx. + 5 bps) for the period preceding the infringements, during which companies appear to perform comparatively better before abusing their market power.

We structure our analysis starting with an insight on the functioning of the EC, and the European Antitrust regulation system. Next, we delve in the implications the DMA will have for the future of the European antitrust space. Furthermore, we elaborate on previously conducted research about abuse of dominance, collusion and their impact on the stock market. Subsequently, we explain how the data was gathered, cleaned and the methodology we apply for our analysis. Moreover, we discuss our results and observations and detail further limitations we encountered during the study. Lastly, we conclude with a summary of our findings and a potential new perspective on the implications this presents for future researchers, investors or even policy makers.

Chapter 2

Literature & Theoretical Overview

2.1 European Competition Policy

2.1.1 Historical Background

The bedrock of European competition policy, lies back with the foundation of the European Commission in 1957, when the treaty of Rome was ratified (Carree et al., 2010) which later lead to the Treaty on the Functioning of the European Union (TFEU)[1]. Carree et al. (2010) analyse the Commission's decisions from 1957-2004, and explain how the rules laid down by the Treaty of Rome are being enforced by the European Commission, with the help of the Directorate General for Competition (DG Comp). Both of these organism work in accordance with the member states' national competition regulatory body, the National Competition Authority. The DG Comp investigates within three areas being state-aid, antitrust and merger cases (Carree et al., 2010).

The Treaty of Rome enables the EC to operate, make decisions, and provide opinions. In 1962, the EC eventually received enforcement powers, which in essence allowed them to initiate investigations, and subsequently either impose sanctions or ask companies to make the necessary adjustments to their dominant positions (Carree et al., 2010).

In 1998, the concept of leniency program was implemented. The main goal being an incentive for cartel participants to come forward and whistle-blow the cartel and their involvement to the EC, under the form of a reduced, or total downsize of the fine to follow (Carree et al., 2010). This initiative led to

[1] See Carree et al. 2010

an increase in cases reported. However, Stephan (2005) concludes the leniency notice implementation had a limited effect, since companies which would resort to it were only part of already failed cartels, reducing the initial intended purpose to capture more cartels.

The EC defines the rules to adhere to when it comes to competition in Article 102 (ex 82) (European Commission, 2023). As explained by Shah (2003), companies falling under Article 102 must meet all of the characteristics laid in the article: having a dominant position, abusing said dominant position, and if an EU member state might be affected by the dominant position of the company. Carree et al. (2010) also outline the contents of Article 102, as abusive practices such as predatory pricing, tying and bundling and discriminatory sales conditions are also considered in scope of the article.

Another way to outline the scope of Article 102 is to identify if the abuse of a dominant position is an exclusionary or exploitative practice. On the one hand, the exclusionary practice aims to block competitors out of the market, by raising costs or increasing barriers of entry into the market. On the other hand, the exploitative practice includes bundling and tying, price discrimination and finally excessive pricing (Russo et al., 2010).

Carree et al. (2010) map and summarize the investigated cases since the existence of the Commission until 2004. They find a steady increase in the number of cases until the peak in 1992, as well as pattern variations attributable to a small seasonality and a higher productivity when the Commissioner was about to end his or her mandate. Interestingly, the EC gains some degree of efficiency over time, by decreasing the average time of investigating, while significantly increasing the number of decisions made.

Additionally, they also analyse how with time, the Commission became less lenient, granting less "negative clearances" or "exemptions", while issuing more infringement decisions, subsequently followed by heftier fines (Carree et al., 2010). Additionally, they observe a concentration of cases within specific sectors such as chemical, consumer electronics, automobile and alcoholic beverage industries.

A study conducted by Combe and Monnier (2011) tests the adequacy of the fines distributed by the EC while also observing a tendency to impose heftier fines since 1990. The authors compare the fines to the profit generated by the

anti-competitive behavior. Since the fines are not high enough and the detection probability from the EC is too low, this raises the question on the efficacy of the current European Antitrust policy.

For the scope of this paper, we are looking to analyse companies in violation of Article 102 and their potential impact on the stock returns during the recognized infringement period and the commitment decisions. Consequently, this implies that any company which has been investigated under a combination of Article 102 and 101 is thereby out of scope.

2.1.2 Investigation process

Looking at the previous investigations, Carree et al. (2010) provide an extensive guide and summary statistics on the reporting routes. An investigation can be initiated through the following four different reporting routes:

1. *Complaints*: Natural or legal persons can formulate a complaint to the EC, who will then evaluate if an investigation is needed. The EC will, however, need to justify in written should they choose not to proceed.

2. *EC's Own initiative*: The EC initiates an investigation resulting from its own suspicions.

3. *Leniency Program*: A form of whistle blowing which can lead to a reduction in the fine for the whistle blower.

4. *Notifications*: This reporting route has been decommissioned in 2004 by the EC.

Over time, the most common reporting route emerges to be the EC's own initiative. Carree et al. (2010) also notice how this route was a preferred option as the number of cases launched by the commission increased. Once the investigation is initiated, the commission will issue a statement of objections (SO) to inform the involved party(ies) of their findings about their possible infringement of Article 101 and/or 102. The SO is a mandatory document required to be issued before any decision or judgement can be made. The next step will be the decision itself, which gathers a detailed analysis about the case, the involved parties, the fines charged or the commitment needed.

Ganglmair and Günster (2011) perform a extensive study regarding the possible outcomes when the European commission closes an investigation. Firstly, the case can be "Dismissed" followed by closing the investigation, thereby not leading to any decision nor fines. Secondly, the case can be "Resolved", where the commission issues a commitment decision in which the party has to commit to change or solve their current abuse of dominance, supervised by an external trustee appointed by the commission. Finally, the case can be "Charged", where an infringement decision is issued in which the abusing company can be fined up to 10% of their annual turnover. All three decision types mark the closing of the investigation process. However, decisions which have been charged by the EC can still be appealed through the Court of First Instance. For simplicity, our analysis will not include appeal cases, independent of a successful procedure or not.

2.1.3 The Digital Market Act

A fundamental question arises when we are looking at antitrust policy: is the current regulatory framework a measure strict enough to deter companies from abusing their dominant position or displaying anti-competitive behaviour?

Eckbo (1992) conducts a study on the topic and find no significant element present in the antitrust policy to effectively deter any forms of anti-competitive behaviour. Similarly, another study from Thompson and Kaserman (2001) observe how quickly the stock price of companies being fined returns to the pre-infringement level (85% of the companies return to 100% of the stock price). The authors also suggest that the deterrent effect from the regulator is fairly small, especially in cases where the company infringes multiple times, also known as recidivists companies.

Duso, Gugler, et al. (2006) analyse this effect, and how the EC learns through time to be less lenient with companies displaying anti-competitive behavior by enforcing harsher remedial actions for Merger & Acquisitions. However, they also observe that the Commission's hesitation to block a merger, in contrast to their American counterpart, impairs their aptitude to enact a fair competition in the European markets.

Cabral et al. (2021) argue how the current competition policies evolve slower compared to the market they oversee, doubled by the existing single market

focus, poses challenges to deal with the biggest digital players.

The European Commission decided to address this seemingly increasing dominance of big companies, especially active in the technology sector, by initiating the "Digital Market Act" in 2020 (European Commission, 2020). The main purpose of this act is to ensure fair competition, and to tackle any possible abuse of dominance stemming from the synergies those companies developed in the previous years. Subsequently, the EU also attempts to address current concerns regarding the European innovative space with the implementation of this act.

The DMA's scope is targeting companies based on turnover, users and market share, which are defined as "Gate Keepers" (Bostoen, 2023). Geradin (2021) details how the DMA qualifies digital platforms as Gate Keepers which provide Core Platform Services (CPS), and have to respect three main conditions laid out in Article 3 of the DMA:

1. Significant impact on internal market.

2. Uses a CPS, enabling business users to reach other users.

3. Enjoys a solid position, and will continue to do so in the future.

Furthermore, article 3 of the DMA defines that there are additional conditions making firms fall in scope. For example, if the companies are providing CPS while their turnover reached 7.5 billion EUR in the last 3 years, combined with having an active user base of at least 10'000 users over the previous year (Cabral et al., 2021).

Another driver for the implementation of the DMA lies with innovation. A motivation for this is to prevent so called "Killer Acquisitions". Killer Acquisitions happen when the acquirer buys a smaller company such as a start-up, to solely terminate the targets' current innovation plans, hence preventing future competition (Cunningham et al., 2021). The implementation of the DMA will help control which digital companies are being acquired and by whom, thereby reducing further possibilities of the Killer Acquisitions taking place.

The scope of companies being investigated is not the only thing that is about to change. In Article 30 of the DMA, the fine could amount up to 20% of the company's turnover for companies non-compliant companies (Bostoen, 2023). In other words, twice the amount that is currently in place when companies

infringe Article 102. As we previously mentioned, studies focus on the recidivism issue: the implementation of the DMA could have the potential to discourage companies from abusing a dominant position repeatedly.

Hence, it becomes apparent the motivations behind this new policy will be to improve the current European anti-competitive regulatory framework and implement an effective, long lasting deterrent effect on companies considered Gate Keepers, while safeguarding innovations and general welfare (Cabral et al., 2021).

2.2 Monopolies & dominant positions

2.2.1 Collusion

According to the TFEU, the definition of a dominant position is as follows (European Commission, 1978):

> "A position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by giving it the power to behave to an appreciable extent independently of its competitors, customers, and ultimately of its consumers. In general a dominant position derives from a combination of several factors which, taken separately are not necessarily determinative".

Cournot (1927) already discusses the paradigm tied to monopolies. As they seem to procure an increase in value for the company abusing their power, it is also leaving a detrimental effect on general economic welfare. An obvious reasoning to tackling this effect would be through regulation. Yet, how effective and how costly is regulation to prevent abuse of dominance and collusion? A study from Posner (1975), suggests that regulating monopolies and anti-competitive behavior might be even more expensive in terms of social costs than the monopoly's detrimental costs to welfare itself.

Despite the impact of collusion being apparent, Asch and Seneca (1976) find a more surprising discovery. Companies which collide and abuse their power, seem to consistently fail to generate profits. One of the motivations for companies to collide is the search for higher profits, which according to Asch and

Seneca (1976) will still lead to negative outcomes. A justification for their results, however, could lie within the fact that only unsuccessful companies become the target of antitrust regulation scrutiny. While the more successful ones are not yet necessarily on the regulator's radar.

A paper from Cowling and Mueller (1978) finds that the cost of monopoly power is quite large, and explains how a lot of the resources are wasted into the creation and maintenance of the monopoly itself. The author also estimates that without monopolies, the gross corporate product could increase. Nonetheless, they also argue, similarly to (Posner, 1975), that the necessary cost, from a regulation point of view, to tackle monopolies might be higher than the welfare cost generated by these abusive structures.

Eckbo (1989) details how the market efficiency includes beneficial pieces of information to understand the impact of antitrust behaviour. They argue that if the antitrust regulation framework is not fundamentally changed, companies which are operating inefficiently will continue trying to create a dominant position, and will abuse it.

Mullin et al. (1995) research the competitive effects of US steel mergers and observe that once the monopoly dominance period came to an end, the output prices for the customers significantly dropped and the industry in general was able to produce more. According to their analysis, the detrimental effect of mergers on economic welfare is undeniable. Similarly, in their study about antitrust policy, Crandall and Winston (2002) find no evidence on monopolies nor mergers having a positive effect on economic and consumer welfare.

Baumol (1992) points out how horizontal collusion between competitors is the main antagonist to monopoly policy. Indeed, the practice to undermine competition has known effects, such as damaging welfare, keeping prices artificially high or even impairing innovation. Baumol's observations also match the findings from Günster et al. (2011), who find a lower productivity and less incentives to invest into more innovative projects during the observed cartel period. Additionally, the authors also mention the dynamic efficiency theory, which hypothesize on a cutback in modernization when facing a weaker competitive force. Similarly to the theory presented by Arrow et al. (1962), companies in a monopolistic situation display less incentives to invest and innovate further compared to firms operating under a perfect competition model.

Another study from Duso, Neven, et al. (2006) look into detail in the monopoly

theory, and the reasons why mergers are complicated constructs which cannot be attractive unless the efficiency benefits outweigh the cost and risks of merging. The authors theorize, that if the merger is an efficient one, it might have a positive impact on the consumer surplus. Furthermore, the authors speculate how the efficiency of the merger define the impact on the consumers, and eventually the prices.

Collusion can also take shape through cartels. Levenstein and Suslow (2006) observe the parallels of cartel participants and the Prisoner's Dilemma. Therefore, companies participating in collusion will have to ensure the benefits of colluding and cheating outweigh the cost of getting caught or being exposed to the whistle blowing risk. In addition, they analyse how concentrated industries have a higher likelihood of creating cartels, and how this behavior appears to lead to an increase in profits and prices. Connor (2007) analyses how international cartels have been able to charge higher prices compared to national ones. The author also issues a recommendation on how the watchdogs should impose higher fines to tackle cartels across the board.

Schinkel et al. (2007) also establish how a position of dominance can occur either naturally, or through a competitive advantage. A natural dominance can be defined as a consequence of intellectual property or similarly a patent. However, an unnatural one can be established through horizontal constraints, vertical restraints or licensing. Carree et al. (2010) further elaborate on how being in a dominant position in a specific market is not necessarily prohibited or punishable. Indeed, the dominant position itself does not only stem from an anti-competitive behavior, as it can also be the logical outcome of a legal competitive behavior. Naturally, such legitimate dominance of position might originate from extensive R&D expenditures, leading to innovative patents and further economies of scale (Russo et al., 2010).

Günster et al. (2011) study the impact of cartels and monopolies, which are abusing their dominance, on key characteristics such as productivity, innovation and profitability. Based on their empirical findings the type of cartel appears to have little influence during the observed period, despite a growth in profitability over time. They also conclude that companies seem to display fewer incentives to push for efficiency and innovation, by looking at the cartel's productivity and R&D activity during the cartel's existence.

González and Moral (2019) monitor what happens to certain Spanish oil companies which are being exposed and fined by the regulator for anti-competitive practices. Indeed, these companies were able to charge subsequently higher prices to their consumers once the fine had been distributed. In other words, the abusive companies were able to recoup the fines by increasing the prices incrementally for their end consumers. According to the authors, this raises further concern over the deterrence and adequacy of the fines imposed by antitrust regulators.

Ravner and Shamir (2021) define collusion as companies seeking to cooperate in order to become more profitable. The authors demonstrate, how collusion tends to rely on the level of competition. In a market where the competition forces are fierce, the tendency for companies to collide and display an anti-competitive behavior is higher than in market facing a lower degree of competition. This is mainly due to the fact that in markets with a lower competitive forces, companies are nearly able to operate as small monopolies, despite the competition with other smaller participants.

As reported by De Loecker et al. (2020), who study the evolution and rise of market power in the USA for the period 1980-2016. They discover that markups increased from 21% in 1980 to 61% in 2014, while the mean profits surged form 1% to 8%. They further support that this trend is a proof of rising market power and its direct impact on the labor market.

2.2.2 Dominance and impact on the stock market

In this section, we take a deeper dive on studies published in the recent years to understand antitrust implications on the investigated companies and its impact on their competitors. We notice how the event study is the preferred way of measuring the relationship between the abuse of dominance and stock market returns.

The event study published by Garbade et al. (1982) focuses on the daily stock prices of 34 stocks to measure the impact of the Department of Justice decisions (DOJ). They find statistically significant results and a drop of 6% after four days of the published news, and establish how the impact changes depending on the firm's financial resources. For firms with larger financial resources the impact is smaller compared to company with less financial resources.

An analysis from Bosch and Eckard Jr (1991) recognizes the impact of price fixing cases in the US, amounting to nearly 2.18 billion dollars of loss in equity market value for their sample (n=127 companies) as soon as the regulators' decisions were published. Their observations seem to be in line with the reaction from investors both in the EU and the US. Brady and Feinberg (2000) outline the stock price effects from the EU merger policy. They also find that the merger regulation enforcement had significant negative effects on the observed companies' stock performance. Indeed, they theorize how investors are predicting companies which are merging to be able to generate higher stock returns, which is why an unfavorable regulatory decision impacts this belief negatively.

According to McGuckin et al. (1992), the difficulty in understanding the collusion effect on stock markets lies with the need to incorporate more than simply the stock returns. One needs to take into consideration the competitors' situation, and carefully analyse if the companies from a specific merger will be affected similarly by the regulator's decision, as this can lead to incomplete analysis.

Bizjak and Coles (1995) study the companies caught by the Clayton Act, which is the American framework similar to article 102 of the TFEU in the EU, and focuses on the impact of the decisions on the wealth loss of the targeted companies. The authors find a significant negative effect on the stock returns around the publishing date, and a positive wealth effect for the companies who initially lodged the complaint.

Yet, it is relevant to understand the differences between EU companies and non-EU companies abusing their dominance, and analyse if the market reacts in a similar manner to the EC's decisions. Aktas et al. (2004) comment on the rise of regulatory power during the 1990-2000 period and how this could pose a threat to global market efficiency. They find that successful mergers attract the attention of the regulators in line with their mandate. Interestingly, they also observe that investors expect the regulators' scrutiny and decisions, which leads to an effect on the returns. However, the authors notice that when the investigation is extremely thorough, the market suddenly predicts a heavier cost on the company, especially when this company is outside the EU.

Duso, Neven, et al. (2006) explore merger cases (n=167) investigated by the EC for the period 1990 until 2022 in more detail, by looking at the effect on

the stock market. While they focus on looking at the EC's motivation behind instigating cases, they conclude that the EC's decisions are not only explained by the protection of consumer welfare, but influenced by other factors such as politics. Yet, the authors further elaborate on how the EC's decision displays a tendency to disregard the company's interest into account.

A similar study from Aguzzoni et al. (2013) research the effects of the EC's decision date, fine amount and raid date on the companies' share price. They find a strong statistically significant effect for the raid date, similar for the infringement decision dates. However, the authors do not observe a similar significance for the court's judgment dates. Interestingly, the researchers also note that while only a fraction of the loss in value is tied to the fines, most of the loss of value is attributable to the discontinuance of the dominant position (Aguzzoni et al., 2013).

Günster and van Dijk (2016) conduct an event study for the cases during 1974-2004 (n=253 companies) and found three key results. Firstly, the impact of European antitrust policy on the investigated companies shows a significant effect on the stock returns. They tie this to investors' revised future profitability expectations, and reputational damage once the news is made public. Secondly, the size of the impacted company and the news paper coverage seem to predict the stock return movements. Thirdly, since the fines distributed by the EC are relatively small compared to the offenses, they question the deterrence effect of the current policy in place. Lastly, the authors hypothesize how the Commission's prohibition decisions are likely to improve consumer welfare, since they are effectively dismantling the abuse of dominance, which in turn might dissuade future abuse of market power.

More recently Bos et al. (2019) explore the impact of the raid date and decision date for a sample of EC cartel cases for the period of 1990-2016. They also discover a strong negative effect on both publishing of the decision and the inspection date. The authors proceed to explain how investors might have expected a reduced profitability once the companies got raided, and reacted stronger when the decision was made public for cases where there was no raid beforehand. In other words, the market's reaction is amplified the first time that the negative news becomes public knowledge, in line with the Efficient Market Hypothesis from Sharpe (1963).

To summarize, the current literature presents extensive results on the diverse

impacts of collusion. Abusive market practices can have a significant effect on stock returns of the companies investigated by the antitrust regulators. However, our study will try a different methodology to approach this topic. Based on the current status of knowledge, we expect to draw similar conclusions from our sample, materialising through a strong deterrence effect from the EC once the infringement and commitment decisions have been published. The jury is still out on whether companies succeed in generating abnormal returns during the abuse of dominance period and is thus subject to our analysis.

Chapter 3

Methodology & Data

3.1 Data

3.1.1 European Commission Cases Data

For this empirical analysis, we use the program R studio. We used OpenAi (2023) to assist us with the debugging of code, and error troubleshooting only. Our study focuses solely on companies having infringed article 102 of the TFEU. This implies we need to drop all the cases in which the companies infringed more than Article 102. We then retrieve the case data from the EC's Official Journal, for the period covering 1980 until 2022. During this time, the EC conducted several investigations (34 of which we focus on in depth) on companies, which all resulted in either an infringement decision or a commitment decision. The case data (CD) is enriched with manually getting the information from every decision document for every case, to populate key variables for our model. The most important variables for the CD retrieved are described below:

1. **The Commitment Decision**: Defines the commitments the company has to adhere to.

2. **The Commitment Duration**: Defines the period of time until which a company has committed to reduce or eliminate their current dominant position.

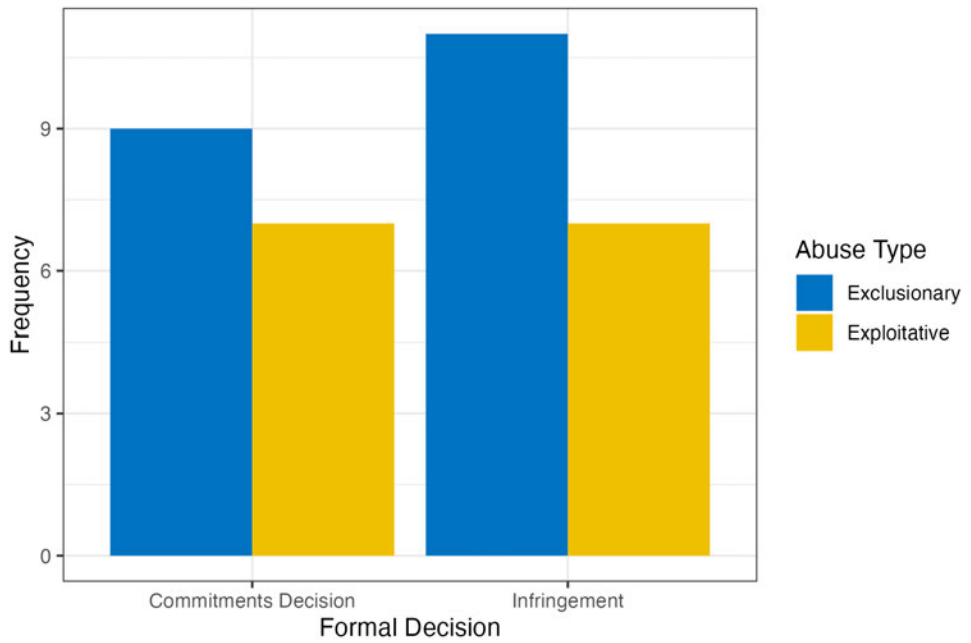
3. **The Infringement Duration**: Defines the period of time the EC has recognized as an infringement period, detailed in the infringement decisions.

4. **The Infringement Decision**: Defines the penalty and subsequent fines for infringing Article 102.

The extent of the decision documents varies depending on the infringement, the case and/or the duration of the investigation. Since the structure of every document is similar across time, the most crucial information for our variables can be retrieved by searching for the key words "HAS ADOPTED". This method is then applied for all 34 cases included in this analysis.

Russo et al. (2010) explain how abuse of dominance can be classified in 2 different categories. Hence, we are looking to characterise the different cases under these two categories: exploitative practices and exclusionary practices for each infringement and commitment decisions as presented in figure 3.1. On the one hand, we observe 16 commitment decision cases of which 9 are exclusionary and 7 are exploitative. On the other hand, there has been 18 infringement cases, of which 11 are exclusionary and 7 are exploitative behaviors. This overview suggests that companies tend to exclude the competition (20) more often than they exploit consumers (14).

FIGURE 3.1: Abuse Types & Formal Decisions



This study covers a sample of companies operating in 11 different countries, concentrated mostly in the US and the EU. From a sector of activity perspective, the firms are spread through 11 different sectors. The EC targets Information Technology (IT), Communications (Com) and Utilities (Uti) the most.

TABLE 3.1: Key Cases Variable Overview

Variable	Unique	n
AbuseType	2	Exc: 20, Exp: 14
Formal Decision	2	Inf: 18, Com: 16
Country	11	USA: 14, GER: 7, FRA: 4, BEL: 2
Sector	10	IT: 8, Com: 7, Uti: 7, Ind: 3
Report Route	3	ComD: 27, Comp: 6, ComPD: 1

On another note, when looking at the cases' reporting routes, it seems that in recent years, the Commission is a lot more on the offensive and instigates more investigations on their own initiative, rather than relying solely on complaints as displayed in figure 3.2. Carree et al. (2010) also observe this reporting route trend in their analysis as highlighted previously.

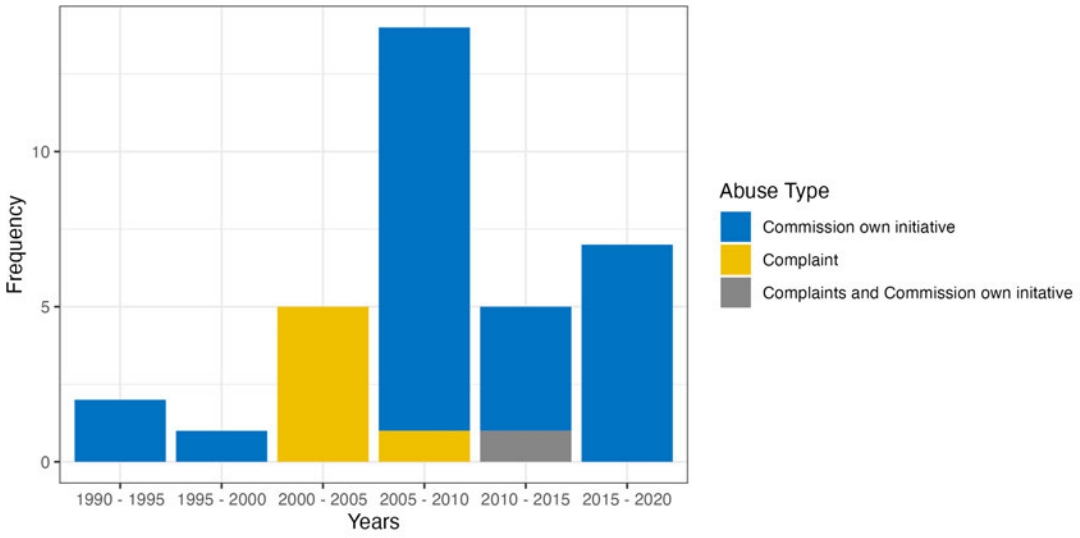


FIGURE 3.2: Report Routes Across Time

All case durations are summarised in table 3.2. The longest investigation lasted 10.8 years, while the shortest could be resolved within 4.4 months only. The commitment decisions imposed by the EC have in average a duration of 6.1 years and can range up to a maximum of 10 years for cases where the cessation of abuse of dominance is expected to take longer. For the infringement duration, the time effectively identified by the EC varies more than for the commitment decisions, since this variable is completely dependent on the result of the investigation. The longest infringement duration lasted 9 years, while the shortest one was 7.8 months only.

TABLE 3.2: Cases Duration in Months

	CommitmentDuration	InfringementDuration	InvestigationDuration
n	16.00	18.00	34.00
mean	72.92	56.30	37.45
sd	23.79	26.74	30.17
median	60.00	63.82	31.00
min	60.00	7.83	4.40
max	120.00	108.00	129.80
range	60.00	100.17	125.40
skew	1.34	-0.26	1.70
kurtosis	-0.06	-0.66	2.63

Table 3.3 outlines the number of cases over our sample period by commissioner and by fine. Mr. Joaquiin Almunia and Ms. Neelie Kroes share the most amount of cases (10) during their tenure. Both were able to fine companies infringing article 102, where the infringement decisions were issued, for a total amount of 197 Million Euros and 1.2 Billion Euros respectively. Mr Loean Brittan on the other hand only covered a small amount of cases (2) and could only fine 47 Million Euros. Ms. Margrether Vestager is by far the most interesting observation: in just 8 cases from our sample she managed to charge almost 9.7 Billion Euros, more than any other commissioner has ever charged. Furthermore, by analysing her previous cases, and since she is still heading the European Commission for Competition, she is the main protagonist on the antitrust front.

TABLE 3.3: Number of Cases by Commissioner (1980 - 2022)

Responsible Commissioner	Number of Cases	Total Fines (in €)
Joaquiin Almunia	10	197'462'194
Neelie Kroes	10	1'235'875'000
Margrethe Vestager	8	9'692'746'000
Mario Monti (M)	4	529'557'304
Leon Brittan (VP)	2	47'000'000

We would like to emphasize on the EC making an assumption on how long the infringement has been going on, and further assuming the company to cease abusing their dominant position on the day the decision is made public. Indeed, the concept of burden of proof creates a hurdle in their investigation process (Fernández, 2019), and has a direct impact on the identification of the effective infringement duration. This means that the company could be infringing for a longer time period than the one identified by the EC's investigation. However, in order to include it in the final decision, the EC needs to back its assumption with hard proof.

3.1.2 Companies In Scope

In order to understand the effect the EC's decisions might have on the investigated companies, we retrieve the stock's daily data, their sector and their respective reference index prices from Bloomberg, for the period between January 1st, 1980 and December 31st, 2022. Therefore, any company that was not listed at the time of the decision is ignored (General Motors, first Michelin Case). For consistency and simplicity purposes, all the other companies that have been delisted (De Beers), were acquired by another company (Clearstream AG) or merged (Akzo Chemie), are subsequently dropped from the observed sample as well.

For companies that are not listed, a verification is performed about the ownership structure. If the company is fully owned by a listed parent company, said parent company is taken into the sample (Telekomunikacja Polska owned by Orange & Slovak Telekom owned by Deutsche T-Mobile), thereby matching the approach outlined by Günster and van Dijk (2016).

After taking into account all the exceptions described above, the sample size of the companies we observe includes 26 different companies across 32 different cases domiciled in 10 different countries. This difference is explained by the EC decisions impacting recidivist companies such as E.ON AG, Google and Qualcomm, which is the reason why this analysis has to treat the sample data on a company basis and not on a case basis.

Fines are only issued among infringement decision cases when the EC deems it necessary, except the for Motorola case [1]. In figure 3.3 we observe how the EC started imposing heftier fines over time. The lowest fine was imposed on Motorola (0 Euros), while the highest one was given to Google (4.3 Billion Euros). The concentration of fines in the IT and Communication Services industry further supports how the EC targets these sectors, and how this is providing them with a basis to implement stricter policies such as the DMA.

Furthermore, once we aggregate the fines distributed by the EC by sector in table 3.4, the Communication Services sector is the sector which suffered the most (8.6 Billion Euros) and the Industrials sector on the other end with the smallest amount (43.7 Millions Euros). To put things into perspective, the maximum fine which can be imposed by the EC is 10% of the company's turnover.

[1] Commission Decision of 29 April 2014, published on the DG Comp Website, COMP/39.985 – Motorola

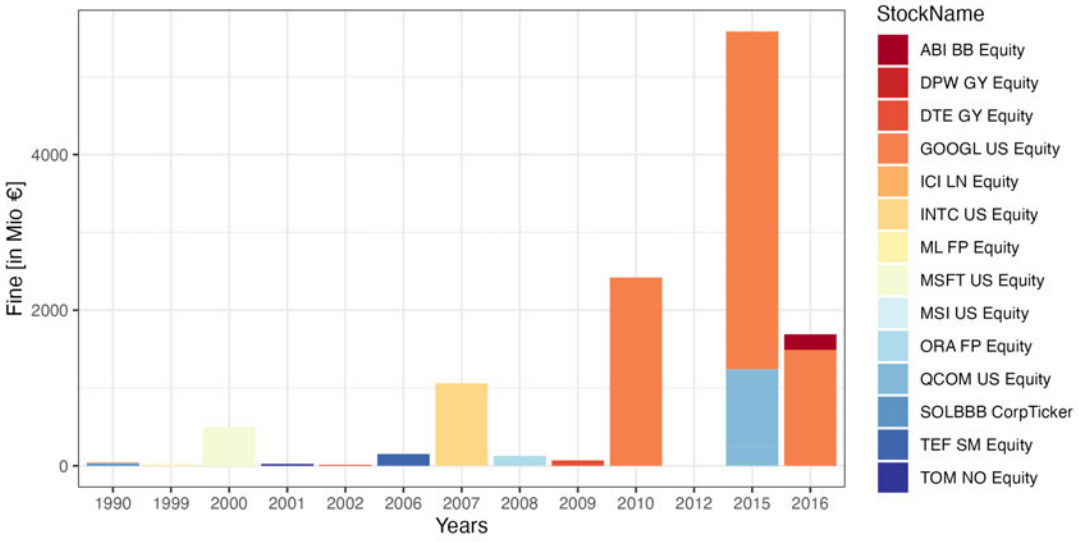


FIGURE 3.3: Fines Across Time 1980-2022

TABLE 3.4: Fines by Sector 1980-2022

Sector	Number of Fines	Total Fine (in €)
Communication Services	7	8'614'802'194
IT	5	2'796'677'304
Industrials	3	43'761'000
Chemical industry	2	47'000'000
Consumer Staples	1	200'400'000

Lastly, it is noteworthy to mention that for both infringement and commitment decisions, some of the world's most well known companies are being investigated, such as Google, Microsoft, Coca-Cola and IBM.

3.1.3 Data Cleaning

To avoid having too many data points where both the stock and index returns equal 0, the 1st of January as well as the 25th of December of any given year, which are well known to be non-trading days globally, are being removed.

After running some summary statistics on the stock and index return distributions, we notice extreme values for the stock returns (Kurtosis=61'362.2300, Skewness=183.9103) and for the index returns as well (Kurtosis=105'550.5100, Skewness=264.9203), which could greatly impede the accurateness of our analysis. Furthermore, table 3.5 shows us extreme outliers which could also bias the results of our model. Hence, we choose a winsorizing approach to replace extreme values, being defined as the top and bottom 0.1% of observations on both tails of the distribution.

TABLE 3.5: Non-winsorized data

	StockReturn	IndexReturn
n	202'925	237'433
mean	0.0006	0.0004
sd	0.0344	0.0222
median	0.0000	0.0003
trimmed	0.0003	0.0005
mad	0.0134	0.0085
min	-0.9161	-0.8979
max	11.4916	8.8333
range	12.4077	9.7312
skew	183.9103	264.9203
kurtosis	61'362.2300	105'550.5100
se	0.0001	0.0000

We outline in table 3.6 how with winsorizing our data gets closer to following a normal distribution, represented through an improved Skewness, Kurtosis, and standard deviations. This holds true for both variables and is a necessary key step before we start conducting the regressions.

TABLE 3.6: Winsorized data

	StockReturn	IndexReturn
n	201'823	236'145
mean	0.0006	0.0003
sd	0.0219	0.0124
median	0.0000	0.0003
trimmed	0.0003	0.0005
mad	0.0135	0.0086
min	-0.1285	-0.0712
max	0.1553	0.0703
range	0.2838	0.1416
skew	0.4602	-0.1981
kurtosis	8.3705	5.0687
se	0.0000	0.0000

3.2 Methodology

3.2.1 Data Structure

Since this thesis is looking at companies evolving through time, the data needs to be prepared into a panel data structure, ranging from 1980 until 2022. Panel data exhibits time series observations of multiple individuals (Hsiao, 2007): in

our case, companies' daily stock returns are observed across time. This implies modelling in two dimensions, one being the time t and the other being stock i. After being compiled, the data set has a unique time indicator (the date of the trading day) and the relevant stock / index return of that day. As mentioned earlier, the scope of the cases are infringement decisions and commitment decisions, which will define the overall structure of the panel.

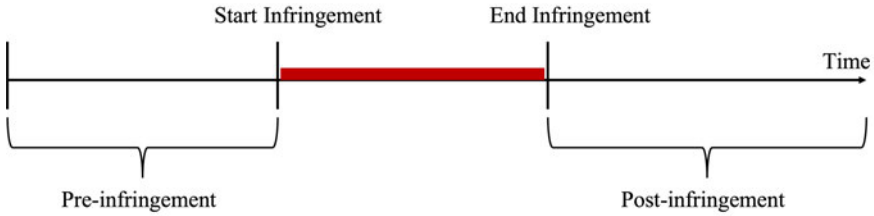


FIGURE 3.4: Infringement logic - Single infringement

Figure 3.4 represents the logic we choose to apply for the infringement decisions, where the EC emitted a decision for the first time. The pre-infringement periods are all the daily returns before the officially recognized infringement period, as defined by the EC (here defined by the "Start" and "End"), which is the abuse of dominance period for a specific company. Subsequently, this is the abuse period mentioned in our research question. The assumption for the post-infringement period is also based on the EC decision document, as the company should cease any abuse of dominance once the decision has been published. Furthermore, this creates the need for dummy variables to account for the necessary periods and observe the effects as described below:

1. **Pre-infringement**: All data points before the infringement duration.

2. **Infringement Duration**: The period of time recognized by the EC in their infringement decisions (marked in red).

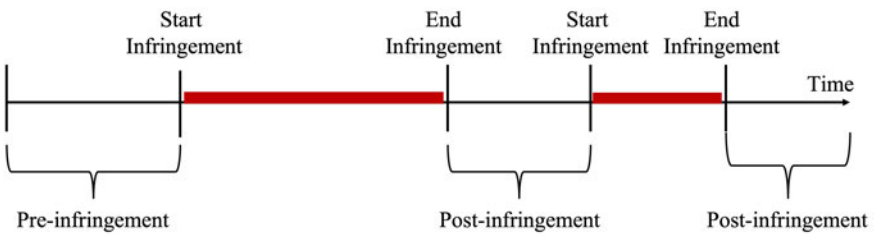


FIGURE 3.5: Infringement logic - Multiple infringements

Considering the sample exhibits companies for which multiple infringement decisions have been issued (Google, Qualcomm), the variables need to be mapped

adequately as described in Figure 3.5. Here, the periods in between or before the second infringement are treated as post-infringement periods. The reason is to ensure the pre-infringement period does not overlap with the previous infringement(s), which might cause some errors and yield incorrect predictions in the models later.

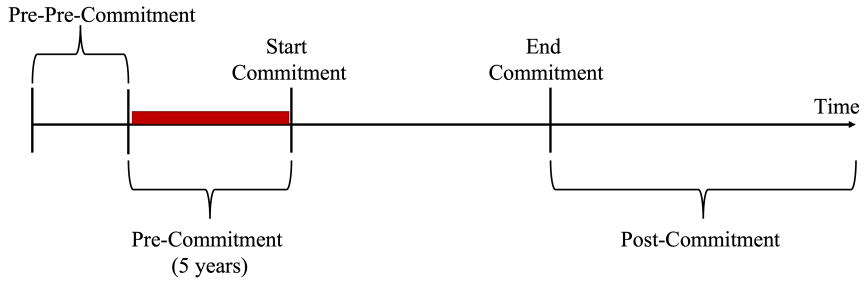


FIGURE 3.6: Infringement logic - Single & multiple commitment decision(s)

The assumptions for the commitment decisions are slightly different, as outlined in Figure 3.6. The pre-commitment period is estimated to be five years prior to the beginning of the commitment period. Similarly to the infringement cases, we need to define the abuse period. In this case the pre-commitment period is defined as the abuse period (marked in red). We choose to apply this time period, considering that the average infringement duration in months is roughly five years as well as shown in table 3.2. The variables are therefore defined as explained below:

1. **Pre-Pre-Commitment**: All data points before the Pre-Commitment period.

2. **Pre-Commitment**: All data points before the commitment decision from the EC and considered to be period of abuse of dominance.

3. **Commitment Duration**: The period of time recognized by the EC in their commitment decisions.

Lastly, our data also exhibits multiple overlapping commitment decisions issued to the same company (E.ON AG appears three times). Consequently, in order to simplify our assumptions, these cases are treated as one aggregate commitment period, similarly to a single commitment decision cases, as detailed in figure 3.6.

3.2.2 CAPM

Sharpe (1963) developed the CAPM, to express a stock return as a function of its market return and the risk free rate. This model has now become a reference in asset pricing, and has also been further enhanced with more factors, such as the Fama-French three factors model implemented by Fama and French (1993).

Several studies use the CAPM model as their methodology of choice to estimate stock returns in the context of antitrust and anti-competitive behaviour (Ellert, 1976), (Choi & Philippatos, 1983). Choi and Philippatos (1983) leverages the CAPM because it presents a good estimation of the market profitability for stocks. Hence, we choose to implement this approach as well, as in our case we want to use this model to explain the stock returns with the returns of the index and add our case variables subsequently. Keeping in mind however, how Lianos and Genakos (2012) criticizes the CAPM approach to measure stock returns in the case of antitrust, due to the market's efficient nature.

3.2.3 Regression model

The equation 3.1 below details the model estimated for this analysis. The dimensions are i for each stock in our sample, on a specific date t. The model attempts to estimate the stock returns with a CAPM using the main listing index return to reflect the market returns. Furthermore, we add the case specific variables to measure their impact on the companies' returns over time. For the different explanatory variables, we use a combination of dummy variables for both the infringement decisions and the commitment decisions.

$$\begin{aligned} R_{it} = \alpha + \beta_1 MarketReturn_{it} + \beta_2 PreInfringement_{it} + \beta_3 \\ InfringementPeriod_{it} + \beta_4 InfringementTrend_{it} + \beta_5 Commitment_{it} + \beta_6 \\ PreCommitment_{it} + \beta_7 CommitmentDecisionPeriod_{it} + \beta_8 CommitmentTrend_{it} + \\ \beta_9 Time_{it} + \beta_{10} ExploitationType_{it} + \alpha_t + \gamma_i + \mu_{it} \end{aligned} \quad (3.1)$$

$MarketReturn_{it}$ represents the main index return where the company is listed. $PreInfringement_{it}$ identifies the period of time before the recognized infringement from the EC's decision document (1 else 0). $InfringementPeriod_{it}$ stands

for the period of infringement or when the abuse of dominance took place (1 else 0). $InfringementTrend_{it}$ is a trend starting at 1 until the infringement period is over with a +1 increment. Similarly, $CommitmentTrend_{it}$ is also a trend starting at 1 until the commitment period is over with a +1 increment. $Commitment_{it}$ represents the commitment cases (1 else 0). $PreCommitment_{it}$ identifies all observations five years prior to the commitment start (1 else 0). A similar approach is used for $CommitmentDecisionPeriod_{it}$. $ExploitationType_{it}$ classifies the exploitative cases (1), while 0 stands for the exclusionary cases. α_t represents the time fixed effects, in our case the trading days. γ_i is the individual fixed effect, in our case the companies. Finally, an overall time trend is included, $Time_{it}$ to help capture the time effect and other effects not measured by the model.

Working with stock prices tends to display non-stationarity. To ensure the constructed model is in line with the basic assumption of stationarity, we perform a unit-root test, similar to an "Augmented Dickey Fuller Test" on both stock prices and stock returns. It becomes apparent that the stock prices in our sample display non-stationarity [2], since we cannot reject the H_0 of non-stationarity as the p-value is too high. For the returns, we can reject the H_0 in favor of the alternative H_a[3]. Therefore, due to this result, using the returns instead of the stock prices is the most preferred approach for our analysis. It should make our analysis more reliable once we start running the regressions.

Next, we draw a correlation matrix for all the dummy variables mentioned in equation 3.1, in the appendix figure B.1. We observe two correlations which are equal or greater than 0.8. *PreCommitmentPeriod* and *CommitmentTrend* have the highest correlation with a coefficient of 0.86, while the *InfringementPeriod* and the *InfringementTrend* have a coefficient of 0.8. This can be explained through both decisions types being mapped similarly. The trend will grow for both variables as the duration of the *PreCommitmentPeriod* and the *InfringementTrend* extends through time, which should not have such a significant impact on the models we run. The biggest negative correlation coefficient is -0.73 for the abuse types. This coefficient is in line with the data construction, as a company can only be exclusionary or exploitative, or both in case of multiple infringements. The *IndexReturns* and the *StockReturns* also show a positive correlation of 0.54, which is not a surprising finding, as the CAPM theory suggests.

[2]Unit root test for Prices = 0.57, since the test value is too high we cannot reject

[3]Unit root test for the Returns = 0.00, here we can reject

Finally, we draw in Appendix Table A.1 a display for a more insightful overview of how we will run the different models. The purpose of this overview is to understand how we progressively add all necessary variables, and what roles they will play once we start our regressions. A tick (✓) indicates that the variable is present in the model, while the cross (✗) shows the absence of this variable in a specific model. We aim to test all our explanatory variables by adding them progressively to the models and observe the different effects and significance or lack thereof.

Chapter 4

Regression Results & Findings

4.1 Results

The models we are testing are based on a variation of the equation 4.1 below:

$$R_{it} = \alpha + \beta_1 MarketReturn_{it} + \beta_2 PreInfringement_{it} + \beta_3 InfringementPeriod_{it} + \beta_4 InfringementTrend_{it} + \beta_5 Commitment_{it} + \beta_6 PreCommitment_{it} + \beta_7 CommitmentDecisionPeriod_{it} + \beta_8 CommitmentTrend_{it} + \beta_9 Time_{it} + \beta_{10} ExploitationType_{it} + \alpha_t + \gamma_i + \mu_{it} \quad (4.1)$$

Table 4.1 shows all the main regression results. We show a total of ten different models with progressively adding the necessary variables, dummies and trends for both infringement and commission decisions. We show the first six models in the result section's Table 4.1. Appendix Table A.2 shows two additional regressions including abuse types. Finally, Appendix Table A.3 exhibits the last two regressions, explaining the impact of the decision day on which the EC releases of the final decision documents. For clarity, the results are interpreted as basis points (where 1 bps = 0.01%).

For each variable in each model, we are looking to reject H_0 in which we assume the beta coefficient of the variables to be equal to 0. Models (1) to (5) include day and individual fixed effects, as fixed effects are used to account for unobserved heterogeneity. Since regression may yield biased estimates for causal effects, adding fixed effects is very helpful to diagnose causal effects (Brüderl & Ludwig, 2015), increase the explained variation and reduce the

omitted variable bias. To demonstrate this in more detail we choose to run the last model (6), which looks at the entirety of our variables without any fixed effects for comparison. All 6 models have a constant coefficient of determination (approximately 0.29), and the same number of observations (n=194'433). The variable *PreCommitmentPeriod*, present in four of the models, is never significant. We can therefore state how the estimated five years before the commitment decisions do not have any impact on the stock returns evaluated in our models. As this variable was suppose to represent a theoretical abuse of dominance period, we therefore fail to recognize a significant effect of the stock returns.

The model (1) is a replication of the classical CAPM, firstly established by Sharpe (1963) and further detailed by Sharpe (1964), to understand how well the main index returns explain the individual stock returns. With no surprise, the beta coefficient of index returns is statistically significant with a very low standard error and a coefficient being very close to 1. As this significance is replicated throughout all our models, it suggests robustness, and provides a basis to add further independent variables such as the case dummy variables mentioned in equation 4.1. Despite our findings being in line with the standard CAPM assumptions, we still run a model in Appendix Table A.4 to verify our finding, by explaining the stock returns without the index returns and discover no significance when the *IndexReturn* variable is taken out of the regression. We also include a *TimeTrend* variable in all our models, specific to every trading day of our sample for each companies to account for time. The *TimeTrend* only exhibits significance from model (1) until model (3) with a very small effect on the stock markets returns. In the subsequent models the *TimeTrend* significant effect disappears.

Since our research question is to test whether companies' abuse of dominance is profitable compared to the market, we will initially focus on two variables, namely *PreCommitmentPeriod* and *InfringementPeriod*. If we look at the commitment decision cases, we assume the period of dominance started five years before the EC's decision date. We use this approach as it is also defined by Levenstein and Suslow (2006), who conclude the average duration of a cartel is five years, and by Günster et al. (2011), who leverage the same assumption in their research to benchmark the cartels' performance. This is reflected in the *PreCommimentPeriod* variable included in models (2) and (4) to (6). Model (2) displays an intriguing finding, as the *CommitmentPeriod* displays a significant effect with nearly -4 bps on the company returns. This finding is replicated

TABLE 4.1: The table shows our estimations on the stock returns in bps (0.01%). All models run with fixed effects while model (6) is a simple regression without any fixed effects made for comparison. We include several dummy variables progressively to observe the effect of the CD variables on the stock returns.

	StockReturn					
	(1)	(2)	(3)	(4)	(5)	(6)
IndexReturn	0.92264***	0.92265***	0.92265***	0.92266***	0.92266***	0.92271***
	(0.00327)	(0.00327)	(0.00327)	(0.00327)	(0.00327)	(0.00327)
Commitment_Decision						0.00020*
						(0.00012)
PreCommimentPeriod		−0.00004		−0.00006	−0.00014	−0.00010
		(0.00016)		(0.00016)	(0.00029)	(0.00029)
CommitmentPeriod		−0.00035**		−0.00041**	−0.00041***	−0.00044***
		(0.00016)		(0.00016)	(0.00016)	(0.00015)
PreAbusePeriod			0.00037*	0.00045**	0.00047**	0.00055***
			(0.00019)	(0.00019)	(0.00019)	(0.00016)
InfringementPeriod			−0.00012	−0.00007	0.00034	0.00041
			(0.00017)	(0.00018)	(0.00026)	(0.00025)
CommitmentTrend					0.00000	0.00000
					(0.00000)	(0.00000)
InfringementTrend					−0.00000**	−0.00000**
					(0.00000)	(0.00000)
TimeTrend	−0.00000***	−0.00000***	−0.00000**	−0.00000	−0.00000	−0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Constant						0.00022
						(0.00018)
Fixed Effects	Yes	Yes	Yes	Yes	Yes	No
Observations	194,433	194,433	194,433	194,433	194,433	194,433
R^2	0.29094	0.29096	0.29096	0.29099	0.29100	0.29099
Adjusted R^2	0.29084	0.29085	0.29086	0.29087	0.29088	0.29096
Note:						*p<0.1; **p<0.05; ***p<0.01

throughout models (4)-(6) as well, suggesting a robust negative effect. Put differently, the company receiving a commitment decision is likely to observe a decrease of approximately 4 bps in their stock returns over the commitment period defined by the commission.

The efficient market hypothesis developed by Fama (1970) exists if the over-reactions and the under-reactions of the market are evenly split (Fama, 1998), or if the market reacts quasi-immediately to new information (Jensen, 1972). In an efficient market, it should be impossible to generate any abnormal market returns by using fundamental or technical analysis. This point is also addressed by Ellert (1976), who observes no significant market movement once the information from the American watchdog is made public, in line with the Efficient Market Hypothesis. This implies, that the information published by the American watchdog has already been priced in by investors.

In effect, our findings could have deeper implications: if we assume the point of view of an investor when the EC's Commitment Decision is published, the investor could potentially realize a gain of approximately 4 bps by shorting the stock over the announced commitment period, assuming the market efficiency conditions hold, and the borrowing costs are equal to zero. Presumably, when the EC publishes its commitment decision, the impact can be quite significant on the company's profitability and strategy. If the company needs to divest or cease its operations (EOAN GY Equity [1]), or if it has to stop profitable collaborations, it could lead to significant monetary downsides. In turn, the market will price in this new information, which consequently will affect the company's stock return. This might explain our findings of roughly -4 bps in our model.

In our summary Table 3.2, we observe the average duration to enforce the commitment imposed by the EC to be five years. Hence, the result around the *CommitmentPeriod* could also have a deterrence effect for companies willing to acquire and abuse a dominant position. If companies gamble and get caught, they can expect a loss in their stock returns of -4 bps over the average commitment period.

Another aspect requiring clarification is the aspect of perfect multicollinearity. In our specifications we define the post-infringement and the period to be five years before the commitment decisions. Indeed, if our time variables can be

[1] Commission Decision of 04 May 2010, published on the DG Comp Website, case COMP/39.317 – E.ON Gas

explained as a linear combination of other variables, (e.g. before, during and after infringement) we will run into a multicollinearity problem. Farrar and Glauber (1967) detail how this can be avoided, as the solution to this problem resides in deciding which variable to drop. Consequently, we choose to remove one of these three variables, *PostInfrPeriod* for infringement cases and *PrePreCommitmentPeriod*, to solve the multicollinearity issue.

Next, we look at the infringement decision cases, where the variable *InfringementPeriod* captures the period of abuse of dominance stated in the EC's decisions. This variable is added for the first time in model (3) and kept until model (6). It seems that the stock returns are hardly impacted during the infringement period. The *InfringementPeriod* does not exhibit any significant effect in model (3) until model (6). Focusing on this result through the lens of company executives, it would seem that infringing article 102, does not have a significant effect on the stock returns. Companies could therefore use this observation to weigh in whether creating and abusing a dominant market position could be a profitable alternative.

For model (5) and (6), we include a time trend specific to the respective infringement and commitments periods. To stay consistent with our daily fixed effects approach, we calculate a time trend for each company. This implies that we start counting at one on the first day the company either starts infringing (reflected in the variable *InfringementPeriod*) or when the it enters the commitment period (reflected in the variable *CommitmentPeriod*). Subsequently, we add an increment of 1 until the period is finished. For the latter, there is no significance to be observed, while the *InfringementPeriodTrend* has a significant effect on stock returns at the 5% level.

Nevertheless, we find a positive effect for the *PreAbusePeriod* variable in model (4) until model (6) of roughly 5 bps, significant at the 5 % level. Based on this observation, it appears that companies tend to perform significantly better before starting to abuse their dominant position. This brings us back to a company's point of view: if the results we created are robust, companies would not have an incentive to abuse their power from a stock market return perspective, as they are performing significantly better before abusing their market dominance.

Yet, this is a question of interpretation. It could also well be that these companies started to realize they were not yielding enough stock returns, and consequently decided to explore alternative routes, taking on more risk, and attempt to create and/or abuse their dominant position. An alternative point of view, as defined by Arrow et al. (1962) could be that companies once attaining a dominant positions become lazy, and their incentive to become better, work more efficiently and innovate slowly disappears. Consequently, this could be a possible explanation as why in our models, stock returns do not appear to be significantly higher during the *InfringementPeriod*.

A second possible justification for this finding could be tied to the EC's investigation approach. The infringement period which is the basis for our model, is defined by the EC after their investigation is completed. As it is no simple feat to quantify the exact abuse period, there is a possibility that companies were infringing before the period defined in the EC's decision. The EC could leverage these results, and attempt to adjust the time period of infringement, as well as the fine tied to it, in order to improve the deterrence effect on anti-competitive behaviour.

Furthermore, since models (1)-(5) include individual and daily fixed effects in the panel regression logic, we have to remove by default the variable *CommitmentDecision*, which enables us to differentiate between cases. This also explains why the result for this explanatory variable can only be displayed in model (6) since this model is without any fixed effects. Interestingly, our model (6) suggests the *CommitmentDecision* variable displays no significant effect on the stock return at the 5% level. Therefore we cannot measure the impact of the EC's decision type adequately.

Next, we look at the influence of the abuse type. Every case analysed in this study is either looking at an exploitative or exclusionary case as described by Russo et al. (2010). We intergrate this in Appendix Table A.2, with two additional models to our current models (5) and (6). To correctly integrate this effect, we generate the variables by the following product (i.e interactive term between the period and the abuse of power behavior): *InfringementPeriod * Exclusionary*, *InfringementPeriod * Exploitative*, *PreCommimentPeriod * Exclusionary* and *PreCommimentPeriod * Exploitative*. We come to the same conclusions and observe no significant effect of the abuse type for commitment cases nor for infringement cases on stock market returns. In other words, we cannot adequately define if the abuse type has an impact on the returns in the models

we present, and fail to reject our null hypothesis for all abuse types across infringement and commitment decisions.

Furthermore, we choose to add a dummy variable for the decision date to our models (5) and (6). This variable could be crucial in identifying the market's reaction when the EC publishes its investigation results. Especially for the infringement cases, given the fine is also made public around this date. Günster and van Dijk (2016) also perform an analysis using an event study design, and find that the market is pricing in a decrease in profitability around key announcement dates. Again, we refer to the efficient market hypothesis, where information is integrated and priced in by the market almost immediately Fama (1970). Therefore, we would expect no significant variation. Appendix Table A.3 displays the results found in model (5) and (6) including the decision dates. Similarly to the abuse type models, we find no further indication of statistically significant effect, where the decision date plays an explanatory role. However, this observation does contrast with previous work such as Günster and van Dijk (2016), Aguzzoni et al. (2013). The difference with these studies can mostly be attributed to the methodology, as we do not run an event study.

In essence, our results display interesting features. Arrow et al. (1962), pointed out how powerful companies loose their incentive to become better. Indeed, we can confirm his results with our model (3) to model (6), as there are no significantly higher returns during the *InfringementPeriod*. Similarly, in line with our assumption about the *PreCommitmentPeriod* being the abuse of dominance period in the commitment cases, our results are consistent with Arrow's theory. Additionally, our findings for the variable *CommitmentPeriod* in commitment cases, where we observe a significant decrease in the stock returns of -4 bps, is also consistent with previous studies which observe a drop in stock returns after the announcements (Günster & van Dijk, 2016), (Garbade et al., 1982), (Bosch & Eckard Jr, 1991). It is noteworthy however, that our findings about the infringement decisions at the decision date deviate from what was observed in previous studies.

4.2 Limitations

The main limitation of this study and its finding lies in the selection of our sample. The main reasons for this shortcoming is twofold. First of all, the sample we are leveraging to conduct our analysis can only include listed companies. We are already excluding a certain number of companies (General Motors, Michelin, De beers, Clearstream, Akzo Chemie) due to specific characters such as mergers, acquisitions and de-listings. Despite the EC investigating numerous companies, the model we construct cannot be applied for these companies. Second of all, the companies that were not investigated or raided are not included in our data set by definition. Since market power is on the rise (De Loecker et al., 2020) and we also found several recidivists companies, is it plausible that the EC has not investigated all companies which abuse their dominant positions. We cannot observe all firms for the simple reasons that not all of the abusing companies were caught by the EC's scrutiny. If Arrow et al. (1962) are wrong, we would expect companies which evade the antitrust investigation process, to be in a more favorable position and thus, achieve positive returns. In other words, it is possible that we underestimate the impact of the *InfringementPeriod* on stock market returns. Having access to the full set of companies which abuse their dominance would yield to a more representative sample. In effect, by definition we are faced with a selection bias, since certain companies are more likely to be included in this sample than others.

Another limitation arises from our findings as well. We note how companies in the *PreAbusePeriod* could generate statistically significant returns of approximately 5 bps, and suddenly during the *InfringementPeriod* the significance disappears. It could well be that companies have been infringing Article 102 for longer than the identified period communicated by the EC. Consequently, this might also lead to some discrepancies in our model and its assumptions.

Additionally, the data quality we have been using throughout this study can also come into play. The stock prices range across a long period of time (1980-2022), and we are not cross-checking these data points with another global financial data provider such as Refinitv or ICE. Furthermore, panel data tends to manifest attrition bias, when individuals in the panel drop over time.

Lastly, we do not account for any significant policy changes in our model despite using time and company fixed effects. Such an omission could potentially yield to omitted variable bias and thus, could have a major impact on

our findings. An example of such an omission would be the forthcoming implementation of the DMA.

4.3 Future Research

The topic around abuse of dominance and its effect on stock returns is broad. Further studies might wish to model the deterrence effect of new European regulation, such as the DMA could have on abuse of dominance. The setup would present itself to conduct a difference in differences model (Callaway & Sant'Anna, 2021) and compare it to the findings exhibited in our study.

Another route could be to compare our results with the US antitrust regulation (The Clayton Act), and observe how the deterrence effect of the American watchdog affects the targeted companies' returns. Is the American regulation stricter and more efficient than its European counterpart?

The most potent finding we come across is the significantly negative effect of the commitment period on stock returns. Studies could look at our results and attempt to create a trading strategy to outperform the market, or potentially avoid including companies in their portfolio which are being investigated by the EC completely.

In the sample we analyse, we come across recidivists companies. The EC's regulatory framework could consider looking at our findings, and adding a controlling variable for companies infringing multiple times, while considering imposing heftier fines or tougher commitment decisions. This approach could also be used jointly with looking at other TFEU articles such as article 101 or a combination of both 102 and 101, thereby allowing the EC to potentially increase its deterrence effect.

Another appealing field of research would be the game theory perspective, similar to Ganglmair and Günster (2011). Studies could attempt to analyze what would happen to the stock returns of the second biggest competitor, once the main market antagonist has been caught and fined by the EC, or had to commit to stop their dominant position.

Chapter 5

Conclusion

The main purpose of this thesis is to explore if companies abusing their dominance position have a measurable effect on their stock market returns. The literature around the abuse of dominance and market power establishes how companies are bound to look for a dominant position. We can also observe that new regulatory initiatives aim to curb this trend, as the EC increased their investigations in the last years. The upcoming DMA is a further confirmation of the EC's plan of action. Firms can indeed leverage their positions by using excluding or exploitative practices towards stakeholders, thereby negatively impacting economic welfare. The abuse of dominance, can also harm the concept of creative destruction laid out by Schumpeter (1942), as it prevents disruption and slows down innovation. This is the predominant reason why regulatory bodies such as the EC play a key role to monitor these activities and enforce the TFEU, notably article 102. Our study focuses thereby only on either the commitment decision or the infringement cases.

Throughout this paper, we aim to answer the question: *Are Companies Abusing Their Dominance Profitable?* We analyse the commission decisions from 1980 until 2022, exclusively infringing article 102 of the TFEU, and retrieve the stock and their index prices. After cleaning the data, our final sample includes 26 stocks across 32 EC Cases, 10 different sectors and headquartered in 10 different countries. The most represented sectors are communication services, IT, and consumer staples. We investigate at two types of cases: firstly, the commitment decisions, where there are no fine attributed, however, the targeted company has to commit to change its position. Secondly, the infringement cases, where the EC distributes a fine which can amount up to 10% of the company's turnover. In our sample this fine spans from 0 Euros to nearly 4.3

billions Euros.

We show through our analysis, that companies which infringed article 102, and received an infringement decisions, seem to be have been performing better (approx 5 bps) before their infringement period started. This is a compelling finding as collusion does not appear to yield significant market returns. Furthermore, as we assume for the commitment decisions that the abuse of dominance period is set before the commitment is initiated, we do not find any significant stock returns during the period of abuse. This leads us to conclude that companies which are abusing their market power do not seem to yield significantly positive returns, compared to other periods of normal market conduct.

For the commitment decision cases, our results also show that during the period of commitment (i.e. where the company commits to cease their dominant position) there is a significantly negative stock return of approx. -4 bps. This could be tied to the size of the commitment made, if companies need to divest or dismantle years of work and/or capital spent to build their dominance in the first place. From a regulatory deterrence perspective, we observe how commitment decisions have a stronger negative impact compared to the infringement decisions, independent of the abuse type either being exclusionary or exploitative.

In conclusion we can address our research question, as we find the period during which companies are abusing their market power doesn't impact the stock returns significantly. When companies are abusing their dominance, they can either expect a decrease in their stock price (commitment cases) once the commitment decisions has been issued, or they can expect a superior stock return performance prior to their abuse of dominance (infringement cases).

Appendix A

Tables

TABLE A.1: Models & Variables Overview, A ✓indicates the variable is present the model, while the ✗shows the absence of this variable for the specific model

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
IndexReturns	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TimeTrend	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CommitmentDecision	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PreCommitmentPeriod	✗	✓	✗	✓	✓	✓	✓	✓	✓	✓
CommitmentPeriod	✗	✓	✗	✓	✓	✓	✓	✓	✓	✓
InfringementPeriod	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓
PreAbusePeriod	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓
InfringementTrend	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓
CommitmentTrend	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓
Exploitative	✗	✗	✗	✗	✗	✗	✓	✓	✗	✗
Exclusionary	✗	✗	✗	✗	✗	✗	✓	✓	✗	✗
DecisionDate	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
FixedEffects	✓	✓	✓	✓	✓	✗	✓	✗	✓	✗

TABLE A.2: This table builds on the previous models (5) and (6) adding the abuse type variables, for our data sample 1980-2022. To measure the Abuse type we use a product between variables.

	Dependent variable:	
	(1)	(2)
IndexReturn	0.92267***	0.92271***
	(0.00327)	(0.00327)
Commitment_Decision		0.00020
		(0.00012)
PreCommimentPeriod	0.00043	0.00001
	(0.00061)	(0.00058)
Exclusionary		−0.00004
		(0.00014)
Exploitative		−0.00006
		(0.00016)
CommitmentPeriod	−0.00041**	−0.00043***
	(0.00016)	(0.00015)
PreAbusePeriod	0.00048**	0.00053***
	(0.00019)	(0.00017)
InfringementPeriod	0.00008	0.00022
	(0.00034)	(0.00033)
CommitmentTrend	0.00000	0.00000
	(0.00000)	(0.00000)
InfringementTrend	−0.00000*	−0.00000*
	(0.00000)	(0.00000)
TimeTrend	−0.00000	−0.00000
	(0.00000)	(0.00000)
PreCommimentPeriod:Exclusionary	−0.00066	−0.00014
	(0.00059)	(0.00056)
PreCommimentPeriod:Exploitative	−0.00053	−0.00008
	(0.00061)	(0.00058)
Exclusionary:InfringementPeriod	0.00048	0.00033
	(0.00036)	(0.00034)
Exploitative:InfringementPeriod	0.00005	0.00001
	(0.00046)	(0.00042)
Constant		0.00028
		(0.00023)
Fixed Effects	Yes	No
Observations	194,433	194,433
R^2	0.29102	0.29100
Adjusted R^2	0.29088	0.29094
Note:	*p<0.1; **p<0.05; ***p<0.01	

TABLE A.3: This table builds on the previous models (5) and (6) for our data sample 1980-2022 by adding another dummy variable for the decision date to map when the EC's decisions are published.

	Dependent variable:	
	(1)	(2)
IndexReturn	0.92266***	0.92271***
	(0.00327)	(0.00327)
Commitment_Decision		0.00020*
		(0.00012)
PreCommimentPeriod	−0.00014	−0.00010
	(0.00029)	(0.00029)
CommitmentPeriod	−0.00041***	−0.00044***
	(0.00016)	(0.00015)
PreAbusePeriod	0.00047**	0.00055***
	(0.00019)	(0.00016)
InfringementPeriod	0.00034	0.00041
	(0.00026)	(0.00025)
CommitmentTrend	0.00000	0.00000
	(0.00000)	(0.00000)
InfringementTrend	−0.00000**	−0.00000**
	(0.00000)	(0.00000)
Decision_Date	−0.00012	−0.00008
	(0.00333)	(0.00333)
TimeTrend	−0.00000	−0.00000
	(0.00000)	(0.00000)
Constant		0.00022
		(0.00018)
Fixed Effects	Yes	No
Observations	194,433	194,433
R^2	0.29100	0.29099
Adjusted R^2	0.29088	0.29096
Note:	*p<0.1; **p<0.05; ***p<0.01	

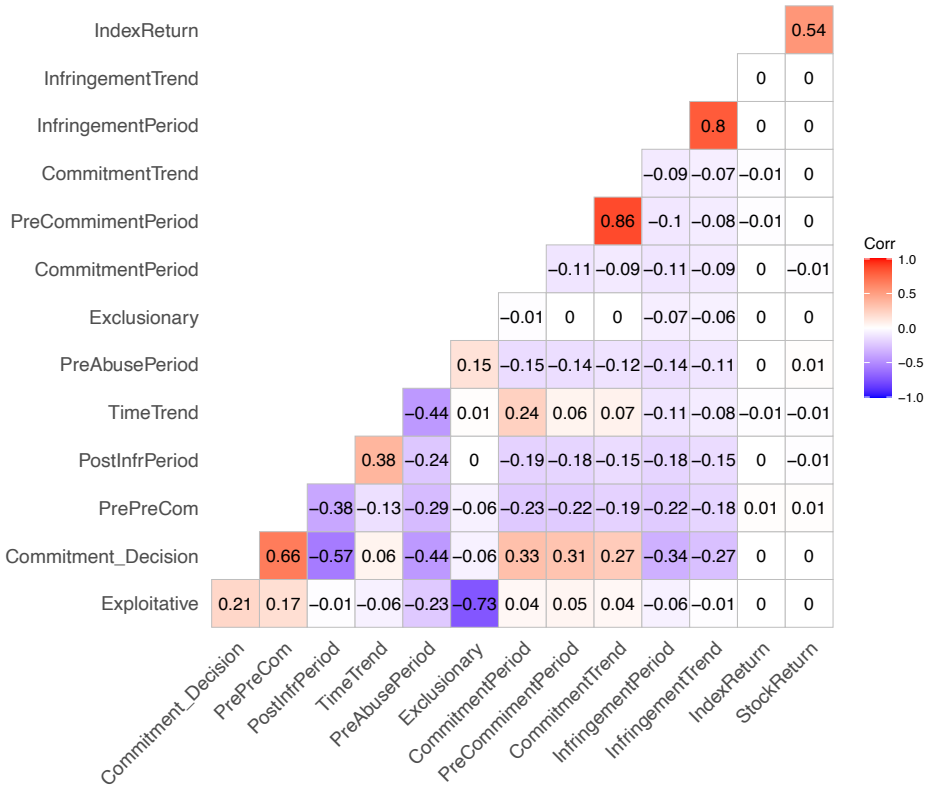
TABLE A.4: This table shows our base model where the *IndexReturn* is removed from the regression. The adjusted R^2 drops to 0.00003 from the 0.29 observed in the models where the *IndexReturn* variable is included. This result is in line with the CAPM theory, where the index return explains a significant part of the stock return.

	StockReturn
PreCommimentPeriod	−0.00034
	(0.00035)
CommitmentPeriod	−0.00042**
	(0.00019)
PreAbusePeriod	0.00037*
	(0.00022)
InfringementPeriod	0.00026
	(0.00032)
CommitmentTrend	−0.00000
	(0.00000)
InfringementTrend	−0.00000*
	(0.00000)
TimeTrend	−0.00000**
	(0.00000)
Fixed Effects	Yes
Observations	201,823
R^2	0.00019
Adjusted R^2	0.00003
Note:	*p<0.1; **p<0.05; ***p<0.01

Appendix B

Figures

FIGURE B.1: Correlation Matrix for explanatory variables



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