EUROPEAN MASTER IN LAW & ECONOMICS

An Empirical Review of Cartel Public Enforcement & Leniency in the EU

Supervisor:

Univ.-Prof. Dr. Christine Zulehner

Author:

Daniel Bates

+32 488 17 93 18

daniel.bates@emle.eu

Word Count:

12972

JEL Codes:

K21; L40

Keywords:

Leniency, Cartels, Deterrence

Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

ERASMUS UNIVERSITEIT ROTTERDAM

universität wien

Abstract

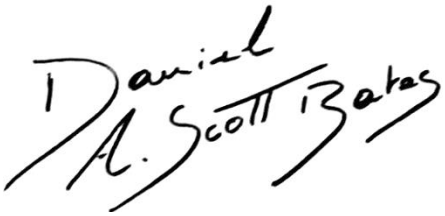
The following thesis, written in the framework of the European Master in Law and Economics, offers an empirical review of cartel public enforcement and leniency in the EU from a positive perspective. The starting point of this analysis consists of reviewing the soft law instruments (Leniency Notice, Settlement Notice, and Fining Guidelines) used in the public enforcement against cartels. Subsequently, a standardised dataset consisting of 212 publicly available documents published by the European Commission is created. This further guides the debate on how the European Commission employs the discretion it is afforded under the soft law instruments. Moreover, a Multinomial Logistic Regression analysis is performed to determine which public enforcement specific determinants lead to an undertaking opting for a certain leniency reduction class. Lastly, this thesis further guides future research based on the trends and findings that stem from the newly created dataset and analysis.

Acknowledgements

I would like to express my thanks to my thesis supervisor Univ.-Prof. Dr. Christine Zulehner for her support and input throughout the course of writing this thesis. Moreover, I would like to express my thanks to all the academic and management staff of the European Master in Law and Economics for the resources and facilities put at my disposal during the past year at Universität Hamburg, Erasmus Universiteit Rotterdam, and Universität Wien, which were instrumental in completing this thesis. I would also like to thank my family and friends for their continuous support throughout the programme and the writing of this thesis.

Authorship Declaration

I hereby declare and confirm that this thesis is entirely the result of my own work except where otherwise indicated. I acknowledge the supervision and guidance I have received from Univ. -Prof. Dr. Christine Zulehner. This thesis is not used as part of any other examination and has not yet been published.



Daniel Bates, 10th of August 2022

List of Abbreviations

Abbreviation	Full Form
DG Comp	Directorate General for Competition
EU	European Union
EC	European Commission
MLR	Multinomial Logistic Regression
RRR	Relative Risk Ratio
TFEU	Treaty on the Functioning of the European Union

Table of Contents

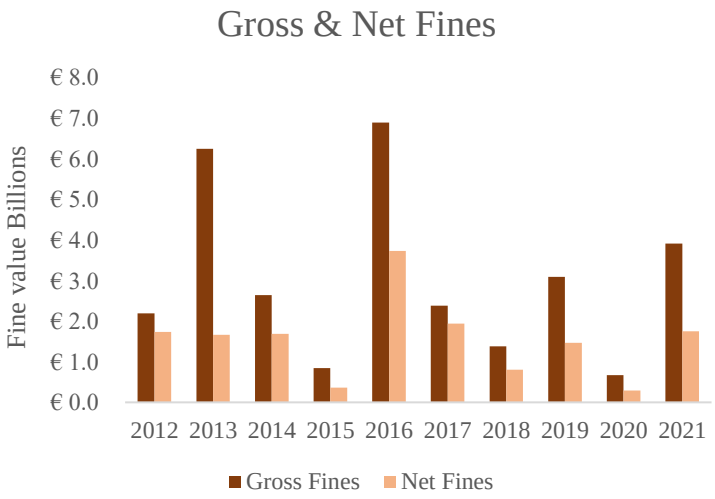
Chapter 1: Introduction and Research Question

Cartels are often shrouded in mystery and have been romanticised by various TV adaptations over the past few years; however, their presence in the European Union's (EU) economic landscape is of central concern to competition law since cartels have detrimental effects on consumers and broader economic viability. Given their harmful effects, it essential to understand the EU's public enforcement mechanisms and tools, such as leniency, that actively fight their presence.

This thesis does not seek to offer a normative analysis on cartel public enforcement or the design of differing leniency regimes. Instead, given the lack of empirical investigation on EU public enforcement and leniency, this thesis provides a positive analysis by (i) reviewing the public legal instruments in place to deal with cartels in the EU, (ii) collecting and summarising publicly available information on enforcement, (iii) running an empirical model to specify the determinants of belonging to a certain leniency class in order to review the leniency programme and, (iv) opening the discussion on the enforcement of competition law based on the European Commission's (EC) use of its legally granted discretion and paving the way for future research.

The legal framework surrounding the enforcement of Article 101 TFEU is unique since it makes use of soft law to guide public enforcement utilizing a sliding scale of reductions afforded to cartelists based on the value and timeliness of their cooperation. This grants the EC a significant proportion of discretion that is recognised within the relevant notices and guidelines. Therefore, in order to assess the ECs use of its discretion, a database was manually created resulting from the careful review of 212 publicly available documents. As a preamble, over the decade [2012;2021], the EC has imposed gross fines of over €30.223bn, while net fines have totalled €15.420bn. this highlights that fine reductions to incentivise the enforcement

of Article 101 TFEU have cost the EC's budget over €14.812bn over the past ten-year period. Note fines are calculated on a gross level to which reductions are applied leading to net fines. This finding tentatively illustrates the type of insights this thesis can bring to the academic debate on public enforcement and leniency regimes.



Graph 1. Gross and Net fines. Author's Illustration

The structure of the thesis follows a step-by-step review (cf. *Figure 1*), where *Chapter 2* is dedicated to understanding the economic dynamics underpinning cartels and the EU's legal instruments in place to deal with public enforcement against cartels. *Chapter 3* turns its focus to the central contribution of this thesis which is the manually created database. Armed with the newly created database, *Chapter 4* runs a multinomial logistic regression (MLR) analysis to understand the determinants behind opting for a specific leniency reduction class. Finally, *Chapter 5* provides a discussion on the findings while also accounting for the inherent limitations of the analyses and the future potential research avenues.

To this end, this thesis aims to answer the following research questions:

How has the EU's public enforcement against cartels evolved over the past decade? Which public enforcement determinants lead to undertakings choosing a specific leniency reduction class?

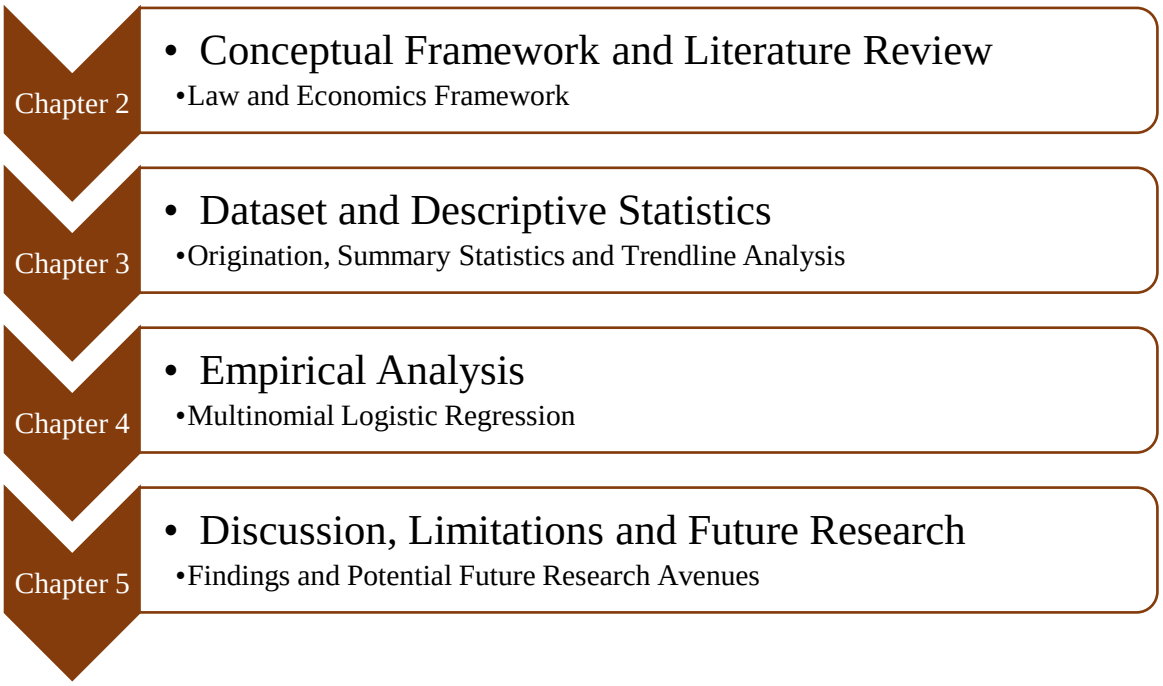


Figure 1. Thesis Structure. Author's Illustration

Chapter 2: Conceptual Framework and Literature Review

The subsequent law and economics research in this thesis can be thought of in two broad heuristic ways. On one hand, legally speaking, this thesis concerns fine setting, leniency, and settlements applicable to violations of Article 101 of the Treaty on the Functioning of the European Union (TFEU) while, on the other hand, an economist would look at the issue from an empirical policy perspective starting with the European Union's Competition Policy concerning cartels and how to prevent and detect them. Here it is important to bear in mind that competition policy and Article 101 enforcement are the competence of the European Commission's Directorate General for Competition (DG Comp) (European Commission, 2022). Therefore, the following chapter is dedicated to outlining public enforcement vis-à-vis cartels using the relevant legal framework and economic commentary.

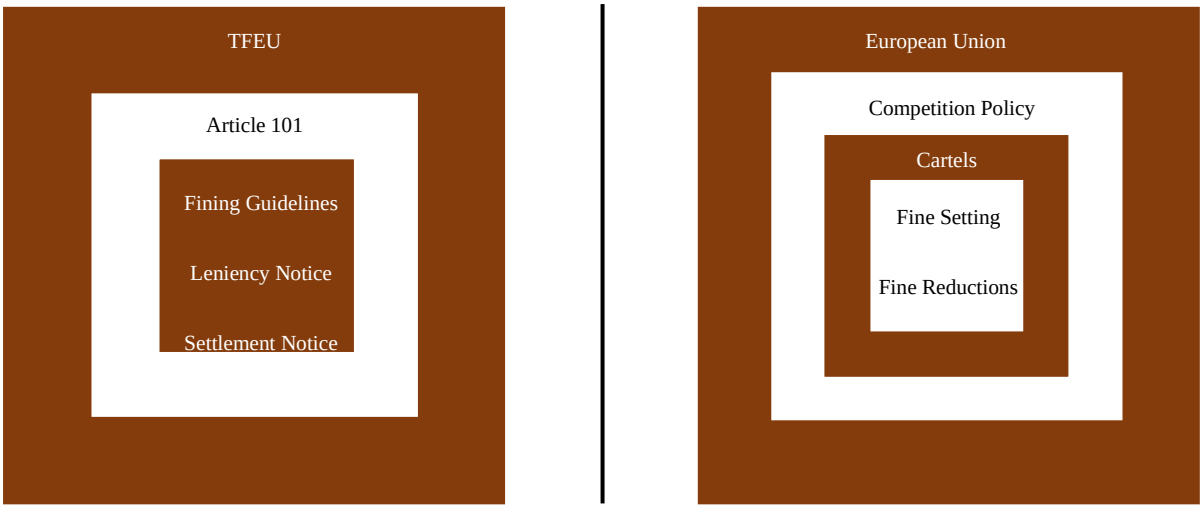


Figure 2. Law and Economics Heuristic on Public Enforcement and Leniency, Author's Illustration

2.1 Art 101 TFEU and Cartels

The following section aims to offer an in-depth review of Article 101 and Cartels. In a first step, the legal framework of Article 101 and its qualification of cartelist activity is discussed. In a second step, economic theory on cartels is specified to understand cartels' effects on the competitive landscape and their characteristics

2.1.1 Legal Basis

Cartels will be defined from a legal perspective as any association of undertakings in violation of Article 101. The latter broadly defines cartels as agreements and associations of undertakings operating within the EU that distort or prevent competition through price-fixing, supply-fixing, market share distribution, discriminate between trading partners or enter into any form of agreement not directly related to commercial aims (Article 101 TFEU). In effect, Article 101 defines cartelist behaviour as any agreement under Art. 101(1) that is automatically voided thanks to Art. 101(2); however, Art. 101(3) makes the case for exceptions. This has the effect of enhancing the overall competitive landscape within the EU:

> 1. The following shall be prohibited as incompatible with the internal market: all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market, and in particular those which:
>
> (a) directly or indirectly fix purchase or selling prices or any other trading conditions;
>
> (b) limit or control production, markets, technical development, or investment;
>
> (c) share markets or sources of supply;
>
> (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
>
> (e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.
>
> 2. Any agreements or decisions prohibited pursuant to this Article shall be automatically void.
>
> 3. The provisions of paragraph 1 may, however, be declared inapplicable in the case of:
>
> - any agreement or category of agreements between undertakings,
>
> - any decision or category of decisions by associations of undertakings,
>
> - any concerted practice or category of concerted practices,
>
> which contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit, and which does not:
>
> (a) impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives;
>
> (b) afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question.

Art 101(1) sets out two types of prohibitions which are those considered to be prohibitions "by object", where there is blatant infringement and no need to prove anticompetitive effects such as the infamous 2016 price-fixing cartel in the European trucking landscape *Case AT.39824 – Trucks,* or those that are considered "by effect", where anti-

competitive effects must be demonstrated. It is important to note that Art. 101(1) also applies only in cases where the market share is considered >10% in horizontal agreements and >15% in vertical cases under the "De Minimis Notice" (De Minimis Notice, 2014).

Art 101(3), also known as the efficiency defence, provides 4 cumulative conditions that can be classified into two categories which are positive and negative conditions (Art. 101(3) Guidelines, 2004). The two positive conditions are (a) the case for an efficiency gain and (b) that a fair share of the gains of the collusive behaviour accrue to consumers while the two negative conditions are (a) that the restriction must be necessary and proportionate and (b) that there is no elimination of competition. Further delving into Art. 101(3), block exemptions may be applicable horizontally when there is <20% market share when dealing with specialisation and technology transfer or <25% market shares with respect to research and development. They may also be applicable vertically when the market share is <30% (EU Regulation No 330/2010, 2010). Moreover, additional individual exemptions may be granted on a case-by-case basis.

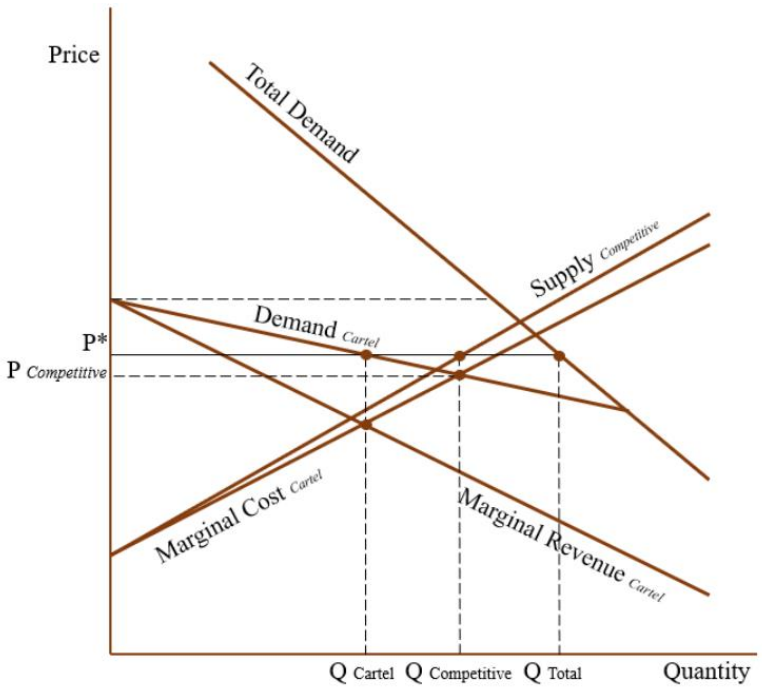
2.1.2 Economic Basis

Economic theory, since its inception, has intensively reviewed cartelist behaviour and more generally defines it as collusive agreements between market participants. It is important to note that many different schools of thought have investigated cartels ranging from traditional micro and macroeconomics to newer game theory economics. Fittingly and as the starting point of this analysis, the *Wealth of Nations* famously states:

> "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." (Smith, 1776)

Microeconomic theory suggests that there are two conditions that determine a cartel's success. First, cartels are inherently unstable by nature and require members to agree on price

and production levels. The inherent instability in cartels derives from a temporal distinction on the prisoner's dilemma where a short-run decrease in prices will lead to an increased market share and higher profits for the defaulting firm but, in the long-run, this leads to the return of a competitive equilibrium in which all cartel participants, including the defaulting party, reap smaller profits (Pindyck & Rubinfeld, 2018). Second, cartel success also hinges on the potential for monopoly power within a given market by the cartelists. Therefore, instrumental to ensuring monopolistic market power is demand elasticity for the good in question (Pindyck & Rubinfeld, 2018). When demand elasticity is sufficiently inelastic, this leads to higher market power and cartel gains which rationalise overcoming the coordination costs of the first condition. *Graph 2.* illustrates the workings of a cartel's market structure. *Total Demand* in the graph represents the total demand for a product in the hypothetical market whereas *Supply* $_{Competitive}$ represents the non-cartelist competitive supply for the hypothetical good in question. In this instance the difference between the latter two curves is *Demand* $_{Cartel}$ which represents the demand for the good produced by the cartel. Here, the intersection of *Marginal Cost* $_{Cartel}$ and *Marginal Revenue* $_{Cartel}$ equates to *Q* $_{Cartel}$ which is the Quantity that the cartel will agree to produce on for a given price *P** whereas the intersection of *Demand* $_{Cartel}$ and *Marginal Cost* $_{Cartel}$ equates to the cartel's competitive price *P* $_{Competitive}$ and competitive quantity *Q* $_{Competitive}$. The effect of cartels is, therefore,



Graph 2. Cartel Market Structure. Author's Illustration based on (Pindyck & Rubinfeld, 2018)

a net reduction in Total Social Welfare that is dependent on the degree of demand elasticity where a higher demand elasticity decreases Δ (P^*; $P_{Competitive}$) and vice versa.

Macroeconomic research has also tentatively tackled the question of cartels. Cartels are found to affect the macroeconomic landscape in several forms. Most recently, authors have found that, in the French market, the presence of cartels and their potential break up could lead to up to 2% increases in aggregate productivity, increase consumption equivalent welfare by up to 3,5 % and bring the economic landscape 37% closer to the efficient frontier (Moreau & Panon, 2021).

Game Theory also offers insights into the implicit workings of cartels, their stability and the rationale behind the tools used in public enforcement vis-à-vis cartels. The application of game theory to cartels requires deviation from the prisoner's dilemma. In this instance, as further outlined in *Section 2.2* below, under the EU's leniency notice, confession does not afford cartelists with the same benefit since fine reductions are time dependent and based on a sliding scale. Moreover, in opposition to the classical prisoner's dilemma, cartel stability is also dependent on the cartel remaining profitable in which case its stability is maintained (Leslie, 2006).

2.2 The Leniency and Settlement Notices

The following section details the Leniency Notice by individually reviewing its constituent parts. It provides clear guidelines on (i) the aims and rationale of leniency, (ii) immunity from fines, (iii) Reduction of a fine and, (iv) a set of general considerations that underpin the EC's point of view. Moreover, although not technically part of the Leniency Notice, this section also details the Settlement Notice which represents an additional fine reduction undertakings are eligible to. At this stage, it is important to understand that Leniency and Settlement are both soft law instruments since they take on the form of Notices (Barlund, 2020). In this instance,

soft law allows for the EC to provide guidelines on the enforcement of competition law while also ensuring both efficiency, flexibility and, increasing legal certainty (Cosma & Whish, 2003). This is attributed to the EC's ability to introduce new processes with greater ease than through the standard legislative process; however, soft law also reduces the democratic accountability by granting the EC more flexibility on interpreting the rules it sets (Monti, 2007).

2.2.1 Aims and Rationale of Leniency

The Leniency Notice applies to cartels under Article 101 TFEU, and it posits that cartels lead to several detrimental consequences for the European competitive and economic landscape (Leniency Notice, 2006, §1). In effect, cartels reduce the pressure to innovate and increase the cost of raw materials and components in supply chains (Leniency Notice, 2006, §2). This leads to, in the short run a reduction in consumer choice and, in the long run, to an overall reduction in competition and employment (Leniency Notice, 2006, §2). However, although this is the statement made in the Notice by the EC, with respect to employment, the academic literature does not come to conclusive statements on the long-run employment effects of cartels and instead focuses on cartels' detrimental effects on aggregate productivity which is a composite measure (Moreau & Panon, 2021). Moreover, the leniency notice makes note of the difficulties associated with voluntary cooperation and therefore the need for a leniency programme to incentivise cooperation and cartel dissolution is essential and justified (Leniency Notice, 2006, §3). The notice most importantly notes that the value of consumer interest proxied by the detection and the punishment of cartels must outweigh the value of the EC interest in fining (Leniency Notice, 2006, §3). This can be seen as a rejection of public choice theory under which the EC may tend to trump its interests over that of consumers. Moreover, this is a firm reaffirmation of the adoption of the consumer welfare standard under the EU's Modern Economic Approach to Competition. One can best illustrate this affirmation as follows:

$$Value[Consumer\ Interest(Detection + Fining)] > Value[EC\ interest(fining)]$$

Equation 1. Primacy of Consumers' Interests over the Commission's Interests, Author's Illustration

2.2.2 Immunity from Fines

Immunity stands for the complete absolution of an undertaking's liability with respect to the fines imposed by the EC when this cartelist is the first to provide substantial evidence to the EC (Leniency Notice, 2006, §8). In effect this is a 100% reduction on the fine the EC would have imposed had there been no immunity granting procedure. Most simply put, the aim of granting immunity is to incentivise firms to come forward and declare that they have engaged in cartelist behaviour (Leniency Notice, 2006, §4). This also creates a time imperative for firms to come forward and declare their active role in a cartel.

The requirements for immunity to apply are that the undertaking must be the first mover to provide a corporate statement. This must include a description of the cartels' aim and functioning, a product definition, market definition, the time during which the cartel was active, the volume of sales generated through the cartel, the names of relevant legal and natural persons involved, any other competition authorities already or likely to be involved in the cartel and any other relevant evidence (Leniency Notice, 2006, §9). The corporate statement must prove an infringement of Article 101 and lead to a targeted cartel investigation. Immunity will not be granted if the EC has sufficient evidence on hand or if the applicant either continues to engage in the cartel or falsifies/destroys evidence (Leniency Notice, 2006, §10-13)

Procedurally speaking the undertaking wishing to apply for immunity must contact DG Comp and can apply for immunity under two forms either through (i) a Formal Application or (ii) a Marker which will be processed one at a time which makes speed of the essence. First, the Formal Application must be presented in the form of a corporate statement and must clearly prove a breach of Article 101 and allow for the initiation of an investigation (Leniency Notice,

2006, §16). Moreover, the Formal Application can either be presented in factual form or may be presented in a hypothetical form. The latter may be rationalised by the EC wishing to further incentivise, beyond the leniency programme, first movers to come to forward and offer some pre-emptive level of shielding from civil lawsuits going forward if the immunity procedure where to fall through (Leniency Notice, 2006, §16). Second, the Marker allows for the first mover to expedite the procedure by guaranteeing a place for the applicant in the immunity queue (Leniency Notice, 2006, §15). In practice, the marker requires for the applicant to provide the names of the parties, the product and the territory and time during which the cartel operated. The main distinction with the formal application is that the evidence can be submitted ex-post to the submission of the marker while guaranteeing a place for immunity. Therefore, Conditional Immunity dated with effect on the submission of the marker will be granted once the evidence is submitted and qualifies according to the EC which implies the proof of a breach of Article 101 and must form the basis for an investigation (Leniency Notice, 2006, §18). It is important to note that applications may fail the test of the EC, in which case the entity may withdraw its evidence; however, DG Comp's investigative powers remain (Leniency Notice, 2006, §20). This rationalises the hypothetical formal application but nonetheless can be seen as an incentive misalignment regarding cooperation between the undertakings and the EC. Conditional Immunity is granted on the basis that the firms are cooperative, put an end to any involvement in cartelist behaviour and must no falsify or destroy any evidence (Leniency Notice, 2006, §22).

2.2.3 Fine Reduction

Fine reductions are applicable to all undertakings that wish to provide the EC with evidence of significant value once another undertaking has been granted conditional immunity (Leniency Notice, 2006, §23-25). Fine reductions take the form of classes based on a sliding scale. In effect, the second undertaking to provide evidence of significant value is provided with a

[30%;50%] reduction, the third mover [20%;30%] reduction and, all subsequent undertakings providing evidence of significant value are provided with [0%;20%] reductions; naturally, non-cooperation leads to a [0%] reduction (Leniency Notice, 2006, §26).

The Requirements to qualify for a fine reduction hinge on the definition of what qualifies as evidence of Significant Added Value. This is set out in the Notice as evidence that (i) reinforces either by nature or by detail the presence of a cartel, (ii) is more valuable when it is contemporary to the cartel rather than ex-post, (iii) is more valuable when it is incriminating rather than indirect evidence and, (iv) is of higher value when the degree of corroboration required from other parties is lower to establish the evidence (Leniency Notice, 2006, §25). Essentially these four conditions underline that the timeliness, and the legal value of the evidence are instrumental in setting the appropriate reduction class with time defining the applicable reduction class and the legal value of evidence establishing the interclass reduction. Here, it is important to note that if an entity provides evidence of significant value that leads to the revealing of an increase in the time during which the cartel operated or the gravity of the collusive behaviour, that entity is shielded from a fine increase resulting thereof (Leniency Notice, 2006, §26).

Procedurally speaking the application for a fine reduction is done through a formal application. The Formal Application, as in the case of a conditional immunity application, must contain evidence that meets the significant added value criteria (Leniency Notice, 2006, §29). The EC will inform the party before a Statement of Objections notification is sent out (Leniency Notice, 2006, §29). However, the EC may decide not to consider fine reductions once the statement of objections has been sent out. This may be viewed as a double-edged sword since, ex-ante, this incentivises firms to come forward under the leniency notice and, ex-post, reduces the incentive for firms to cooperate with the commission. The EC will come to its final position

on the applicable reduction class and interclass range once the administrative procedure is over (Leniency Notice, 2006, §30).

Leniency Reduction Classes					
Mover	1	2	3	4 et al.	5
Leniency Reduction	[100%]	[50%;30%]	[30%;20%]	[20%;0%]	[0%]
Settlement Reduction	0 or 10%				

Notes: Presents the different leniency reduction classes as defined by the leniency notice and the relevant reduction ranges. If the undertaking decides to settle, regardless of its leniency class, it may receive an additional 10% reduction under the settlement procedure (cf. *Section 2.2.5).*

Table 1. Leniency Reduction Classes. Author's Illustration.

2.2.4 General Considerations

Overall, the leniency programme in the EU is instrumental in aligning incentives and increasing the detection of cartels with a view of fining such behaviour. Legal certainty has been increased with the Notice since (i) it replaced all previous regimes in place, (ii) has created reasonable expectations for undertakings to come forward in a clear manner and (iii) elaborated on the reasons for reductions to be applicable.

2.2.5 Settlement Procedure

Although not the primary tool in alleviating fines, the EC incentivises cooperation through the settlement procedure. Note that for the purposes of this thesis, the settlement procedure is collated to Leniency. The settlement procedure offers undertakings the option to benefit from an additional 10% reduction in fines on top of the Leniency reductions they may already benefit from (Settlement Notice, 2006, §32). The EC rationalises this reduction by stating that the settlement procedure allows for more cases to be handled while utilising the same number of resources which, in fine, increases deterrence and helps the public interest (Settlement Notice, 2006, §1). The settlement procedure requires undertakings to acknowledge their participation and liability in the infringement (Settlement Notice, 2008, §2). Moreover, as the name of the

procedure indicates, the settlement procedure equally requires parties cooperate by (i) acknowledging the infringement and describing it, (ii) providing an indication of the fine the undertaking anticipates, (iii) confirmation of the undertaking's knowledge of its alleged infringement as per the EC's objection, (iv) confirmation the party will not request additional hearings or access to information and (v) the agreement from the party to receive a formal statement of objections (Settlement Notice, 2008, §20). Overall, the settlement procedure can be summarised as a streamlining and minimisation of the administrative and resource burden imposed on the EC that is justified as being in the public interest and an increase in deterrence.

2.3 Fining Guidelines

Fines are the deterrence tool employed by the EC in its public enforcement against cartels. The following section, first, provides an overview of the workings of the procedure and, second, provides its theoretical grounds within deterrence theory and enforcement.

2.3.1 Fining procedure

The European Commission's competency to fine cartels is currently set out in Article 23(2) of Regulation 1/2003. However, due to the relative opacity of fining procedures which were previously outlined in 1998, the Commission further published its 2006 Guidelines on the method of setting fines imposed pursuant to Article 23(2)(a) of Regulation No 1/2003 (Van den Bergh, 2017). This is attributed to the experience gained during the subsequent 8 years (1998-2006) (Fining Guidelines, 2008, §8). These Guidelines grant the Commission significant discretion is setting fines and consist of a two-step procedure.

First, the EC sets out a basic amount for the fine. To this end, the EC refers to the pre-tax sale of goods in the affected geographic market and sets its basic amount as [0%;30%] of the value of sales (Fining Guidelines, 2008, §19-21). This highlights the discretion conferred upon the EC to set these fines although the EC should consider a non-exhaustive list of factors

such as the (i) the nature of the infringement, (ii) the combined market shares of the relevant undertakings, (iii) the geographic scope and (iv) whether the infringement has been implemented (Fining Guidelines, 2008, §22). The EC finds horizontal, price-fixing, market-sharing, and output limitations as the most detrimental forms of cartelist behaviour and recommends setting the fines at the higher end of the scale (Fining Guidelines, 2008, §23). Once the value of sales has been determined, this is multiplied by the number of years the alleged infringement has taken place (Fining Guidelines, 2008, §24). Moreover, at the EC's discretion, an additional [15%;25%] of value of sales is added to the basic amount in order to act as deterrent where the range is determined based on the gravity as outlined above (Fining Guidelines, 2008, §25). The following equation sets out the EC's determination of the basic amount of the fine

$$Basic\ Fine = Value\ of\ Sales * Duration\ Multiplier * (Percentage\ of\ sales + Additional\ Amount)$$

Equation 2. Basic Fine. Author's Illustrations

Second, the EC can adjust the basic amount of the fine either upwards in the presence of aggravating circumstances or downwards in the presence of mitigating circumstances. With respect to aggravating circumstances, instances where (i) an undertaking has continued or repeated anti-competitive practices may lead to an increase of 100% of the basic amount, (ii) there is a refusal to cooperate or active obstruction of the EC's investigation and, (iii) the undertaking is the leader of the abuse or enforces retaliatory measures to other non-participating undertakings (Fining Guidelines, 2008, §28). With respect to mitigating circumstances, it is up to EC's discretion to reduce fines if the undertaking (i) proves the infringement was negligent, (ii) provides evidence that it actively avoided its anti-competitive behaviour, (iii) cooperated beyond its legal requirement to do so and, (iv) its anticompetitive behaviour was authorised by legislation or a public authority (Fining Guidelines, 2008, §29). The fining guidelines also entitle the EC to increase its fines for the sole purposes of deterrence

and ensuring cartel behaviour is not profitable especially with respect to firms who may have turnovers significantly larger than the value of sales used in step 1 above through what is referred to as a deterrence multiplier (Fining Guidelines, 2008, §30-31). There is also a legal maximum to the fines DG Comp may impose whereby these must not exceed 10% of global turnover of the undertakings in the previous business year (Fining Guidelines, 2008, §32-33). Moreover, the setting of these fines occurs ex-ante to any leniency considerations and there may be exceptional circumstances where an undertaking's fine may be revised if faced with an inability to pay since this would affect the undertakings economic viability (Fining Guidelines, 2008, §34-35). Therefore, the following equation is employed to adjust basic fines:

$$Adjusted\ Fine = Basic\ Fine * (1 + Aggravating\ Circ. - Mitigating\ Circ.) * Deterrence\ Multiplier$$

$$Conditional\ on: Adjusted\ Fine\ (< 10\%\ Global\ turnover\ \&\ Ability\ to\ Pay)$$

Equation 3. Adjusted Fine. Author's Illustration

Overall, the fining guidelines highlight the very large amount of discretion the EC enjoys when setting fines in both steps 1 and 2 of the process. It is important to note that the specific procedures or figures used by the EC are not always publicly available which still means the process is relatively opaque. These guidelines serve as a general methodology and empower the EC to set fines at its own discretion even in symbolic cases (Fining Guidelines, 2008, §36-28). Moreover, it is important to understand that all the proceeds from the above established fining procedure feed into the EC's general budget without being specifically earmarked for certain projects (European Commission, 2014).

2.3.2 Deterrence & Enforcement

The public enforcement against cartels in the EU is best understood through the lens of both deterrence theory and punishment.

While private enforcement is concerned with corrective justice and compensating victims through damage actions, public enforcement is concerned with punishing undertakings for their behaviour and deterring any future undertakings from engaging in cartelist behaviour (Barlund, 2020). Deterrence theory posits that deterrence-based enforcement needs to ensure that infringements are no longer economically rational (profitable) and that the level at which this is the case should be the standard for setting the punishment (fines) since utility maximizing undertakings would not engage in such practices (Becker, 1968). With deterrence and punishment in mind the metaphor of the carrot and stick is employed with respect to leniency. The fining guidelines establish the stick undertakings are potentially subject to while leniency and settlement reductions are the carrot that motivate them to come forward (Harding & Joshua, 2010). This, linking back to game theory, serves to flip the pay-off structure and reward cooperation especially once a first mover has been established. Deterrence may also be split into both a specific and a general whereby specific deterrence serves to ensure that the fined parties do not infringe in the future and general deterrence sets the example for all other parties to never engage in cartelist behaviour (Lianos, Davis, & Nebbia, 2015).

Given this thesis focusses on a positive analysis of public enforcement and leniency, these theories are taken as the basis for the subsequent analysis and the rest of the analysis does not aim to come to normative fine determination or leniency frameworks. Instead, this thesis will assess the goals and rationalisations of the programme by empirically analysing the framework in place.

Chapter 3: Dataset & Descriptive Statistics

3.1 Dataset

The following dataset represents the central contribution of this thesis since no comprehensive publicly available dataset on public enforcement and leniency are, to the best of the author's knowledge, in existence at the time of writing. While the EC publishes ad-hoc statistics in pdf files, there is no comprehensive malleable dataset in existence. Therefore, the focal unit of this thesis is to consider the EC's fining decisions to which leniency has either been applied or not.

3.1.1 Origination

To arrive to a comprehensive dataset, the process consisted of going through the previous decade of publicly available information on the EC's DG Comp website dedicated to cartels. The focal unit of analysis of this thesis is the fining decisions applied to parties for given infringements over the [2012;2021] period.

In practice, fining decisions are released through four types of publicly available sources which are (i) fining press releases, (ii) cartel procedures and, (iii) summary decisions and (iv) DG Competition's case search tool. Fining press releases are the EC's mass communication tool and allow for public enforcement decisions to be broadcast to the public. Cartel Procedures are the legal reasoning underpinning the EC's decision to impose fines for identified infringements. On the one hand, these can take the form of settlement procedures which are shorter and form the basis of the settlement reduction outlined in *Section 2.2.6* or, on the other hand, these may take the form of ordinary procedures which are significantly more extensive and require more time, effort, and resources on behalf of the EC which is resource constrained. Summary Decisions are the official publications of the fining decisions in the Official Journal of the European Union and contain a summarised less extensive version of the cartel procedure. DG Competition's Case search tool is a search engine from which all three

documents per case can be downloaded and displays the name and the economic activity to which the case is applied.

Overall, this represents an average of 4 documents per case with a total count of 212 documents (c. 18,000 pages) for the cases considered over the previous decade (cf. *Appendix 1)*. Since there is no malleable dataset available, the methodology described above is, to the best of my knowledge, novel, and a significant contribution since it represents a consolidated overview of the economic tools used to enforce Article 101.

3.1.2 Variable Selection & Description

The following section provides an overview of the variables that were selected. As stated above, the focal unit of this thesis is the fining decisions imposed relative to infringements of Article 101 TFEU with each row of the final database representing one of these fined infringements. At the highest level, a distinction is made on two types of variables which are (i) the primary variables sourced directly from official publications and (ii) the secondary variables created from primary variables to support data analysis purposes.

First, a total of 28 directly sourced variables per infringement are hereinafter referred to as primary variables (cf. *Appendix 2*). These variables are further classified into 5 categories based on their role within public enforcement. The first type of variable is descriptive (D) and provides information on the year, the case name, the case number, the economic activity of the infringement and the name of the fined entity. The second type of variables is fining (F), these represent the final fine to which leniency has been applied such as the net imposed fine and the gross fine the first mover avoided through immunity under the leniency notice when available. The third type of variables is Leniency (L), these are the variables that give the percentage of leniency and settlement reductions granted on gross fines. The fourth type of variables is Basic (B), these are the variables that belong to the determination of the basic amount of the fine

which are the start/end-dates of the infringement, the applied duration multiplier, the value of sales (either declared or within bounds), the percentage of the sales considered, the additional deterrence percentage and, finally, the basic amount of the fine (either declared or within bounds). These variables are all employed in the methodology set out in the fining guidelines as per Equation 2. The last type of variables is Adjusted (A), these are the variables employed in the determination of the adjusted amount of the fine such as the basic amount of the fine (declared or within bounds), the deterrence multiplier, the aggravating and mitigating circumstances, the adjusted fine (either declared or within bounds), the inability to pay if applicable and the turnover limit if applicable. These variables are all employed in the methodology set out in the fining guidelines as per *Equation 3*.

Primary Variables Overview		
Category	**Name**	**Frequency**
D	Descriptive	5
F	Fining	2
L	Leniency	2
B	Basic Amount	11
A	Adjusted Amount	11

Note: 3 variables are both A & B variables

Table 2. Primary Variables Overview. Author's Illustration.

Second, based on the primary variables and in order to run meaningful analyses, 13 secondary variables are hereinafter created (cf. *Appendix 2)*. These transformed variables serve a numerical gap-filling role. These variables are classified according to the same framework as the primary variables although there are no Descriptive (D) secondary variables given the nominal and categorical nature of this classification. With respect to Leniency (L), five variables are created: the undertakings position within the leniency framework is established as per *Table 1*, the total percentage reduction the undertaking benefitted from under both leniency and settlement (TORP), the euro amount of leniency (LEUR), settlement (SEUR) and their total (TORE). Regarding Fining (F), given that the availability of gross fines is limited, this variable backs out the gross fine an undertaking would have been subject to ex-ante any reductions; however, since fist movers benefit from immunity, the declared avoided gross fines

in Press Releases is used (GFIN). As for Basic Amount (B), given cartel procedures either publish sales figures within a bound or publish a declared value of sales, when faced with bounded sales figures the average is taken (SALA). There doesn't seem to be any methodological reason for using bounds although this may be explained by (i) confidentiality considerations or (ii) the methodological discretion the EC enjoys when determining fines. In order to ensure comparability amongst cases, regardless of the EC's methodology, a variable that displays the final amount of sales is constructed which selects either the declared value of sales or the average value of sales (SALA) based on the ECs employed methodology (SALF). The same logic applies to the declared or bounded nature of the basic amount of fines where an average variable (BAMA) and a final variable (BAMF) are created. Moreover, under (B), a duration variable is created which subtracts the starting date of the infringement from the end date of the infringement (DURA) in order to give another time metric. With regards to Adjusted Amount (A), both variables (BAMA & BAMF) are elaborated above. Moreover, since adjusted fine amounts are also provided either within bounds or as declared values, when within bounds, the average of the lower and higher value of the adjusted amount is calculated (ADFA) and then either the adjusted average or the adjusted declared value of the fine is reported (ADFF).

Secondary Variables Overview		
Category	**Name**	**Frequency**
D	Descriptive	N.A.
F	Fining	1
L	Leniency	5
B	Basic Amount	5
A	Adjusted Amount	4

Note: 2 variables are both A & B variables

Table 3. Secondary Variables Overview. Author's Illustration.

3.1.3 Dataset Limitations

Given both the novel and hand-collected nature of this database, several limitations appear prima facie and must be accounted for in order to ensure academic integrity. These limitations are (i) missing observations, (ii) the ECs methodology and, (iii) the temporal dimension this database is limited to (i.e., 10 years).

First, a large proportion of the database is not fully populated given that the EC affords varying degrees of confidentiality to the undertakings involved. This leads to an unbalanced database displaying missing values in various proportions over the 41 variables. Unfortunately, given confidentiality and methodological freedoms the EC enjoys in both its fine-setting and disclosure policies, this is inevitable.

Second, given that the EC disposes of a high degree of discretion in setting its fines, there is a risk for variable specific heterogeneity to be apparent in this database. This is most prevalent with the different methodological approaches taken by the EC such as, for example, the use of either declared or ranges for its value of sales, basic amounts, or adjusted amounts. To counter this phenomenon, this database is further supported by 13 secondary variables that aim to standardise and reduce the natural heterogeneity present. However, for the sake of academic research, underlying methodological heterogeneity may never be fully controlled for.

Third, the database covers a period of 10 years which could be increased to account for a larger temporal dimension; however, given the author time limitations to manually sift through the 212 documents the database in its current form limits itself to 339 observations over 41 variables which is the cases considered over the past 10 years. Moreover, the leniency programme and settlement procedures in their current format have been in existence since 2006 and 2008 respectively meaning the database could be increased by another 6 years regarding leniency and fining procedures and 4 regarding settlement; however, many of the decisions surrounding the dates of the introduction of the notices and guidelines used the old frameworks. This also justifies this database limiting itself to 10 years for statistical validity and reliability.

To conclude, while there are limitations with the compilation of the dataset that are accounted for, the creation of this dataset represents a first attempt to compile and offer an

empirical overview based on publicly available documents of public enforcement vis-à-vis cartels to sow the seeds for future research.

3.2 Descriptive Statistics

The following provides an overview of the summary statistics compiled on the basis of the dataset methodology elaborated in the previous section. To this end, the summary statistics for the full dataset and per leniency class are provided (cf. *Appendices 3, 4 & 5*). Lastly, armed with the full database, it is possible to discuss the apparent trends in the data associated with leniency and public enforcement.

3.2.1 Summary Statistics

The summary statistics (observations, means, standard deviations, medians, skewness, kurtosis, maximum and minimum) for the full dataset are available for the primary and secondary variables in *Appendix 3*.

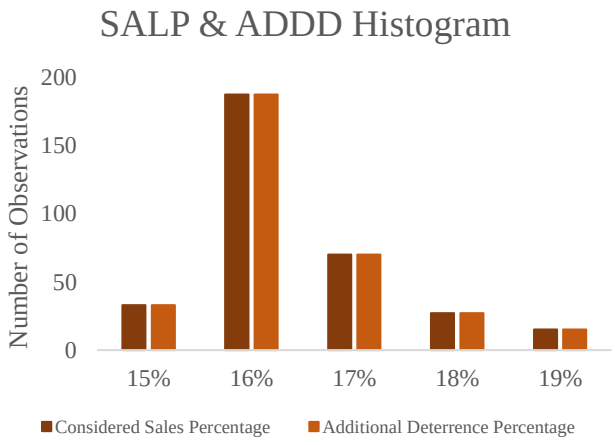
First, as addressed in *Section 3.1.3*, differing numbers of observations are present in both the primary and secondary variables. This is attributed to the heterogeneity in methodologies adopted by the EC and confidentiality considerations. Therefore, in order to account for a maximum number of observations per variable, the dataset assumes an unbalanced form.

Second, the units employed by the variables differ based on their nature with 19 in euro values, 9 in percentage format, 4 in numerical form, 2 in binary,1 in categorical numerical form and, the remaining variables left in categorical form whose units are unassigned (N.A.) (cf. *Appendix 2*). This leads to heterogeneity in the magnitude of the observations due to unit factors. Both high levels of skewness and kurtosis are observed in the euro values of observations. In effect, Skewness and kurtosis may be considered problematic when >|3.00| and >|10.00| (Kline, 2005) (cf. *Appendix 3*). While not a flaw at this stage of analysis in

descriptive statistics, the natural logarithm was applied to the euro denominated variables in descriptive statistics that break down the dataset into the respective leniency reduction classes (cf. *Table 1*) which has addressed this issue for the future empirical analysis of this thesis (cf. *Appendix 4 & 5)*.

Third, a Pearson's correlation matrix was constructed in order to provide information on potential multicollinearity issues (cf. *Appendix 6*). As expected, there are high degrees of correlation for certain variables. This is expected since the variables collected, for the most part, are constructed upon each other as is illustrated by *Equations 2 & 3*. For example, LNSALF, LNBAMF & LNADFF all highly correlate with each other given that the value of sales (LNSALF) is used in determining the basic amount of the fine (LNBAMF) and, in turn, the basic amount of the fine is used in determining the adjusted amount of the fine (LNADFF).

Fourth, an interesting observation from the summary statistics appears at this stage. In setting its basic amount of fines (cf. *Equation 2*), the EC disposes of the freedom to set its percentage of value of sales (SALP) and additional deterrence factor (ADDD), between the ranges of [0;30%] and [15;25%] (Fining Guidelines, 2006, § 19-21 & 25). In practice, the EC mirrors both factors and does not fully utilise its methodological freedom in setting fines. This can be seen from the summary statistics tables (cf. *Appendix 3 & 4*), the Pearson correlation analysis (ρ=1.0000***; cf. *Appendix 6*) and the histogram below (cf. *Graph 3).* Moreover, the summary statistics show that the EC has limited itself to setting fines for both the percentage value of sales and the additional deterrence factor between [15%;19%]. This means that for the value of sales percentage,



Graph 3. SALP & ADDD Histogram. Author's Illustration.

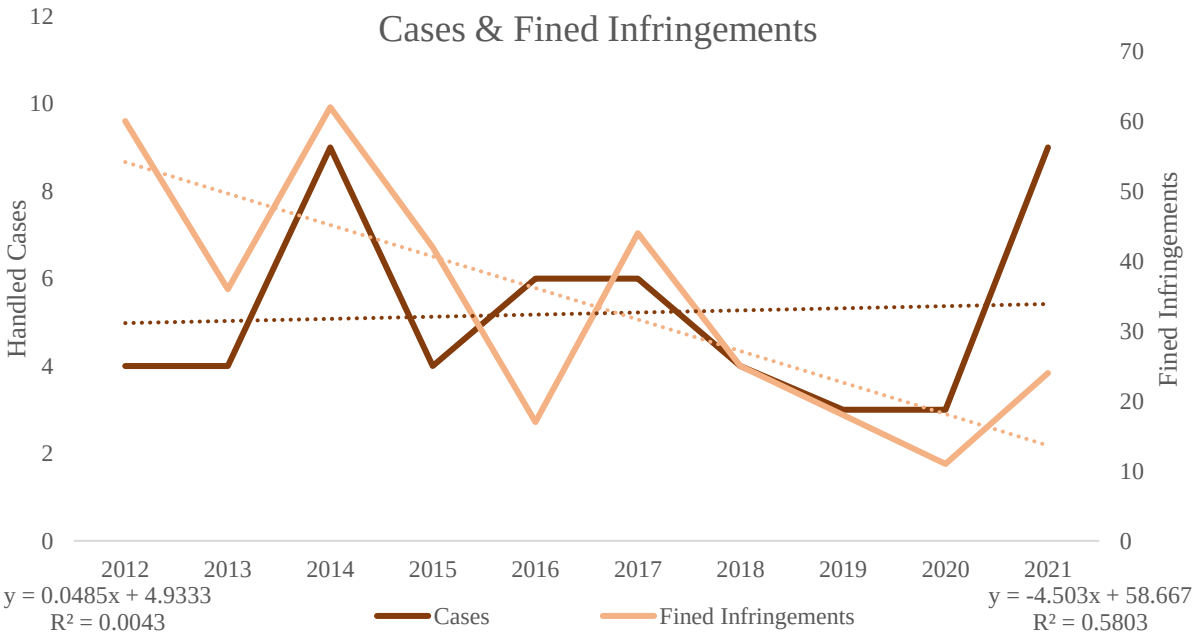
although empowered to go up to 30%, the EC rests just above the average value of 15%. Concerning additional deterrence, the EC stays at the lower end of the scale it employs. This showcases an average use of the value of sales percentage and a conservative use of the additional deterrence percentage.

Overall, the summary statistics also serve to illustrate the nature and the reality underpinning the data. For example, using the max. value of NFIN yields the EC's record 2016 €1.008bn net fine imposed on Daimler in the famous *Case AT.39824 - Trucks* or using the min. value of NFIN yields the 2015 fine of €65k on Propack in *Case AT. 39563 – Retail Food Packaging*. Moreover, separating the variables into their respective classes, also serves to verify for the correct leniency reduction class assignment (MOVE) by checking the ranges of the reductions as defined in *Table 1*. All the values per reduction category appear supplemented by the summary statistical information on all the variables per leniency category (cf. *Appendices 4 & 5*).

3.2.2 Visualisation and Trendline Analysis

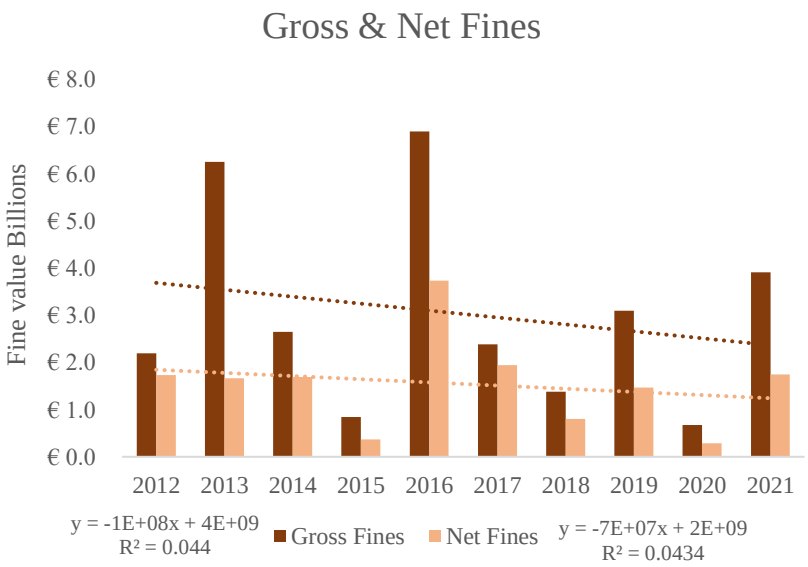
The following section provides an overview of the dataset using graphs and linear trendlines to uncover patterns in the dataset and the modus operandi of public enforcement against cartels.

First, as explained formerly, the focal unit of the dataset is the fining decisions applied per infringement; however, it is also important to note that the EC imposes these fining decisions within distinct cases wherein multiple fined infringements may belong. *Graph 4*, which plots both the fined infringements and the number of distinct cases to which these infringements belong, showcases that the number of cases does not display a meaningful trend (R^2=.0043). This means that, over time, the EC assesses a yearly average of 5.2 cases although there are outlier years with 9 distinct cases (2014 & 2021). Regarding the fined infringements, a noticeable decreasing trend is present (R^2=.5803). While linear time trendline analysis does not allow for statistical causal inference, it does showcase a decrease in the fining decisions while the number of handled cases is constant. This may tentatively illustrate a decrease in the specificity of the EC's fining decisions over the past decade (cf. *Appendix 7* for both individualised and a fined infringement per case visualisation.

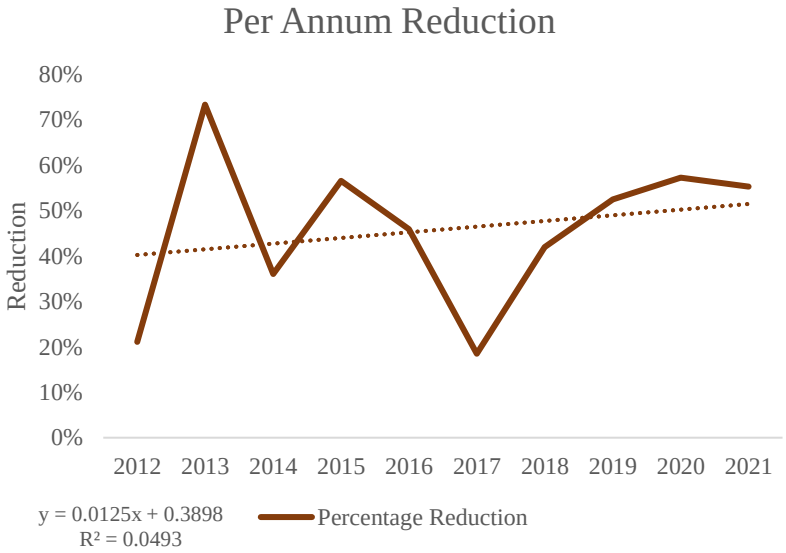


Graph 4. Cases & Fined Infringements. Author's Illustration.

Second, a central point of comparison when dealing with the fining procedure, leniency and settlement is to assess the difference between the gross fines (GFIN) and the net fines imposed (NFIN) as demonstrated in *Chapter 1*. This elucidates the cost of both leniency and settlement. From *Graph 5*, the trend is that fines both gross and net remain fairly constant over the past decade on average; however, the presence of outlier years with record fines in 2013 and 2016 (*Cases AT.39861/AT.39914 - Yen/Euro Interest Rate Derivatives* and *Case AT.39824 - Trucks*) significantly inflate the Gross and Net fine values of those years and lead to the low levels of explained variability (R^2=.0440; R^2=.0434). Building upon the Gross and Net Fine values, it is possible to estimate the percentage reductions afforded to cartelists by estimating the average per annum reduction [(GFIN-NFIN)/GFIN]. *Graph 6* showcases a slight increasing trend with respect to the reductions afforded to cartelists; however, again, the variability explained by the trendline analysis



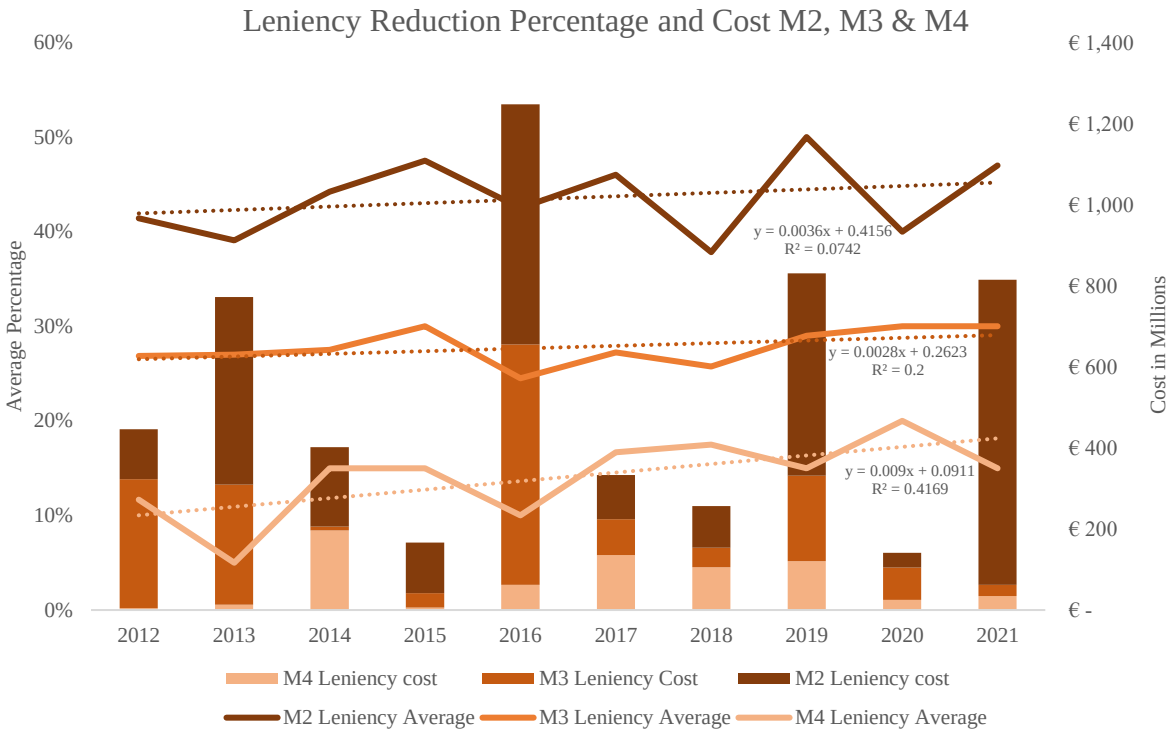
Graph 5. Gross & Net Fines. Author's Illustration.



Graph 6. Per Annum Reduction. Author's Illustration

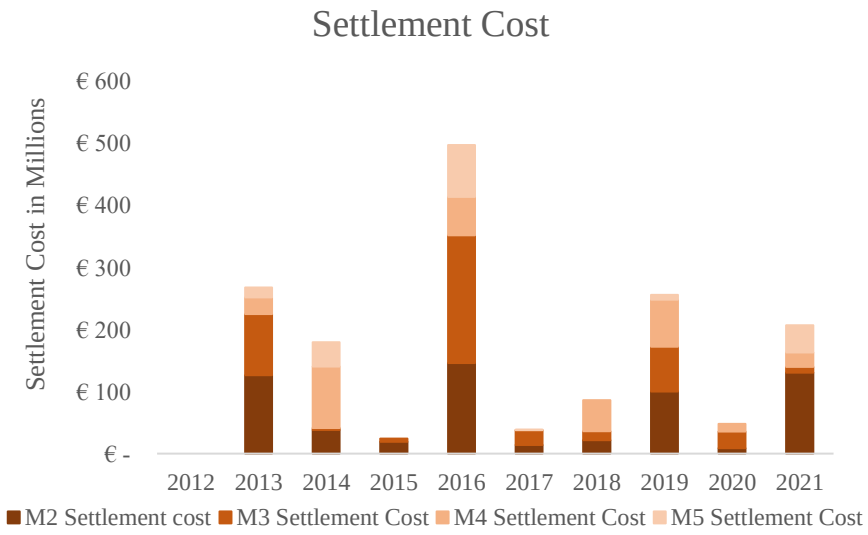
remains low (R^2=.0493). A noteworthy point is that in the last 5 years [2017;2021], the trend has been strikingly upward sloping. Refer to *Appendix 8*, for a broken timeline and average fining values per infringement. Overall, while subject to high variability, the EC seemingly imposes consistent fines in euro amounts but may be becoming more prone to offer reductions over the course of the past 5 years.

Third, the cost of leniency showcases the discounts the EC is willing to afford to cartelists in order for them to come forward under the Leniency Notice. Referring back to the leniency class reductions (cf. *Table 1*), it is possible to segment the trends over time underlying leniency and settlement for the different movers. *Graph 7* plots both the euro cost and yearly average percentage of leniency afforded to the 2nd ([30%;50%]), 3rd ([20%;30%]) and 4th ([0%;20%]) movers; here, the 1st and 5th movers are not visualised since they are respectively afforded either 100% or 0% reductions (cf. *Appendix 9* for their own graphs). Here, note that over time the yearly average leniency percentage reduction has been increasing over time across the reduction classes (R^2_{M2}=.0742; R^2_{M3}=.2000; R^2_{M4}=.4169) drifting towards the uppe bounds. Interestingly, while the percentage and euro cost of leniency are positively correlated for M2 and M4 (ρ_{M2} =.3295; ρ_{M4}=.3188), M3 displays a negative correlation (ρ_{M3}=-.6387) indicating that while the EC is affording prima facie higher reductions in percentage terms, these are not actualising in euro terms. This means that while leniency is becoming more costly for 2nd and 4th movers in line with percentage increases, it is seemingly increasingly cost effective with respect to 3rd movers; however, a negative correlation is noteworthy since prima facie percentage cost reductions are not materialising in euro terms for undertakings.



Graph 7. Leniency Reduction Percentage and Cost M2, M3 & M4. Author's Illustration.

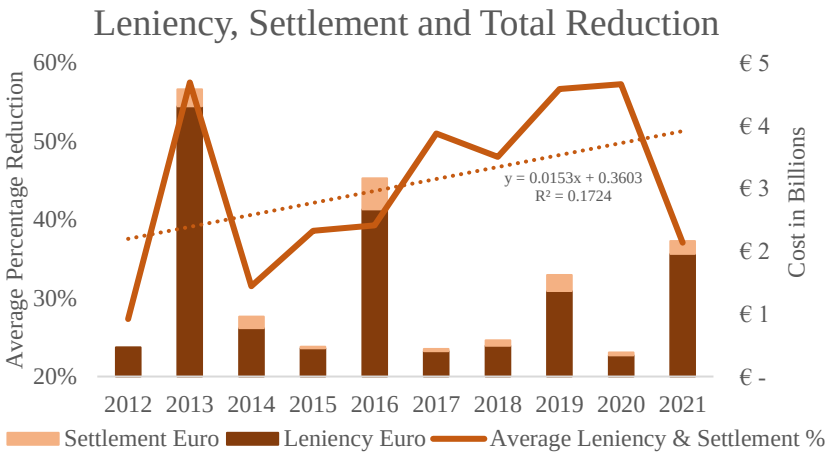
Fourth, the other constituting element when considering fine reductions is the settlement procedure which either grants a 10% fine reduction if the undertaking decides to settle or not. While leniency remains the focal point of this thesis, settlement must also be accounted for since, in effect, it is a promotion of cooperation with a monetary incentive for cartelists. *Graph 8* illustrates the total settlement reductions per leniency class. Here, the 1st mover is excluded since by default they do not benefit from settlement reductions given their immunity



Graph 8. Settlement Cost. Author's Illustration

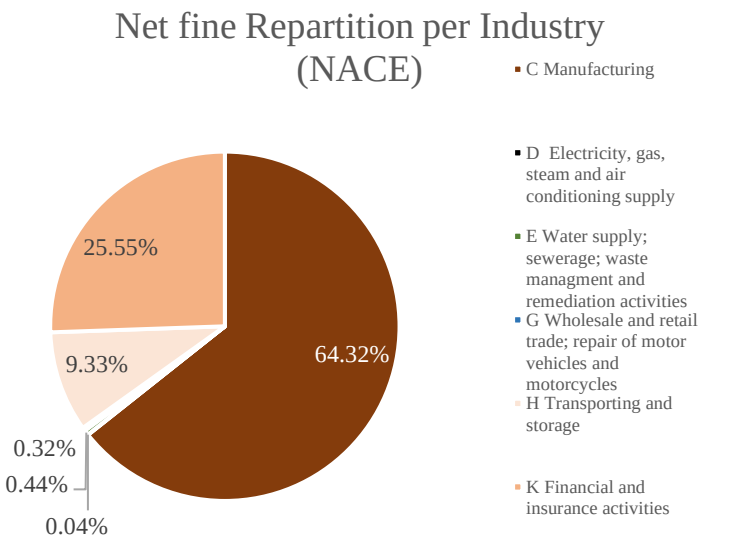
and 100% fine reduction under leniency. Moreover, no cases were fined under settlement in 2012. *Appendix 10* offers class specific graphs.

Fifth, the leniency and settlement mechanisms have cost well over €13.210 billion and €1.602 billion over the past decade which directly impacts the ECs budget and, in fine, consumer welfare. Of course, these costs must be balanced with the €15.420 bn net benefit arising from fining cartelists and enhancing the competitive landscape. Delving into *Graph 9*, which plots both the settlement and reduction amounts and the average percentage of reduction (TORP), it illustrates the magnitude of leniency relative to settlement and also shows an increasing percentage of reductions afforded to undertakings. Moreover, *Appendix 11*, offers insights into the trends per category with M2, M3 and M4 increasing over time (R^2_{M2}=.3073; R^2_{M3}=.4515; R^2_{M4}=.6061).

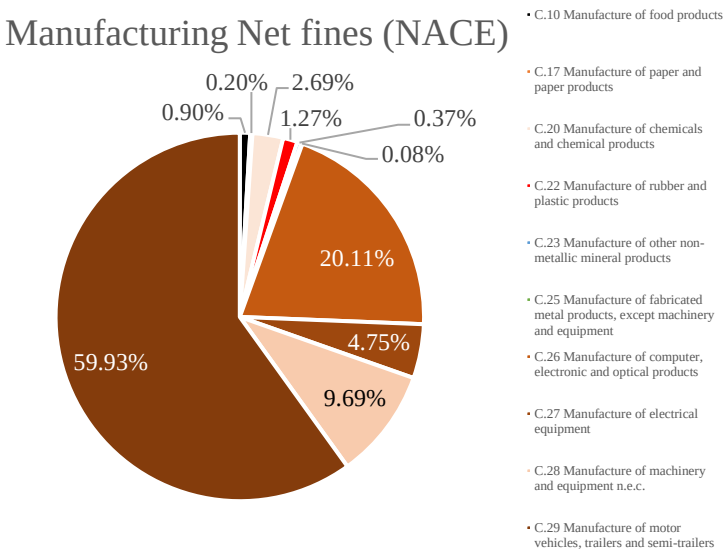


Graph 9. Leniency, Settlement and Total Reduction. Author's Illustration.

Lastly, an interesting finding comes from breaking down the net fines the EC imposes on undertakings in various industries. From the dataset, all fine infringements are classified into their respective industrial classification codes (NACE codes). In a first instance, *Graph 10* breaks down the total net fines as per the highest level of industrial classification. From this, it becomes apparent that the EC is prone to fine manufacturing and financial undertakings. Further, delving into the manufacturing segment (cf. *Graph 11*), the automotive industry has been heavily fined by the EC indicating that either (i) this industry is more prone to cartelist behaviour or (ii) that the EC focusses on certain industries more than others. In effect, support for the latter is more likely given the EC has published documentation that attests to its fining achievements within the automotive sector (cf. *Appendix 12)*. While no statistical inferences are being made in this thesis on the industrial makeup of the EC's fining decisions, the descriptive nature of this analysis leads to opening the debate on the industrial focus of cartel public enforcement.



Graph 10. Net Fine Repartition per Industry. Author's Illustration.



Graph 11. Manufacturing Net fines (NACE). Author's Illustration.

Chapter 4: Empirical Analysis

Although the creation of this database leads to many potential empirical research avenues, the following chapter is dedicated to using a multinomial logistic regression (MLR) in order to understand what fine specific characteristics, sourced from the forecreated database, lead to an undertaking choosing to opt for one of the 5 leniency class reductions. To this end, the chapter develops the hypotheses that are going to be tested in the model, details the assumptions and the form of the model, provides the results of the analysis, and discusses the model's fit and limitations.

4.1 Hypothesis Development

Based on *Equations 2 & 3, Table 1,* and the *Pearson Correlation Matrix*, it is possible to identify variables that may elucidate the drivers behind undertakings' motivations to apply for leniency reduction classes ex-post the ECs intent to fine cartelists. Therefore, the analysis below seeks to empirically determine the public enforcement specific determinants of an undertaking choosing to opt for a certain class. Overall, this analysis aims to expand on undertakings' motivations to apply for a specific leniency class beyond the avoidance of a fine thanks to public enforcement's utilisation of several infringement specific variables to determine its fining decisions.

As stated above, the first rationale, as defined by the leniency notice, behind an undertaking opting for a specific leniency class is that it is motivated to reduce the gross fine (LNGFIN) it may be potentially subject to since cooperation must be rewarded (Leniency Notice, 2006, §3). A fitting metaphor is the "carrot and stick" approach whereby cooperation under leniency is seen as a reward for the potential stick that is embodied by the gross fine. Given the latter, the expected sign of this relationship is positive (1< RRR) since this indicates

that a larger potential gross fine incentivises specific leniency reduction class applications. Hereinafter, it is hypothesised that:

H1: The likelihood of an undertaking opting for a specific leniency class is affected by the value of the gross fine it is subject to.

The second hypothesis deals with the size of the infringement the undertaking committed. In this instance, a larger value of sales from an infringement may either incentivise a firm to cooperate with the investigation since a larger value of sales will, in fine, lead to a larger fine or, in opposition, may lead to the undertaking entrenching itself without wishing to cooperate with the EC in its investigations given the magnitude of the sales it has generated from its cartelist behaviour. The size of the infringement's best available proxy is the relevant value of sales of the undertaking (LNSALF). Given that this relationship is unclear ex-ante, the expected sign of this relationship is either positive or negative (<1< RRR). Hereinafter, it is hypothesised that:

H2: The likelihood of an undertaking opting for a specific leniency class is affected by the size of its infringement.

The third hypothesis deals with the duration of the infringement. This seeks to shed light on whether the amount of time an undertaking is party to an infringement dictates its likelihood of deciding to apply for a specific reduction class. This may reveal whether undertakings are incentivised to cooperate or if they display loyalty to their infringements and instead seek not to cooperate. Given that this relationship is unclear ex-ante, the expected sign of this relationship is either positive or negative (<1< RRR). Hereinafter, it is hypothesised that:

H3: The likelihood of an undertaking opting for a specific leniency class is affected by the length of time it has been infringing.

Lastly, it is equally important to control for other factors that may shed light on the drivers behind belonging to certain leniency reduction classes. Controlling for an undertaking's size may be done by referring to the deterrence multiplier applied by the EC to undertakings of larger sizes (DETM) or by referring to the undertakings 10% turnover limit which is a relative size metric (TURN), this may reveal whether larger undertakings are either more or less prone to apply for specific leniency reductions. In effect, size may be argued to allow for undertakings to dispose of significantly more resources to allocate towards legal counsel that will act within their best interests under the leniency; however, these metrics' relative nature make them imperfect and are therefore only used as controls. Moreover, the financial viability of undertakings, proxied by their inability to pay the fine imposed by the EC (INTP), may reveal whether firms in financial distress are more prone or not to opt for a specific leniency reduction class. Again, these three metrics remain superfluous metrics given the ECs discretion in setting them and financial undertaking-level data would be more insightful.

Overall, the hypotheses developed above reveal three relevant research hypotheses underpinning the leniency programme and the fine-level determinants that may lead to an undertaking opting for a specific leniency reduction class relative to not applying for leniency.

4.2 Empirical Model

In order to analyse the fine-specific characteristics that may determine the likelihood of an undertaking to opt for leniency in one of the 5 categorically distinct specified classes, the model will take the form of a multinomial logistic regression (MLR).

MLRs are the extension of the binary logistic regression model extending binary outcomes to multiple distinct categorical outcomes. MLRs require careful consideration with respect to multicollinearity issues which is why a Pearson correlation matrix was performed in the summary statistics (cf. *Appendix 6)* (Starkweather & Moske, 2011). Given the nature of the

collected variables being interlinked, there are high levels of multicollinearity between certain variables which is why the model is run in three distinct iterations. Regarding the sample size considerations, these are recommended to be at least 10 observations per independent variable which is met over the full dataset employed (Schwab, 2002). Moreover, MLR requires for the independence of irrelevant alternatives assumption to hold which specifies that the likelihood of belonging to one of the categorical classes is not dependent on belonging to an omitted categorical class (Brooks, 2019). Since there are no more than 5 distinct outcomes which are all accounted for in the dataset, this is not an issue. Overall, carefully considering that all ex-ante assumptions of this type of model are met, it will take on the following form:

$$P(Y_j = l) = e^{X_j\beta_l} \Big/ 1 + \sum_{l=0}^{5} e^{X_j\beta_l} \; for\; l = 1,2,3,4\;\&\;5$$

Where the probability of the undertaking belonging to a specific class is denoted by $P(Y_j)$. X_j denotes the vector of the variable that is hypothesised to influence the likelihood of belonging to one of the specific leniency reduction classes. β_l is the log-likelihood coefficient estimated by the model for each l state which are the leniency reduction classes as established in *Table 1*.

Here the model is split into three parts given the results of the Pearson correlation matrix (cf. *Appendix* 6) indicating multicollinearity issues amongst certain variables (LNGFIN, DURM, LNSALF) Therefore, the multinomial logistic model will be run in three independent model iterations ($M_1, M_2 \& M_3 = 0,1$) . With respect to the empirical probability model, it will take on the following form:

$$P_j = \propto_0 + M_1 * \beta_{H1}(LNGFIN_j) + M_2 * \beta_{H2}(LNSALF_j) + M_3 * \beta_{H3}(DURM_j) + \beta_{ctrl}(DETM_j) + \beta_{ctrl}(INTP_j) + \beta_{ctrl}(TURN_j) + \varepsilon_j$$

In this model, the base outcome is defined as the leniency class where no reduction is applied. The output of the model will be the loglikelihood coefficients relative to the base outcome. In order to interpret these loglikelihood coefficients, these are log-transformed into relative risk ratios which are the factors that multiply the likelihood of an undertaking belonging to a specific class relative to the base specification. $\propto_0$ & ε_j denote the intercept and the error term respectively.

4.3 Results

Multinomial Logistic Regression Models 1, 2 & 3 (RRR)				
Class	**Variables**	**Model 1**	**Model 2**	**Model 3**
	LNGFIN	**1.5024*** **		
	LNSALF		**1.4139** **	
	DURM			**1.1054*** **
[100%]	DETM	1.0555	220.4512	2.5832
	INTP	8.53e-06	4.54e-07	1.22e-06
	TURN	.3080	2.04e-07	**.1321***
	constant	**.0004*** **	**7.88e-06*** **	.2325
	LNGFIN	**1.2862*** **		
	LNSALF		**1.3079** **	
	DURM			1.0898
[30%;50%]	DETM	.2167	.2789	.3019
	INTP	**6.8531** **	4.3871	1.8107
	TURN	1.2040	2.09e-07	.9115
	constant	.0467	.0214	1.7590
	LNGFIN	**1.2860*** **		
	LNSALF		1.0912	
	DURM			**1.1644** **
[20%;30%]	DETM	2.2595	11.2356	6.7071
	INTP	4.87e-06	3.83e-07	1.14e-06
	TURN	.8263	.7679	.6936
	constant	**.0031** **	.0083	.0412
	LNGFIN	**1.3130** **		
	LNSALF		1.2376	
	DURM			**1.1752** **
[0%;20%]	DETM	6.7747	1.0430	32.9425
	INTP	5.9108	2.8126	1.5067
	TURN	1.2012	1.3025	.9869
	constant	**.0003** **	.0056	.0034
[0%]		Base Outcome		
Pseudo R^2 (McFadden)		0.0420	0.0652	0.0287
LR Chi^2		35.61	35.24	25.82
Observations		283	179	298

Notes: Presents the results (relative risk ratios) of the Multinomial Logistic Regressions for Models 1, 2 & 3 taking [0%] as the base outcome. Significance is denoted at the 10%,5% and 1% levels by *, **, ***. For the complete results (coefficients, relative risk ratios and p-values, refer to *Appendix MNLR*.

Table 4. Multinomial Logistic Regression Models 1, 2 & 3 (RRR)

Model 1 indicates, across all leniency reduction classes, that a higher potential gross fine (LNGFIN) incentivises undertakings to apply for leniency. Most significantly, the 1st mover, who receives full immunity from the gross fine, is 50.24% more likely to apply for leniency relative to not applying for leniency for a one unit increase of (the natural logarithm of) the gross fine. Interestingly, 2nd, 3rd and 4th movers are more likely to apply for leniency by 28.62%, 28.60% and, 31.30% respectively relative to the base outcome of no leniency. The difference in the orders of magnitude illustrates that 1st movers are more influenced by a one unit increase in the value of their gross fines than 2nd, 3rd and, 4th movers. This confirms the first, "carrot and stick", hypothesis whereby undertakings are more likely to apply for leniency based on the value of the gross fines they would be subject to without leniency.

Model 2 indicates that only 1st and 2nd leniency reduction classes display significant coefficients on the value of sales (LNSALF). This means that a one unit increase in (the natural logarithm of) the value of sales, which proxies the size of the infringement, leads to 41.39% and 30.79% increase in the likelihood of being a 1st and 2nd mover respectively. The coefficients are not significant on 3rd and 4th movers. This confirms, at least for 1st and 2nd movers, that the larger the declared size of the infringement, the higher likelihood for undertakings to cooperate under leniency. This aids in rejecting the entrenching explanation and attribute it to the ex-ante anticipation of a larger gross fine.

` Model 3 finds that, for the 1st, 3rd and 4th movers, the duration of the infringement (DURM) increases the likelihood of the undertaking opting for leniency. Therefore, a one unit increase in the duration of the infringement leads to a 10.54%, 16.44% and, 17.52% increase in the likelihood of applying for leniency. This illustrates, much like model 2, that there is no entrenching or loyalty effect once the EC investigates and that, therefore, the longer the infringement (and therefore potential gross fine), the higher likelihood undertakings have to cooperate under the leniency notice. Here it is important to note that for the 2nd reduction class,

the relative risk ratio is significant at the 15% level (cf. appendix) indicating an 8.98% higher likelihood of belonging to the 2nd reduction class.

Regarding the control variables in the models, the relative size proxy (TURN) indicates that if the turnover limit is met there is 96,79% lower likelihood of an undertaking opting for the 1st reduction class relative to the base outcome. This indicates that, when only including the duration multiplier in Model 3, the binary characteristic of the fine exceeding the undertaking's 10% turnover limit lowers the likelihood of an undertaking belonging to the 1st immunity reduction class; however, note this control variable is not significant in either models 1 and 2 or for the other reduction classes. The inability to pay (INTP) variable is significant in the 1st model specification only for the 2nd mover indicating that if the undertaking is unable to pay the fine, it has a 6.85 higher likelihood of belonging to the 2nd reduction class relative to the base outcome; however, again, this variable is significant only in the 1st model specification. All other control variables yielded insignificant relationships across leniency reduction classes. Overall, the two significant findings on the control variables do not allow for generalisations on size, relative size, and financial viability metrics across leniency reduction classes.

4.4 Fit and Limitations

When employing MLR models, McFadden's R^2 is the relevant measure of fit. It takes 1 minus the log-likelihood of the fitted model with the independent variables divided by the log likelihood of the null model where only the intercept is included (McFadden, 1974). While the values of McFadden's R^2 are low, this is quite common when using MLR in research. The insight comes from comparing the models with each other where Model 2, Model 1 and Model 3 values are respectively 0.0652, 0.0420 and 0.0287. This indicates a highest fit for Model 2 and the lowest fit for Model 3.

The limitations from this analysis are apparent since the variables employed to test the three hypotheses are all significantly correlated to each other which leads to multicollinearity excluding the possibility of running one comprehensive model and, therefore, rationalises the 3-model iteration approach. This was expected and constitutes one of the central limitations of this analysis. The mitigation of this is left for future research (cf. *Section 5.3*) since this thesis represents the first step in consolidating all the variables related to public enforcement and leniency. The three variables employed, although interrelated, all seek to explain different determinants underlying the choice of certain leniency reduction classes and all point towards the same direction.

Chapter 5: Discussion, Limitations & Future Research

The following discussion chapter is structured along central contributions of this thesis's positive analysis which is to understand the (i) legal-economic framework, (ii) the data and trends underlying public enforcement and (iii) the empirically tested findings on the EC's public enforcement tools of fining and leniency.

5.1 Discussion

The legal and economic framework surrounding the public enforcement of Article 101 TFEU, and the economic effects of cartels is the central premise of this discussion. Regarding cartels, their detrimental economic effects date back to the time of Adam Smith and have been investigated extensively through microeconomic, macroeconomic, and game theory economics. As a countermeasure to cartels, Article 101 TFEU and its infringement are the foundation upon which public enforcement is built. The EC's legal framework surrounding public enforcement is built around the use of soft law guidelines and notices to enforce Article 101 in practice (Barlund, 2020). It is essential to understand that the use of both Notices and Guidelines (soft law), grants the EC significant discretion in public enforcement which is said to increase its flexibility and efficiency (Cosma & Whish, 2003); however, significant discretion also comes with accountability considerations (Monti, 2007). These are present, albeit in soft law format, in the *Fining Guidelines, Leniency and Settlement Notices* acknowledging that the interests of the public must hold primacy over the interests of the EC. Again, the use of soft law tools opens the door for the empirical investigation on the application of these notices and guidelines.

Regarding the discretion afforded to the EC, by constructing the most comprehensively possible database, it is possible to identify where the EC employs its discretion and where it has decided not to. Using the framework of the fining guidelines (cf. *Equations 2 and 3*), it is

possible to uncover the patterns behind the EC's fine setting policy. First, in setting its basic amount of fines, the commission employs the best proxy for its value of sales and the duration of the infringement to which it applies its discretion in determining; however, turning to the value of sales percentage (SALP) and the additional deterrence (ADDD), the EC seemingly under employs the discretion it is afforded by mirroring both metrics. The fining guidelines clearly state that the considered value of sales is recommended to be set at the higher end of the scale based on the gravity of the infringement such as horizontal, price-fixing, market-sharing, and output limitations (Fining Guidelines, 2008, §23). In practice, the data analysis has revealed that both metrics perfectly mirror each other in every decision. Moreover, the EC constrains the scale to a [15%;19%] range although it enjoys the liberty of [0%;30%] and [15%;25%] ranges for the value of sales and additional deterrence respectively. A fitting example of this conservatism is the fining decision imposed in the *Case AT. 39452 – Mountings for windows and window doors* where the infringers participated in price fixing cartel for which a 16% value of sales and additional deterrence was used; price fixing is deemed one of the gravest infringements. This showcase either (i) the EC is not detecting high gravity cartels which begs the question of redesigning the fining and leniency program or (ii) the EC is conservatively employing these metrics within the bounds of its discretion parameters. Interestingly and contrary to what might be expected, this finding showcases an instance where the EC is under employing the discretion it is afforded. This is problematic since the conservative use of the metrics leads to, in fine, lower basic amount of fines and lower deterrence on cartelists. Second regarding the adjustments made to basic fines, the EC enjoys the freedom to set deterrence multipliers, mitigating and aggravating circumstances. Deterrence multipliers (DETM) are destined to take on a >1 value for undertakings whose turnover is significantly larger than their infringement which accounts for larger undertakings having an increased degree of responsibility. In practice these deterrence multipliers are

constrained to a [1;1.4] range and are seldom different from the baseline multiplier of 1 which does not increase the fine. This, again, showcases that although empowered to set multipliers at its own discretion, the EC has adopted to constrain multipliers to a relatively narrow spectrum. Regarding both mitigating and aggravating circumstances, these are seldom considered with a majority of cases not considering any aggravating or mitigating circumstances. However, although cases of repeat infringements exist and the EC enjoys the discretion of applying 100% aggravating circumstances, in practice it has only limited itself to a 50% increase. A fitting example is that of Deutsche Bahn, which over the past decade has been involved in two infringements (i) in 2012 in *Case AT. 39462 – Freight Forwarding* (as the pare of Schenker) and (ii) *Case AT. 40330 – Rail Cargo*. In the latter case, although Deutsche Bahn is a large undertaking having committed repeat infringements, the EC imposed a 50% aggravating circumstance showcasing a conservative use of its 100% upper limit. The cases concerning undertakings' inability to pay, and turnover limits are infrequent throughout and showcase that a wide variety of undertakings both in terms of financial viability and size are considered by the EC.

By constructing the most comprehensively possible database, accounting for confidentiality and methodological discretion afforded to the EC, several findings emerge over time. First, the value of fines imposed both gross and net is fairly stable, although clear outliers exist; however, the euro value of fines is of the order of billions of euros per annum. Moreover, when comparing the gross fines (€30.223bn), calculated as per the fining guidelines, with the net fines (€15.420bn), which are the gross fines to which leniency and settlement reductions have been applied, it is apparent that 49.01% or roughly half of the value of gross fines is discounted to incentivise detection. Recounting the primacy of the public's interest over that of the EC's fining interest (cf. *Equation 1*) as per the soft law instruments, here, careful consideration must be afforded to the facts given that, while cartels are detrimental to the

economic landscape and they must be removed, the public indirectly benefits form the net fines given it increases the budget of the commission and the deterrence effect on cartelists. These discounts therefore represent a cost arising from the cartelist's behaviour that must be punished but affording large discounts is effectively a pass on of these costs in the form of the budget of the EC to which member states pay in with taxpayer funds. Moreover, settlement has cost an average of €160 million per annum over the past decade. Here, it could be argued that the EC is offering substantial reductions under the veil of settlement. This seemingly contradicts *Equation 1*, where the EC's interest in fining may be outweighing the public's interest since it offers substantial reductions to cartelist to minimise its administrative burden. When considering the per annum total reductions of fines by comparing the gross and net fines, the trend has been sporadic over the [2012;2016] period while showing a clear increase over the [2017;2021] period. This must be recognised and warrants further investigation as increasing overall fine reductions may be proof of leniency reductions requiring significantly more percentage leniency to maintain the same efficacy. Second, while the number of distinctly handled cases has been relatively stable albeit for outlier years, the overall trend in the per annum number of fining decisions is on the downward path. This may highlight that the specificity with which the EC imposes its fining decisions is decreasing since the fewer fines are being imposed; however, their euro value remains stable. Third, when segmenting the leniency variables, it becomes apparent the trend over the past decade has been for leniency to become increasingly "lenient", in effect for 2nd, 3rd and 4th movers the trend has been for the average leniency to drift towards to the upper bounds of their respective leniency reduction ranges. As discussed in *Chapter 2*, timeliness determines the reduction class, and the significance of the evidence justifies the interclass range. From this, two explanations emerge. First, the EC is increasingly lenient because undertakings and their legal counsel are increasingly understanding what constitutes significantly value adding evidence, or second, the

EC is increasingly lenient in order to maintain its number of cases and fined infringements. Lastly, turning to the industrial breakdown of the imposed fines, the EC seemingly adopts its investigative and fining decision with a primary focus on manufacturing, and more specifically the automotive industry. Given it is impossible to determine the true number of cartels in existence given their secretive nature, it is worth opening the debate on whether the EC should heavily target a specific sector. Of course, it may be that the automotive industry is prone to cartelist behaviour; however, as per microeconomic theory, elasticity of demand within the automotive industry is relatively elastic meaning the microeconomic incentives do not align (Fridstrøm & Vegard, 2021). This also warrants further attention since it may raise the question of "trophy hunting" by focussing on certain industries more than others especially given recent publications (cf. *Appendix 12*).

Lastly, the empirical analysis employed in this thesis aimed to test the public enforcement specific determinants underpinning the choice of undertakings in applying for their leniency reduction class. In so doing, the findings support the main stated goal of the Leniency notice which is to incentivise infringing undertakings to come forward and cooperate with the EC. In effect, the "carrot and stick" metaphor is empirically proved thanks to the use of an MLR with undertakings most likely to opt for the 1st mover (immunity) class when faced with significantly large gross fines (or "sticks") and a decreasing likelihood among the subsequent leniency reduction classes relative to not opting for leniency. Overall, this showcases that the Leniency Notice is effective in its incentive structure opting for a sliding scale for reductions. Moreover, delving into the effects of the constituent parts of gross fines, both the size of the infringement and the duration of the infringement do not lend any support to undertakings showcasing any loyalty to their fellow cartelists and instead have the same "sign" (>1 RRR) as the gross fines. Interestingly, the likelihood, of an undertaking opting for the 3rd or 4th reduction class is higher than that of 1st or 2nd reduction classes when considering

the duration of the infringement. This showcases that 3rd and 4th movers are less loyal the longer the infringement lasts relative to 1st and 2nd movers. Overall, the empirical model tested and proved the efficacy of the sliding scale in the EU's Leniency notice.

5.2 Limitations

There are several limitations to the research conducted in this thesis and these concern both the dataset and the empirical analysis.

Concerning the dataset, as detailed in *Section 3.1.3*, the compilation of the dataset was not straightforward and is subject to various limitations. First, the number of observations is sporadic in some instances given its availability in public documents making the dataset unbalanced. A potential solution to this issue would be to get full access to all information subject to confidentiality from the EC directly; however, this remains unlikely given confidentiality concerns. Second, because the soft law nature of the guidelines and the notices confer discretion on the EC, the methodology used in setting fines is not always apparent when sifting through case documents. In effect, although best efforts have been made, methodological detractions employed by the EC are quasi-impossible to control for ex-post. Lastly, this thesis limited itself to a 10-year period given time constraints. This may be further expanded and reveal other trends underlying public enforcement and leniency.

Regarding the empirical model, the MLR methodology employed presents limitations given the high levels of multicollinearity present amongst the variables. This is problematic since the effect of the variables is not discernible although their magnitudes differ. As is outlined below, this may be controlled for by increasing the number of variables used in the MLR model but requires serious resources both in terms of time and effort.

5.3 Future Research

The database elaborated in this thesis, which is available upon request, has shed light on many notable trends and a wide variety of potential avenues for future research.

First, *Section 3.2.2's* strength lies in the fact that it provides a timeline for the empirical evolution of public enforcement and leniency in the EU. This has uncovered many trends that warrant further investigation such as the drift of leniency reduction classes towards their upper bounds. In the above research, many factors may account for this, and it therefore opens the door for an investigation into which DG Comp specific factors explain this drift. Overarchingly, this warrants for the question of whether leniency is increasingly "lenient" while maintaining the same efficacy levels.

Second, the time frame of the dataset may also be increased to account for different leniency regimes before the Notices and Guidelines in this thesis came into effect. This would allow to compare the public enforcement policy shifts and assess how and to what extent these have changed the public enforcement landscape. This requires significantly increasing the timeframe of this dataset by another 10 years.

Second, the dataset already provides for a comprehensive picture of public enforcement; however, it could be significantly increased by adding undertaking-level variables at the financial and organizational level (using Bloomberg, Orbis, etc.) such as size, quality of legal counsel, etc. Such analysis would allow to improve the determinants in the MLR regression employed and paint a more holistic picture and may minimize multicollinearity concerns.

Third, the apparent focus on fining certain industrial sectors is also a potential research avenue since this may uncover (i) industries that are prone to cartelist behaviour or may, instead, underline (ii) the EC's focus on certain industries which may be explained by limited

resources or, more problematically, (iii) a form of "trophy hunting". This thesis does not make causal inferences on this and therefore paves the way for future research to tackle this question.

Fourth, the database and findings above also allow for the comparison with leniency regimes in other jurisdictions. Famously, the US imposes criminal sanctions on individuals involved in cartels which changes the game theoretical form underpinning public enforcement and leniency. The dataset and research above may help future research apply empirical evidence to such multijurisdictional comparisons.

To conclude, this thesis serves to empirically review and guide future research concerning public enforcement and leniency. While only a first step in the academic debate, it will hopefully open and shape potential future research avenues.

References

European Commission. (2004, April 27). Art. 101(3) Guidelines. *Guidelines on the application of Article 101(3) TFEU (Formerly Article 81(3) EC)*. EUR-Lex.

Article 101 TFEU. (2008, May 09). *Official Journal 115 p. 0088 - 0089*. Official Journal of the European Union.

Becker, G. (1968). Crime and Punishment . *Journal of Political Economy*, 169-217.

Brooks, C. (2019). *Introductory Econometris for Finance* . Cambridge: Cambridge University Press.

Case AT.39824 - Trucks, AT.39824 (European Commission September 27, 2017).

Cosma, H. A., & Whish, R. (2003). Soft Law in the Field of EU Competition Policy . *European Business Law Review* , 25-56.

De Minimis Notice. (2014, August 30). *Notice on agreements of minor importance which do not appreciably restrict competition under Article 101(1) of the Treaty on the Functioning of the European Union* . Official Journal of the European Union.

EU Regulation No 330/2010. (2010, April 23). *on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of vertical agreements and concerted practices*. Official Journal of the European Union .

European Commission. (2006, Spetember 1). Fining Guidelines. *Guidelines on the method of setting fines imposed pursuant to Article 23(2)(a) of Regulation No 1/2003*. Brussels: Official Journal of the European Union .

European Commission. (2006, December 8). Leniency Notice. *Commission Notice on Immunity from fines and reduction of fines in cartel cases (Text with EEA relevance)*. Brussels: Official Journal of the European Union.

European Commission. (2008, 07 08). Settlement Procedure . *Commission Notice on the conduct of settlement procedures in view of the adoption of Decisions pursuant to Article 7 and Article 23 of Council Regulation (EC) No 1/2003 in cartel cases (Text with EEA relevance)*. Brussels, Belgium.

Harding, C., & Joshua, J. (2010). *Regualting Cartels in Europe.* Oxford: Oxford University Press.

Kline, R. (2005). *Principles and practices of structural equation modeling (2nd Edition).* New York: Guilford Press.

Leslie, C. R. (2006). Synmposium: The Anititrust Enterprise: Antitrust Amnesty, Game Theory, and Cartel Stability. *The Journal of Corporate Law* , 453-488.

Lianos, I., Davis, P., & Nebbia, P. (2015). *Damages Claims for the infringement of EU Competition Law* . Oxford: Oxford University Press.

McFadden, D. (1974). Conditional logit analysis of qualitative choice behaviour. In P. Zarembka, *Frontiers in Econometrics* (pp. 105-142). Academic Press .

Monti, G. (2007). *EC Compeittion Law*. Cambridge : Cambridge University Press.

Moreau, F., & Panon, L. (2021). Macroeconomic Efffects of Market Structure Distortions. *Association Nationale de Recherche (France)*, 1-81.

Pindyck, R., & Rubinfeld, D. L. (2018). *Microeconomics.* Harlow: Pearson.

Schwab, J. (2002). *Multinomial logistic regression: Basic relationships and complete problems.*

Smith, A. (1776). *Wealth of Nations* . London: W. Starahan & T. Cadell.

Starkweather, J., & Moske, A. (2011). *Multinomial Logistic Regression.* Denton: University of North Texas.

Van den Bergh, R. (2017). *Comparative Comeptition Law and Economics* . Cheltenham: Edward Elgar Publishing.

Appendix

Appendix 1 – Considered Cases

The following provides the yearly APA references for the 212 documents (c. 18,000 pages) employed in the construction of the database. These are the references to (i) the Cartel Procedures, (ii) the Press Releases, (iii) the Summary Decisions, and (iv) the links to DG Comp's case search tool.

2012

Case AT.39437 – TV and Computer Monitor Tubes

European Commission. (2012, December 5). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39437 - TV and computer monitor tubes*. Brussels, Belgium: DG Competition.

European Commission. (2012, December 5). Press Release. *Antitrust: Commission fines producers of TV and comupter monitor tubes € 1.47 billion for two decadelong cartels*. Brussels, Belgium: DG Competition.

European Commission. (2012, December 5). Summary Decision. *Summary of Commission Decision of 5 December 2012 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case COMP/39.437 — TV and computer monitor tubes)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39437 TV and computer monitor tubes*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39437

Case AT.39452 – Mountings for windows and window doors

European Commission. (2012, March 28). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39452 - Window Hinges*. Brussels, Belgium: DG Competition.

European Commission. (2012, March 28). Press Release. *Antitrust: Commission fines nine producers of window mountings €86 million for price fixing cartel* . Brussels, Belgium: DG Competition.

European Commission. (2012, March 28). Summary Decision. *Summary of Commission Decision of 28 March 2012 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA*

Agreement (Case COMP/39.452 — Mountings for windows and window doors). Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39452 Mountings for windows and window doors*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39452

Case AT.39462 – Freight Forwarding

European Commission. (2012, March 28). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39462 - Freight Forwarding*. Brussels, Belgium: DG Competition.

European Commission. (2012, March 28). Press Release. *Antitrust: Commission imposes €169 million fine on freight forwarders for operating four price fixing cartels* . Brussels, Belgium: DG Competition.

European Commission. (2012, March 28). Summary Decision. *Summary of Commission Decision of 28 March 2012 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case COMP/39.462 — Freight Forwarding)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39462 Freight Forwarding*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39462

Case AT.38695 – Sodium Chlorate

European Commission. (2012, March 27). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.38695 - Sodium Chlorate (amendment)*. Brussels, Belgium: DG Competition.

European Commission. (2012, March 27). Press Release. *Antitrust: Commission fines sodium chlorate paper bleach producers €73 million for market sharing and price fixing cartels (Corrected)* . Brussels, Belgium: DG Competition.

European Commission. (2012, March 27). Summary Decision. *Summary of Commission Decision of 27 March 2012 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case COMP/38.695 — Freight Forwarding)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.38695 Freight Forwarding*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_38695

2013

Case AT.39861 - Yen Interest Rate Derivatives

European Commission. (2013, December 4). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39861 - Yen Interest Rate Derivatives*. Brussels, Belgium: DG Competition.

European Commission. (2013, December 4). Press Release. *Antitrust: Commission fines banks €1.49 billion for participating in cartels in the interes rate derivative industry*. Brussels, Belgium: DG Competition.

European Commission. (2013, December 4). Summary Decision. *Summary of Commission Decision of 4 December 2013 (Case COMP/39.861 — Yen Interst Rate Derivatives)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39861 Yen Interest Rate Derivatives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39861

Case AT.39914 – Euro Interest Rate Derivatives

European Commission. (2013, December 4). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39914 - Euro Interest Rate Derivatives*. Brussels, Belgium: DG Competition.

European Commission. (2013, December 4). Press Release. *Antitrust: Commission fines banks €1.49 billion for participating in cartels in the interes rate derivative industry*. Brussels, Belgium: DG Competition.

European Commission. (2013, December 4). Summary Decision. *Summary of Commission Decision of 4 December 2013 (Case COMP/39.914 — Euro Interst Rate Derivatives)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39914 Euro Interest Rate Derivatives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39914

Case AT.39633 – Shrimps

European Commission. (2013, November 27). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39633 - Shrimps*. Brussels, Belgium: DG Competition.

European Commission. (2013, November 27). Press Release. *Antitrust: Commission fines four North Sea shrimps traders €28 million for price fixing cartel*. Brussels, Belgium: DG Competition.

European Commission. (2013, November 27). Summary Decision. *Summary of Commission Decision of 27 November 2013 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case COMP/39.633) — Shrimps)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39633 Shrimps*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39633

Case AT.39748 – Automotive Wire Harnesses

European Commission. (2013, July 7). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39748 - Automotive Wire Harnesses*. Brussels, Belgium: DG Competition.

European Commission. (2013, July 7). Press Release. *Antitrust: Commission finesproducers of wire harnesses €141 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2013, July 7). Summary Decision. *Summary of Commission Decision of 7 July 2013 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case COMP/39.748) — Automotive Wire Harnesses)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39748 Automotive Wire Harnesses*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39748

2014

Case AT.39574 – Smart Card Chips

European Commission. (2014, Septemeber 3). Commission Decision of 3.9.2014 relating to proceedings under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement. *Case AT.39574 - Smart Card Chips*. Brussels, Belgium: DG Competition.

European Commission. (2014, September 3). Press Release. *Antitrust: Commission fines smart card chips producers €138 million for cartel*. Brussels, Belgium: DG Competition.

European Commission. (2014, September 3). Summary Decision. *Summary of Commission Decision of 3 September 2014 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case COMP/39.574 — Smart Card Chips)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39574 Smart Card Chips*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39574

Case AT.39610 – Power Cables

European Commission. (2014, April 2). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39610 - Power Cables*. Brussels, Belgium: DG Competition.

European Commission. (2014, April 2). Press Release. *Antitrust: Commission fines producers of high voltage power cables €302 million for operating a cartel*. Brussels, Belgium: DG Competition.

European Commission. (2014, April 2). Summary Decision. *Summary of Commission Decision of 2 April 2014 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39610 — Power Cables)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39610 Power Cablees*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39610

Case AT.39780 – Envelopes

European Commission. (2014, December 10). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39780 - Envelopes*. Brussels, Belgium: DG Competition.

European Commission. (2014, December 11). Press Release. *Antitrust: Commission fines envelope producers over €19.4 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2014, December 10). Summary Decision. *Summary of Commission Decision of 11 December 2014 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39780 — Envelopes)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39780 Envelopes*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39780

Case AT.39792 – Steel Abrasives

European Commission. (2014, April 2). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39792 - Steel Abrasives*. Brussels, Belgium: DG Competition.

European Commission. (2014, April 2). Press Release. *Antitrust: Commission fines producers of steel abrasives €30.7 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2014, April 2). Summary Decision. *Summary of Commission Decision of 2 April 2014 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39792 — Steel Abrasives)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39792 Steel Abrasives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39792

Case AT.39801 – Polyurethane Foam

European Commission. (2014, January 29). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39801 - Polyurethane Foam*. Brussels, Belgium: DG Competition.

European Commission. (2014, January 29). Press Release. *Antitrust: Commission fines producers of foam for mattresses, sofas and car seats €114 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2014, January 29). Summary Decision. *Summary of Commission Decision of 29 January 2014 (Case AT.39801 — Polyurethane Foam)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39801 Polyurethane Foam*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39801

Case AT.39922 – Bearings

European Commission. (2014, March 19). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39922 - Bearings*. Brussels, Belgium: DG Competition.

European Commission. (2014, March 19). Press Release. *Antitrust: Commission fines producers of car and truck bearings €953 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2014, March 19). Summary Decision. *Summary of Commission Decision of 19 March 2014 (Case AT.39922 — Bearings)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39922 Bearings*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39922

Case AT.39924 - Swiss Franc Interest Rate Derivatives

Bid-Ask Spread Infringement

European Commission. (2014, October 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39924 - Swiss France Interest Rate Derivatives (Bid Ask Spread Infringement)*. Brussels, Belgium: DG Competition.

European Commission. (2014, October 21). Press Release. *Antitrust: Commission settles cartel on bid-ask spreads charged on Swiss Franc interest rate derivatives; fines four major banks €32.3 million*. Brussels, Belgium: DG Competition.

European Commission. (2014, October 21). Summary Decision. *Summary of Commission Decision of 21 October 2014 (Case AT.39924 — Swiss Franc Interest Rate Derivatives (bid-ask spread infringement))*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39924 Swiss Franc Interest Rate Derivatives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39924

CHF LIBOR

European Commission. (2014, October 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39924 - Swiss France Interest Rate Derivatives (CHF LIBOR)*. Brussels, Belgium: DG Competition.

European Commission. (2014, October 21). Press Release. *Antitrust: Commission settles RBS-JPMorgan Cartel in derivatives on Swiss Franc LIBOR; imposes €61.6 million fine on JPMorgan*. Brussels, Belgium: DG Competition.

European Commission. (2014, October 21). Summary Decision. *Summary of Commission Decision of 21 October 2014 (Case AT.39924 — Swiss Franc Interest Rate Derivatives (CHF LIBOR))*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39924 Swiss Franc Interest Rate Derivatives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39924

Case AT.39952 – Power Exchanges

European Commission. (2014, March 05). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39952 - Power Exchanges*. Brussels, Belgium: DG Competition.

European Commission. (2014, March 05). Press Release. *Antitrust: Commission fines two power exchanges €5.9 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2014, March 5). Summary Decision. *Summary of Commission Decision of 5 March 2014 (Case AT.39952 — Power Exchanges)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39952 Power Exchanges*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39952

Case AT.39965 – Mushrooms

European Commission. (2014, June 25). Cartel Procedure relating to proceedings under Article 101 of the Treaty on the Funcioning of the European Union and Article 53 of the EEA Agreement. *Case AT.39965 - Mushrooms*. Brussels, Belgium: DG Competition.

European Commission. (2014, June 25). Press Release. *Antitrust: Commission fines three producers of canned mushrooms €32 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2014, June 25). Summary Decision. *Summary of Commission Decision of 25 June 2014 (Case AT.39965 — Mushrooms)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39965 Mushrooms*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39965

2015

Case AT.39563 – Retail Food Packaging

European Commission. (2015, June 24). Cartel Procedure relating to proceedings under Article 101 of the Treaty on the Funcioning of the European Union and Article 53 of the EEA Agreement. *Case AT.39563 - Retail Food Packaging*. Brussels, Belgium: DG Competition.

European Commission. (2015, June 24). Press Release. *Antitrust: Commission fines producers and distributors €115 865 000 for operating retail food packaging cartels*. Brussels, Belgium: DG Competition.

European Commission. (2015, June 24). Summary Decision. *Summary of Commission Decision of 24 June 2015 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39563 — Retail Food Packaging)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39563 Retail Food Packaging*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39563

Case AT.39639 – Optical Disc Drives

European Commission. (2015, October 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39639 - Optical Disc Drives*. Brussels, Belgium: DG Competition.

European Commission. (2015, October 21). Press Release. *Antitrust: Commission fines supliers of optical disc drives €116 million for cartel*. Brussels, Belgium: DG Competition.

European Commission. (2015, October 21). Summary Decision. *Summary of Commission Decision of 21 October 2015 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39639 — Optical Disc Drives)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39639 Optical Disc Drives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39639

Case AT.40055 – Parking Heathers

European Commission. (2015, June 17). Cartel Procedure Council Regulation (EC) 1/2003 and Commission Regilation (EC) 773/2004. *Case AT.40055 - Parking Heaters*. Brussels, Belgium: DG Competition.

European Commission. (2015, June 17). Press Release. *Antitrust: Commission fines parking heaters producer €68 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2015, June 17). Summary Decision. *Summary of Commission Decision of 21 October 2015 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40055 — Parking Heaters)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40055*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40055

Case AT.40098 – Blocktrains

European Commission. (2015, July 15). Commission decision of 15.7.2015 realting to proceedings under Article 101 of the Treaty on the Funtioning of the European Union. *Case AT.40098 - Blocktrains*. Brussels, Belgium: DG Competition.

European Commission. (2015, July 15). Press Release. *Antitrust: Commission fines cargo train operators €49 million for cartel*. Brussels, Belgium: DG Competition.

European Commission. (2015, July 15). Summary Decision. *Summary of Commission Decision of 21 October 2015 (Case AT.40098 — Blocktrains)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40098*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40098

2016

Case AT.39792 – Steel Abrasives

European Commission. (2016, May 25). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39792 - Steel Abrasives*. Brussels, Belgium: DG Competition.

European Commission. (2016, May 25). Press Release. *Antitrust: Commission fines Pometon €6.2 million for participation in steel abrasives cartel*. Brussels, Belgium: DG Competition.

European Commission. (2016, May 25). Summary Decision. *Summary of Commission Decision of 25 May 2016 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39792 — Steel Abrasives)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39792 Steel Abrasives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39792

Case AT.39824 - Trucks

European Commission. (2016, July 19). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.39824 - Trucks*. Brussels, Belgium: DG Competition.

European Commission. (2016, July 19). Press Release. *Antitrust: Commission fines truck producers €2.93 billion for participating in a cartel*. Brussels, Belgium: DG Competition.

European Commission. (2016, July 19). Summary Decision. *Summary of Commission Decision of 19 July 2016 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39824 — Trucks)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39824 Trucks*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39824

Case AT.39904 - Rechargeable Batteries

European Commission. (2016, December 12). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39904 - Rechargeables Batteries*. Brussels, Belgium: DG Competition.

European Commission. (2016, December 12). Press Release. *Antitrust: Commission fines rechargeable battery producers €166 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2016, December 12). Summary Decision. *Summary of Commission Decision of 12 December 2016 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39904 — Rechargeable Batteries)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39904 Trucks*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39904

Case AT.39914 - Euro Interest Rate Derivatives

European Commission. (2016, December 7). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39914 - Euro Interest Rate Derivatives*. Brussels, Belgium: DG Competition.

European Commission. (2016, December 7). Press Release. *Antitrust: Commission fines Crédit Agricole, HSBC and JPMorgan Chase €485 million for euro interest rate derivatives cartel*. Brussels, Belgium: DG Competition.

European Commission. (2016, December 12). Summary Decision. *Summary of Commission Decision of 7 December 2016 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39914 — Euro Interest Rate Derivatives)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39904 Trucks*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39914

Case AT.39965 – Mushrooms

European Commission. (2016, April 6). Cartel Procedure relating to proceedings under Article 101 of the Treaty on the Funcioning of the European Union and Article 53 of the EEA Agreement. *Case AT.39965 - Mushrooms*. Brussels, Belgium: DG Competition.

European Commission. (2016, April 6). Press Release. *Antitrust: Commission fines Riberebro €5.2 million for participation in canned mushrooms cartel*. Brussels, Belgium: DG Competition.

European Commission. (2016, April 6). Summary Decision. *Summary of Commission Decision of 6 April 2016 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39965 — Mushrooms)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39965 Mushrooms*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39965

Case AT.40028 - Alternators and Starters

European Commission. (2016, January 27). Cartel Procedure Council Regulation (EC) 1/2003 & Commission Regulation (EC) 773/2004. *Case AT.40028 - Alternators and Starters*. Brussels, Belgium: DG Competition.

European Commission. (2016, January 27). Press Release. *Antitrust: Commission fines car parts producers €137 789 000 in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2016, January 27). Summary Decision. *Summary of Commission Decision of 27 January 2016 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40028 — Alternators and Starters)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40028 Alternators and Starters*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40028

2017

Case AT.39258 – Airfreight

European Commission. (2017, March 17). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39258 - Airfreight*. Brussels, Belgium: DG Competition.

European Commission. (2017, March 17). Press Release. *Antitrust: Commission re-adopts decision and fines air cargo carriers €776 million for price fixing cartel*. Brussels, Belgium: DG Competition.

European Commission. (2017, March 17). Summary Decision. *Summary of Commission Decision of 17 March 2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement* and Article 8 of the Agreement between the European Community and the Swiss Confederation on Air Transport *(Case AT.39258 — Steel Airfreight)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39258 Airfreight*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39258

Case AT.39824 - Trucks

European Commission. (2017, September 27). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39824 - Trucks*. Brussels, Belgium: DG Competition.

European Commission. (2017, September 27). Press Release. *Antitrust: Commission fines Scania €880 million for participating in trucks cartel*. Brussels, Belgium: DG Competition.

European Commission. (2017, September 27). Summary Decision. *Summary of Commission Decision of 27 September 2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39824 — Trucks)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39824 Trucks*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39824

Case AT.39881 - Occupant Safety Systems supplied to Japanese Car Manufacturers

European Commission. (2017, November 22). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39824 - Occupant Safety Systems supplied to Japaanese Car Manufacturers*. Brussels, Belgium: DG Competition.

European Commission. (2017, November 22). Press Release. *Antitrust: Commission fines five car safety equipment suppliers €34 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2017, November 22). Summary Decision. *Summary of Commission Decision of 22 Novemebr 2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39881 — Occupant Safety Systems supplied to Japaanese Car Manufacturers)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39881 Occupant Safety Systems supplied to Japaanese Car Manufacturers*. Retrieved from European Commission Competition Policy : https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39881

Case AT.39960 - Thermal Systems

European Commission. (2017, March 8). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39960 - Thermal Systems*. Brussels, Belgium: DG Competition.

European Commission. (2017, March 8). Press Release. *Antitrust: Commission fines six car air conditioning and engine cooling suppliers €155 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2017, March 8). Summary Decision. *Summary of Commission Decision of 8 March 2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39960 — Thermal Systems)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39960 Thermal Systems*. Retrieved from European Commission Competition Policy : https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39960

Case AT.40013 - Lighting Systems

European Commission. (2017, June 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40013 - Ligthing Systems*. Brussels, Belgium: DG Competition.

European Commission. (2017, June 21). Press Release. *Antitrust: Commission fines three car lighting system producers €27 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2017, June 21). Summary Decision. *Summary of Commission Decision of 21 June 2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40013 — Lighting Systems)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40013 Lighting Systems*. Retrieved from European Commission Competition Policy : https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40013

Case AT.40018 - Car battery recycling

European Commission. (2017, February 8). Cartel Procedure of 8.2.2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union. *Case AT.40018 - Car battery recycling*. Brussels, Belgium: DG Competition.

European Commission. (2017, February 8). Press Release. *Antitrust: Commission fines three companie €68 million for car battery recycling cartel*. Brussels, Belgium: DG Competition.

European Commission. (2017, February 8). Summary Decision. *Summary of Commission Decision of 8 February 2017 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40018 — Car battery recycling)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40018 - Car battery recycling*. Retrieved from European Commission Competition Policy : https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40018

Case AT.39920 - Braking Systems

European Commission. (2018, February 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39920 - Braking Systems*. Brussels, Belgium: DG Competition.

European Commission. (2018, February 21). Press Release. *Antitrust: Commission fines maritime car carriers and car parts suppliers a total of €546 million in three separate cartel settlements*. Brussels, Belgium: DG Competition.

European Commission. (2018, February 21). Summary Decision. *Summary of Commission Decision of 21 February 2018 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.39920 — Braking Systems)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39920 Braking Systems*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39920

Case AT.4009 - Maritime Car Carriers

European Commission. (2018, February 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40009 - Maritime Car Carriers*. Brussels, Belgium: DG Competition.

European Commission. (2018, February 21). Press Release. *Antitrust: Commission fines maritime car carriers and car parts suppliers a total of €546 million in three separate cartel settlements*. Brussels, Belgium: DG Competition.

European Commission. (2018, February 21). Summary Decision. *Summary of Commission Decision of 21 February 2018 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40009 — Maritime Car Carriers)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40009 Maritime Car Carriers*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40009

Case AT.40113 - Spark Plugs

European Commission. (2018, February 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40113 - Spark Plugs*. Brussels, Belgium: DG Competition.

European Commission. (2018, February 21). Press Release. *Antitrust: Commission fines maritime car carriers and car parts suppliers a total of €546 million in three separate cartel settlements*. Brussels, Belgium: DG Competition.

European Commission. (2018, February 21). Summary Decision. *Summary of Commission Decision of 21 February 2018 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.400113 — Spark Plugs)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40113 Spark Plugs*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40113

Case AT.40136 - Capacitators

European Commission. (2018, March 21). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40136 - Capacitators*. Brussels, Belgium: DG Competition.

European Commission. (2018, March 21). Press Release. *Antitrust: Commission fines eight producers of capactitators €254 million for participating in cartel*. Brussels, Belgium: DG Competition.

European Commission. (2018, March 21). Summary Decision. *Summary of Commission Decision of 21 March 2018 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.400136 — Capacitators)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40136 Cpacitators*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40136

2019

Case AT.37956 - Reinforcing Steel Bars (excl. from dataset - pre-leniency)

European Commission. (2019, July 4). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.37956 - Reinforcing steel bars*. Brussels, Belgium: DG Competition.

European Commission. (2019, July 4). Press Release. *Antitrust: Commission re-adopts decision and fines five producers of reinforcing steel vars €16 million for price fixing cartel*. Brussels, Belgium: DG Competition.

European Commission. (2019, July 4). Summary Decision. *Summary of Commission Decision of 4 July 2019 relating to a proceeding under Article 65 of the ECSC Treaty (Case AT.37956 — Reinforcing steel bars)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.37956 Reinforcing Steel Bars*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_37956

Case AT.40127 - Canned Vegetables

European Commission. (2019, September 27). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40127 - Canned Vegetables*. Brussels, Belgium: DG Competition.

European Commission. (2019, September 27). Press Release. *Antitrust: Commission fines Coroos and Groupe CECAB €31.6 million for participating in canned vegetables cartel*. Brussels, Belgium: DG Competition.

European Commission. (2019, September 27). Summary Decision. *Summary of Commission Decision of 27 September 2019 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40127 — Canned Vegetables)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40127 Canned Vegetables*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40127

Case AT.40135 - FOREX

Three Way Banana Split

European Commission. (2019, May 16). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40135 - FOREX (Three Way Banana Split).* Brussels, Belgium: DG Competition.

European Commission. (2019, May 16). Press Release. *Antitrust: Commission fines Barclays, RBS, Citigroup, JPMorgan and MUFG €1.07 billion for participating in foreign exchange spot trading cartel*. Brussels, Belgium: DG Competition.

European Commission. (2019, May 16). Summary Decision. *Summary of Commission Decision of 16 May 2019 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40135 — FOREX (Three Way Banana Split))*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40135 FOREX*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40135

Essex Express

European Commission. (2019, May 16). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40135 - FOREX (Essex Express)*. Brussels, Belgium: DG Competition.

European Commission. (2019, May 16). Press Release. *Antitrust: Commission fines Barclays, RBS, Citigroup, JPMorgan and MUFG €1.07 billion for participating in foreign exchange spot trading cartel*. Brussels, Belgium: DG Competition.

European Commission. (2019, May 16). Summary Decision. *Summary of Commission Decision of 16 May 2019 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40135 — FOREX (Essex Express))*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40135 FOREX*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40135

Case AT.40481 - Occupant Safety Systems (II) supplied to the Volkswagen Group and the BMW Group

European Commission. (2019, September 27). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40481 - Occupant Safety Systems (II) supplied to the Volkswagen Group and the BMW Group*. Brussels, Belgium: DG Competition.

European Commission. (2019, September 27). Press Release. *Antitrust: Commission fines car safety equipment suppliers €368 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2019, September 27). Summary Decision. *Summary of Commission Decision of 27 September 2019 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40481 — Occupant Safety Systems (II) supplied to the Volkswagen Group and the BMW Group)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40481 Occupant Safety Systems (II) supplied to the Volkswagen Group and the BMW Group*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40481

2020

Case AT.39563 - Retail Food Packaging

European Commission. (2020, December 17). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.39563 - Retail Food Packaging*. Brussels, Belgium: DG Competition.

European Commission. (2020, December 17). Press Release. *Antitrust: Commission re-adopts decision and fines CCPL €9.44 million for its participation in retail food packaging cartels*. Brussels, Belgium: DG Competition.

European Commission. (2020, December 17). Summary Decision. *Summary of Commission Decision of 17 December 2020 replacing the fines set by Decision C(2015) 4336 final of 24 June 2015relating to a proceeding underArticle 101 of the Treaty on the Functioning of the European Union to the extent that it concerns CCPL S.c., Coopbox Group S.p.A. and Coopbox Eastern s.r.o. (Case AT.39563)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.39563 Retail Food Packaging*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39563

Case AT.40299 - Closure Systems

European Commission. (2020, September 29). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40299 - Closure Systems*. Brussels, Belgium: DG Competition.

European Commission. (2020, September 29). Press Release. *Antitrust: Commission fines car parts suppliers of €18 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2020, September 29). Summary Decision. *Summary of Commission Decision of 29 September 2020 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40299)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40299 Closure Systems*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40299

Case AT.40410 - Ethylene

European Commission. (2020, July 14). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40410 - Ethylene*. Brussels, Belgium: DG Competition.

European Commission. (2020, July 14). Press Release. *Antitrust: Commission fines ethylene purchasers €260 million in cartel settlement*. Brussels, Belgium: DG Competition.

European Commission. (2020, July 14). Summary Decision. *Summary of Commission Decision of 14 July 2020 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union (Case AT.40410)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40410 Ethylene*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40410

2021

NB fewer documents (cartel procedures and summary decisions) available given many have not yet been published at the time of writing this thesis.

Case AT.39861 - Yen Interest Rate Derivatives

European Commission. (2021, May 28). Press Release. *Antitrust: Commission re-adopts decision and fines ICAP €6.45 million for faciltating several cartels in the Yen Interest Rate Derivatives trading market*. Brussels, Belgium: DG Competition.

DG Competition. (2022, July). *AT.39861 - Yen Interest Rate Derivatives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39861

Case AT.39914 - Euro Interest Rate Derivatives

European Commission. (2021, June 28). Press Release. *Antitrust: Commission amends and re-adopts decision in the euro interest rate derivatives cartel*. Brussels, Belgium: DG Competition.

DG Competition. (2022, July). *AT.39861 - Euro Interest Rate Derivatives*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39914

Case AT.39914 - Ethanol Benchmarks

European Commission. (2021, December 10). Press Release. *Antitrust: Commission fines former ethanol producer Abengoa €20 million in cartel settlement*. Brussels, Belgium: DG Competition.

DG Competition. (2022, July). *AT.40054 - Ethanol Benchmarks*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_39914

Case AT.40127 - Canned Vegetables

European Commission. (2021, Novemeber 19). Press Release. *Antitrust: Commission fines Conserve Italia €20 million for participating in canned vegetables cartel*. Brussels, Belgium: DG Competition.

DG Competition. (2022, July). *AT.40127 - Canned Vegetables*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40127

Case AT.40135 - FOREX (Sterling Lads)

European Commission. (2021, December 2). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40135 - FOREX (Sterling Lads)*. Brussels, Belgium: DG Competition.

European Commission. (2021, December 2) Press Release. *Commission fines UBS, Barclays, RBS, HSBC and Credit Suisse €344 million for participating in a Forein Exchange spot trading cartel*. Brussels, Belgium: DG Competition.

European Commission. (2021, December 2). Summary Decision. *Summary of Commission Decision of 2 December 2021 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40135 (Sterling Lads))*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40135 FOREX*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40135

Case AT.40178 - Car Emissions

European Commission. (2021, July 8). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40178 - Car Emissions*. Brussels, Belgium: DG Competition.

European Commission. (2021, July 8) Press Release. *Commission fines car manufacturers €875 million for restricting competition in emission cleaning for new diesel passenger cars*. Brussels, Belgium: DG Competition.

European Commission. (2021, July 8). Summary Decision. *Summary of Commission 8 July 2021 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40178 - Car Emissions))*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40178 - Car Emissions*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40178

Case AT.40324 - European Government Bonds

European Commission. (2021, May 20). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40324 - European Government Bonds*. Brussels, Belgium: DG Competition.

European Commission. (2021, May 20) Press Release. *Commission fines investment banks €371 million for participating in a European Givernments Bonds trading cartel*. Brussels, Belgium: DG Competition.

European Commission. (2021, May 20). Summary Decision. *Summary of Commission Decision of 20 May 2021 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40324 - European Givernment Bonds)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40324 - European Government Bonds*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40324

Case AT.40330 - Rail Cargo

European Commission. (2021, April 20). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40330 - Rail Cargo*. Brussels, Belgium: DG Competition.

European Commission. (2021, April 20) Press Release. *Commission fines three EU railway companies €48 million for customer allocation cartel*. Brussels, Belgium: DG Competition.

European Commission. (2021, April 20). Summary Decision. *Summary of Commission Decision of 20 April 2021 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union (Case AT.40330 - Rail Cargo)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40330 - Rail Cargo*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40330

Case AT.40346 - SSA Bonds

European Commission. (2021, April 28). Cartel Procedure Council Regulation (EC) 1/2003. *Case AT.40346 - SSA Bonds*. Brussels, Belgium: DG Competition.

European Commission. (2021, April 28) Press Release. *Commission fines investment banks €28 million for participating in SSA bonds trading cartel*. Brussels, Belgium: DG Competition.

European Commission. (2021, April 28). Summary Decision. *Summary of Commission Decision of 28 April 2021 relating to a proceeding under Article 101 of the Treaty on the Functioning of the European Union and Article 53 of the EEA Agreement (Case AT.40346 - SSA Bonds)*. Brussels, Belgium Official Journal of the European Union.

DG Competition. (2022, July). *AT.40346 - SSA Bonds*. Retrieved from European Commission Competition Policy: https://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=1_AT_40346

Appendix 2 – Primary & Secondary Variable Specification

Primary Variables							
Variable	**Name**	**Cat.**	**Type**	**Unit**	**Description**	**Source**	**Notes**
YEAR	Year	D	I	Num.	Year the fining decision was imposed	PR, CP, SD, WE	N.A.
CNUM	Case Number	D	N	N.A.	Case number attributed by DG Comp	CP, SD, WE	N.A.
CNAM	Case Name	D	N	N.A.	Case name attributed by DG Comp	CP, SD, WE	N.A.
EACT	Economic Activity	D	N	N.A.	Economic activity NACE code	WE	Some cases may have multiple so the first available is chosen
UNAM	Undertaking Name	D	N	N.A.	Undertaking on which fine is imposed	CP, PR	Given Abbreviation
NFIN	Net Fine Imposed	F	I	€	Value of fine net of reductions	PR, CP, SD	N.A.
GFFM	Gross Fine imposed on First Mover	F	I	€	Euro value of the gross fine avoided by the first mover with immunity	PR	Available on an ad-hoc basis in Fining Press Releases (may be subject to pro-rata adjustments)
LPER	Leniency Reduction	L	R	%	Leniency Percentage applied to Fine	PR, CP, SD	Based on leniency reduction classes
SPER	Settlement Reduction	L	R	%	Settlement Percentage applied to Fine	PR, CP, SD	Either 0% or 10 % if agreed to settle
STAD	Start Date	B	I	Date	Start date of infringement	CP, SD	N.A.
ENDD	End Date	B	I	Date	End Date of infringement	CP, SD	N.A.
DURM	Duration Multiplier	B	I	Num.	Annualised multiplier based on start and end dates	CP	The number of days and months are rounded down to 2 digits.
SALL	Considered Sales Lower Bound	B	I	€	Value of Sales (or best available Proxy) lower bound	CP	Value of Sales either have a range [Lower; Higher] or a declared value.
SALH	Considered Sales Higher Bound	B	I	€	Value of Sales (or best available Proxy) higher bound	CP	
SALD	Declared V Sales	B	I	€	Value of Sales or Proxy	CP	
SALP	Percentage of Sales Considered	B	R	%	Percentage sales considered for the fines' basic amount	CP, SD	Range is [0%;30%]
ADDD	Additional Deterrence	B	R	%	Percentage of sales considered for the additional deterrence in the basic amount	CP, SD	Range is [15%;25%]
BAML	Basic Fine Lower Bound	B/A	I	€	Lower bound of the basic Fine	CP	Basic Fines either have a range [Lower; Higher] or a declared value.
BAMH	Basic Fine Higher Bound	B/A	I	€	Higher bound of the Basic Fine	CP	
BAMD	Basic Fine Declared	B/A	I	€	Declared value of the Basic Fine	CP	
DETM	Deterrence Multiplier	A	R	Num.	Multiplier applied to large firms	CP, SD	1 if not applied or >1 if applied
AGGC	Aggravating Circumstances	A	R	%	Percentage increase afforded	CP, SD	N.A.
MITC	Mitigating Circumstances	A	R	%	Percentage reduction afforded	CP, SD	N.A.
ADFL	Adjusted Fine Lower	A	I	%	Lower bound of adjusted Fine	CP	Adjusted Fines either have a range [Lower; Higher] or a declared value.
ADFH	Adjusted Fine Higher	A	I	€	Higher bound of adjusted Fine	CP	
ADFD	Adjusted Fine Declared	A	I	€	Declared value of adjusted Fine	CP	
INTP	Inability To Pay	A	N	Bin,	Inability to Pay invoked	CP, SD	1 or 0 if applicable
TURN	Turnover Limit	A	N	Bin.	Turnover Limit reached	CP, SD	1 or 0 if applicable

Notes:
Categories are D=Descriptive, F=Fining, L=Leniency, B= Basic Fine, A= Adjusted Fine.
Types are N=Nominal, O=Ordinal, I=Interval, R=Ratio.
Units: Num.=Number, €=Euro, %=Percentage, Bin. =Binary.
Sources: PR=Press Release, CP=Cartel Procedure, SD=Summary Decision, WE= DG Comp case search tool.
N.A. = non-Applicable.

Table 5. Primary Variables. Author's Illustration.

Secondary Variables						
Variable	**Name**	**Cat.**	**Type**	**Unit**	**Description**	**Transformation**
MOVE	Undertaking Mover Position	L	O	N.A.	Undertaking leniency reduction class	Based on Table 1 classification
TORP	Total Reduction	L	R	%	Total Reduction applied to the gross fine	[LPER + SPER]
GFIN	Gross Fine	F	I	€	Gross Fine Imposed on undertakings ex-ante Leniency and Settlement (1st mover cf. GFFM)	NFIN/[1-TORP] or GFFM
LEUR	Leniency Amount	L	I	€	Euro amount of leniency granted to undertaking	LPER*GFIN
SEUR	Settlement Amount	L	I	€	Euro Amount of settlement reduction granted to undertaking	SEUR*GFIN
TORE	Total Reduction Amount	L	I	%	Euro Amount of total fine reduction	TORP*GFIN
SALA	Average Sales	B	I	€	Average sales proxy based on lower and higher bounds	[SALL+SALH]/2
SALF	Final Sales	B	I	€	Final sales proxy based on availability	If SALD exists, then SALD, else SALA
DURA	Duration of infringement	B	I	Num.	Duration in days of fined infringement	ENDD-STAD
BAMA	Average Basic Amount	B/A	I	€	Average basic fine amount based on lower and higher bounds	[BAML+BAMH]/2
BAMF	Final Basic Amount	B/A	I	€	Final basic fine value based on availability	If BAMD exists then BAMD, else BAMA
ADFA	Average Adjusted Amount	A	I	€	Average adjusted fine amount based on lower and higher bounds	[ADFL+ADFH]/2
ADFF	Final Adjusted Amount	A	I	€	Final Adjusted fine value based on availability	If ADFD exists then ADFD, else ADFA

Notes:
Categories are D=Descriptive, F=Fining, L=Leniency, B= Basic Fine, A= Adjusted Fine.
Types are N=Nominal, O=Ordinal, I=Interval, R=Ratio.
Units: Num.=Number, €=Euro, %=Percentage, Bin. =Binary.
N.A. = non-Applicable.

Table 6. Secondary Variables. Author's Illustration.

Appendix 3 – Summary Statistics 1ry & 2ry Variables Full Dataset

Summary Statistics Primary Variables Full Dataset								
Variable	**Obs.**	**Mean**	**SD**	**Median**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**
NFIN	339	45,489,304	114,289,430	5,207,000	5.0054	33.3880	0	1,008,766,000
GFFM	44	177,273,166	296,651,932	60,498,603	2.7273	10.1770	781,590	1,370,330,257
LPER	339	0.3760	0.3791	0.300	0.6926	2.0289	0	1
SPER	261	0.0456	0.0499	0	0.1769	1.0313	0	0.1
DURM	305	3.4802	3.0984	2.75	1.2378	4.5051	0.057	14
SALL	100	86,792,901	169,016,839	25,000,000	4.0920	23.5003	0	1,200,000,000
SALH	100	122,420,871	230,769,318	39,000,000	4.1049	23.0353	250,000	1,600,000,000
SALD	79	50,304,852	492,034,408	29,806,831	1.1108	3.0976	50,000	185,521,000
SALP	332	0.1641	0.0094	0.16	1.0258	3.9089	0.15	0.19
ADDD	332	0.1641	0.0094	0.16	1.0258	3.9089	0.15	0.19
BAML	95	85,539,589	177,614,514	20,000,000	3.9053	21.0238	0	1,200,000,000
BAMH	95	121,740,284	245,673,825	33,000,000	3.8355	19.7420	100,000	1,600,000,000
BAMD	87	49,650,815	110,805,451	11,217,000	5.4284	38.6272	336,000	880,523,000
DETM	331	1.0160	0.0987	1	-5.9189	69.9794	0	1.4
AGGC	331	0.0135	0.0814	0	5.8143	34.8057	0	0.5
MITC	331	0.0313	0.0813	0	4.5127	28.5816	0	0.7
ADFL	26	60,478,846	74,272,826	20,000,000	1.0149	2.8532	100,000	250,000,000
ADFH	26	79,459,615	88,950,445	37,500,000	0.0729	2.1135	250,000	280,000,000
ADFD	13	110,003,846	94,565,085	76,250,000	1.1296	3.6119	10,275,000	338,300,000
Variable	**Obs.**		**Frequency**			**Percent**		
INTP	322		10			0.0311		
TURN	338		27			0.07988		

Notes: Presents the summary statistics of all the Ordinal, Interval and Ratio variables except for YEAR, STDD, ENDD since these are numeric dates. Given that INTP and TURN are binary nominal variables their frequency and percentage incidence is reported since traditional summary statistics would be inappropriate.; Obs.=Observations & SD= Standard Deviation.

Table 7. Summary Statistics Primary Variables Full Dataset. Author's Illustration.

Summary Statistics Secondary Variables Full Dataset								
Variable	**Obs.**	**Mean**	**SD**	**Median**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**
TORP	339	0.4111	0.3725	0.35	0.5124	1.8836	0	1
GFIN	339	89,184,272	203,814,868	19,537,000	4.4954	27.01	0	1,681,276,667
LEUR	339	3,896,855	130,760,901	887,333	6.6829	56.7808	0	1,370,330,257
SEUR	260	6,162,520	18,535,623	0	5.4156	38.3165	0	168,127,667
TORE	339	43,694,968	136,916,101	2,222,222	6.1791	48.7529	0	1,370,330,257
SALA	100	104,606,886	199,680,948	31,000,000	4.1009	23.2386	175,000	1,400,000,000
SALF	179	80,641,184	154,816,861	29,806,831	5.3021	38.7882	0	1,400,000,000
DURA	313	1319	1136	1034	1.2310	4.4809	21	5114
BAMA	95	103,639,937	211,078,481	27,500,000	3.8660	20.3392	70,000	1,400,000,000
BAMF	182	77,831,950	172,347,314	20,000,000	4.6163	28.6609	70,000	1,400,000,000
ADFA	26	39,729,808	44,475,222	18,750,000	0.7292	2.1134	125000	140,000,000
ADFF	40	61,575,625	72,226,565	41,300,000	1.78552	6.8976	0	338,300,000

Variable	**Obs.**	**Frequency**	**Percent**
MOVE 1	339	78	0.2301
MOVE 2	339	72	0.2124
MOVE 3	339	48	0.1416
MOVE 4	339	32	0.0944
MOVE 5	339	109	0.3215

Notes: Presents the summary statistics of all the Ordinal, Interval and Ratio variables of the secondary variables. MOVE is broken down into its five constituent categories and the frequencies and the percentage incidence of observations is reported given its ordinal natures.

Table 8. Summary Statistics Secondary Variables Full Dataset. Author's Illustration.

Appendix 4 – Sum. Stats. Primary Variables by Leniency Category

Summary Statistics Primary Variables								
First Mover								
Variable	**Obs.**	**Mean**	**SD**	**Median**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**
LNNFIN	78	0	N.A.	0	N.A.	N.A.	0	0
LNGFFM	44	17.7504	1.8547	17.9178	-.4177	2.5388	13.5690	21.0383
LPER	78	1	0	1	N.A.	N.A.	1	1
SPER	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
DURM	73	3.6664	3.2998	2.74	1.0304	3.4450	.08	13.67
LNSALL	28	17.2294	1.6305	17.2167	-.4890	3.4187	13.1223	20.5001
LNSALH	28	17.7679	1.4415	17.9869	-.4340	3.7798	13.8155	20.9055
LNSALD	13	17.6638	.7502	17.6480	.0092	2.4349	16.3271	18.9803
SALP	77	.1633	.0083	.16	1.0650	4.4839	.1500	.1900
ADDD	77	.1633	.0083	.16	1.0650	4.4839	.1500	.1900
LNBAML	27	16.2614	3.8001	17.0343	-3.0179	13.6340	.0001	20.5001
LNBAMH	27	17.3934	1.8398	17.8228	-.6815	3.6409	12.4292	20.9055
LNBAMD	15	16.7636	1.10998	16.5377	1.0967	5.1056	14.9517	19.8019
DETM	77	1.02564	.0553	1	2.0514	6.0802	1	1.2
AGGC	77	.0129	.0800	0	5.9604	36.5266	0	.5
MITC	77	.0222	.0675	0	5.1563	34.5231	0	.5
LNADFL	8	16.4141	2.8273	16.9707	-.5019	1.9122	11.5129	19.0625
LNADFH	8	17.0307	2.4651	17.5350	-.6957	2.3344	12.4292	19.2535
LNADFD	2	17.9832	2.3421	17.9832	0	1	16.3271	19.6394

Variable	**Obs.**	**Frequency**	**Percent**
INTP	75	0	.0000
TURN	78	3	.0385

Notes: Presents the summary statistics in the same form as *Appendix 3*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation.

Summary Statistics Primary Variables
Second Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
LNNFIN	72	16.1947	1.9667	16.8112	-0.5875	1.8638	12.4292	18.5159
LNGFFM	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LPER	72	.4351	.0694	.45	-.7887	2.5328	.3	.5
SPER	72	.0680	.0469	.1	-.7744	1.5998	0	.1
DURM	67	3.3942	2.717	3	.7063	2.650	.08	10
LNSALL	26	16.9943	1.7271	16.9638	0.1869	2.6315	13.8155	20.9055
LNSALH	26	17.5001	1.5521	17.2331	0.2962	2.8324	14.5086	21.1932
LNSALD	10	17.5420	1.1093	17.7511	-0.2655	1.5358	15.9568	18.8261
SALP	71	.1628	.0083	.16	.6397	3.6951	.15	.19
ADDD	71	.1628	.0083	.16	.6397	3.6951	.15	.19
LNBAML	26	15.9224	3.8033	16.6674	-2.8578	13.0352	.0001	20.90559
LNBAMH	26	17.0772	1.799644	17.2167	-0.0022	3.1695	13.1223	21.1932
LNBAMD	10	16.3185	1.6525	15.3853	0.4210	1.4119	14.4419	18.5881
DETM	71	.9985	.1855	1	-4.236	24.7384	0	1.4
AGGC	71	.0140	.0833	0	5.7034	33.5289	0	.5
MITC	71	.0232	.0706	0	4.8659	31.0516	0	0.5
LNADFL	8	15.9516	2.2156	16.8112	-0.5875	1.8638	12.4292	18.5159
LNADFH	8	16.5702	2.1121	17.4376	-0.6565	2.0151	13.1223	19.0625
LNADFD	1	18.3979	N.A.	18.3979	N.A.	N.A.	18.3979	18.3979

Variable	Obs.	Frequency	Percent
INTP	71	4	.0563
TURN	72	6	.0833

Notes: Presents the summary statistics in the same form as *Appendix 3*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation.

Summary Statistics Primary Variables

Third Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
LNNFIN	48	16.7167	2.0015	17.1853	-.4431	2.6171	12.4171	20.7319
LNGFFM	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LPER	48	.2758	.0351	.3	-1.1751	3.0185	.2	.3
SPER	48	.0687	.0468	.1	-.8090	1.6545	0	.1
DURM	44	4.1949	3.3394	3.18	1.3223	4.4477	.08	14
LNSALL	19	15.0804	5.5970	16.6487	-2.1223	6.2561	.0001	19.5192
LNSALH	19	17.1098	1.8035	17.2167	-.4777	2.2362	13.7101	19.6734
LNSALD	6	17.6099	1.2390	17.8165	-.2768	1.6020	15.9035	19.0386
SALP	48	.1639	.0091	.16	1.14907	4.1750	.15	.19
ADDD	48	.1639	.0091	.16	1.14907	4.1750	.15	.19
LNBAML	19	15.1409	5.5741	16.8112	-2.1915	6.4454	.0001	19.3369
LNBAMH	19	17.1387	1.6873	17.1502	-.6558	2.3549	13.8155	19.5192
LNBAMD	6	17.0663	1.6444	17.4941	-.3605	1.4780	15.0654	18.8309
DETM	48	1.0237	.0531	1	2.1050	6.3619	1	1.2
AGGC	48	.03125	.1223115	0	3.6147	14.0666	0	.5
MITC	48	.0270	.1051	0	5.695	36.5175	0	.7
LNADFL	7	16.9275	2.2908	18.1975	-.3653	1.4706	13.5923	19.3369
LNADFH	7	17.3198	2.0902	18.5159	-.3772	1.4162	14.2855	19.4503
LNADFD	1	17.67834	N.A.	17.6783	N.A.	N.A.	17.6783	17.6783

Variable	Obs.	Frequency	Percent
INTP	46	0	0
TURN	48	4	0.0833

Notes: Presents the summary statistics in the same form as *Appendix 3*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation.

Summary Statistics Primary Variables

Fourth Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
LNNFIN	32	17.0744	2.2782	17.6651	-.7776	2.8220	11.1124	20.0192
LNGFFM	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LPER	32	.1531	.0491	.15	-.5407	2.050	.05	.2
SPER	32	.0468	.0507	0	.1252	1.0156	0	.1
DURM	22	4.4863	3.8435	4.5	1.1156	3.9011	.25	14
LNSALL	11	17.2378	2.4429	17.0736	-.4616	2.0842	12.6115	20.1199
LNSALH	11	17.7164	2.2753	17.6867	-.5175	2.2126	13.3046	20.4488
LNSALD	4	16.8379	1.9418	17.1859	-.4247	1.6322	14.3353	18.6445
SALP	32	.1618	.0073	.16	1.1666	4.4587	.15	.18
ADDD	32	.1618	.0073	.16	1.1666	4.4587	.15	.18
LNBAML	11	17.5098	2.4641	17.9098	-.4836	1.8283	13.5923	20.2766
LNBAMH	11	17.9555	2.3221	18.6030	-.54684	1.8895	14.1519	20.6054
LNBAMD	12	17.5181	1.9671	18.0863	-1.3852	3.9887	12.7248	19.4102
DETM	32	1.0215	.0655	1	3.2330	12.7835	1	1.3
AGGC	32	.0312	.1229	0	3.6147	14.0666	0	.5
MITC	32	.0884	.1362	0	1.8286	5.8480	0	.5
LNADFL	3	15.9188	2.3888	15.4249	.3635	1.5000	13.8155	18.5159
LNADFH	3	16.3177	2.1420	15.7614	.4449	1.5000	14.5086	18.6830
LNADFD	8	18.1339	1.0609	18.3575	-.8645	2.5177	16.1452	19.2477

Variable	Obs.	Frequency	Percent
INTP	23	9	0.3913
TURN	33	4	0.1250

Notes: Presents the summary statistics in the same form as *Appendix 3*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation.

Summary Statistics Primary Variables
Fifth Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
LNNFIN	108	16.0438	1.9210	15.9589	-.1292	2.8100	11.0821	20.5960
LNGFFM	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LPER	109	0	0	0	N.A.	N.A.	0	0
SPER	109	.0201	.0403	0	1.4857	3.2074	0	0.1
DURM	99	2.8598	2.8057	2	1.5552	6.1828	.0570	14
LNSALL	16	15.7133	4.5963	16.6875	-2.6942	9.8432	.0001	19.8069
LNSALH	16	16.9740	2.0662	17.0153	-.7570	3.1904	12.4292	20.2124
LNSALD	46	16.7608	1.5871	17.0374	-1.3957	5.9725	10.8197	18.8397
SALP	104	.1662	.0109	.16	.8264	2.8815	.15	.19
ADDD	104	.1662	.0109	.16	.8264	2.8815	.15	.19
LNBAML	12	14.8059	5.1985	15.8281	-2.0942	6.6864	.0001	19.5192
LNBAMH	12	16.4207	2.4471	16.2681	-.4335	2.7675	11.5129	20.3665
LNBAMD	44	15.8281	1.7457	15.7534	.4519	2.8374	12.8452	20.5960
DETM	103	1.0155	.0519	1	3.5716	15.5641	1	1.3
AGGC	103	0	0	0	N.A.	N.A.	0	0
MITC	103	.0279	.0517	0	2.4093	10.1906	0	.3
LNADFL	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LNADFH	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LNADFD	1	18.1303		18.1303			18.1303	18.1303

Variable	Obs.	Frequency	Percent
INTP	106	5	.0471
TURN	108	10	.0925

Notes: Presents the summary statistics in the same form as *Appendix 3*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation.

Appendix 5 – Sum. Stats. Secondary Variables by Leniency Category

Summary Statistics Secondary Variables First Mover								
Variable	**Obs.**	**Mean**	**SD**	**Median**	**Skewness**	**Kurtosis**	**Minimum**	**Maximum**
TORP	78	1	0	1	N.A.	N.A.	1	1
LNGFIN	44	17.7504	1.8547	17.9178	-.4177	2.5388	13.5690	21.0383
LNLEUR	44	17.7504	1.8547	17.9178	-.4177	2.5388	13.5690	21.0383
LNSEUR	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LNTORE	44	17.7504	1.8547	17.9178	-.4177	2.5388	13.5690	21.0383
LNSALA	28	17.5464	1.4983	17.7275	-.4368	3.6262	13.5278	20.7232
LNSALF	41	17.5836	1.2989	17.7275	-.5088	4.4191	13.5278	20.7232
DURA	75	1365	1181	1026	1.0343	3.5321	33	4994
LNBAMA	27	17.1449	1.9104	17.3708	-.6174	3.4029	12.0725	20.7232
LNBAMF	42	17.0087	1.6641	16.9253	-.3408	3.8222	12.0725	20.7232
LNADFA	8	16.3376	2.4651	16.8418	-.6957	2.3344	11.7360	18.5604
LNADFF	10	16.6667	2.4119	17.2929	-.7037	2.6401	11.7360	19.6394

Notes: Presents the summary statistics in the same format as *Appendix 4*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation

Summary Statistics Secondary Variables

Second Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
TORP	72	.5031	.0796	.5	-.5039	2.6784	.3	.6
LNGFIN	72	16.9066	1.9687	17.2591	-.3031	2.4480	12.861	21.0166
LNLEUR	72	16.0604	1.9536	16.3557	-.2635	2.4029	12.1678	20.1003
LNSEUR	72	10.1811	7.1916	14.2107	-.6337	1.5763	.0001	18.7140
LNTORE	72	16.2063	1.9823	16.5242	-.2727	2.4186	12.3501	20.3234
LNSALA	26	17.2880	1.6114	17.1035	.2616	2.7629	14.2209	21.0597
LNSALF	36	17.3586	1.4780	17.2208	.1449	2.8390	14.2209	21.0597
DURA	70	1326	1065	1109	.9854	3.7512	36	4948
LNBAMA	26	16.8217	1.8850	16.9228	.0140	2.9632	12.8346	21.0597
LNBAMF	36	16.6819	1.8145	16.7444	.1386	2.6903	12.8346	21.0597
LNADFA	8	15.8771	2.1121	16.7444	-.6565	2.0151	12.4292	12.4292
LNADFF	9	16.1572	2.1469	16.8112	-.7458	2.1905	18.36939	18.3979

Notes: Presents the summary statistics in the same format as *Appendix 4*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation

Summary Statistics Secondary Variables

Third Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
TORP	48	.3445	.0562	.35	-.5273	2.1687	.2	.4
LNGFIN	48	17.1427	2.006	17.5420	-.3990	2.5801	12.8479	21.2428
LNLEUR	48	15.8457	2.0297	16.2731	-.3437	2.5365	11.4616	20.0388
LNSEUR	48	10.2002	7.1735	13.4824	-.6227	1.6083	.0001	18.9402
LNTORE	48	16.0630	2.0302	16.3037	-.3133	2.4992	11.7981	20.3265
LNSALA	19	16.8478	1.9176	16.9510	-.4588	2.1813	13.1223	19.5993
LNSALF	25	17.0307	1.7855	17.1297	-.6052	2.4940	13.1223	19.5993
DURA	46	1576	1199	1355	1.2709	4.355	42	5114
LNBAMA	19	16.8930	1.8036	16.9925	.6593	2.4115	13.1223	19.4322
LNBAMF	25	16.9346	1.7346	17.1473	-.6277	2.3474	13.1223	19.4322
LNADFA	7	16.6266	2.0902	17.8228	-.3772	1.4162	13.5923	18.7571
LNADFF	8	16.7581	1.9706	17.7505	-.5730	1.6514	13.5923	18.7571

Notes: Presents the summary statistics in the same format as *Appendix 4*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation.

Summary Statistics Secondary Variables
Fourth Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
TORP	32	.2	.0707	.2	-.0695	2.214	.05	.3
LNGFIN	32	17.3013	2.3129	17.8293	-.7555	2.7926	11.3355	20.2424
LNLEUR	32	15.3600	2.4268	15.8947	-.7711	2.7896	9.7261	18.4775
LNSEUR	32	7.4468	8.1784	.0001	.2081	1.1323	.0001	17.9398
LNTORE	32	15.6176	2.5213	15.9351	-.7231	2.8427	9.7261	18.8830
LNSALA	11	17.5096	2.3389	17.4264	-.4948	2.1597	13.0170	20.2978
LNSALF	15	17.3305	2.1932	17.4264	-.3937	2.1160	13.0170	20.2978
DURA	22	1820	1337	1883	1.0354	3.8845	122	5114
LNBAMA	11	17.7618	2.3772	18.3153	-.5227	1.8652	13.9108	20.4545
LNBAMF	23	17.6346	2.1258	18.2463	-.8288	2.7236	12.7248	20.4545
LNADFA	3	15.6245	2.1420	15.0682	.4449	1.5	13.81551	17.9899
LNADFF	11	17.4495	1.7548	18.0838	-.9578	2.6861	13.81551	19.2477

Notes: Presents the summary statistics in the same format as *Appendix 4*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation

Summary Statistics Secondary Variables
Fifth Mover

Variable	Obs.	Mean	SD	Median	Skewness	Kurtosis	Minimum	Maximum
TORP	109	.0201	.0403	0	1.4857	3.2074	0	.1
LNGFIN	108	16.0653	1.9283	15.9589	-.1227	2.8056	11.0821	20.5960
LNLEUR	108	.0001	0	.0001	N.A.	N.A.	.0001	.0001
LNSEUR	108	2.9456	5.9171	.0001	1.5505	3.5231	.0001	18.2419
LNTORE	108	2.9456	5.9171	.0001	1.5505	3.5231	.0001	18.2419
LNSALA	16	16.7420	2.1554	16.8911	-.84795	3.29896	12.0725	20.0301
LNSALF	62	16.7560	1.7322	16.9776	-1.1857	4.9439	10.8197	20.0301
DURA	100	1050	1017	650	1.5850	6.2693	21	5114
LNBAMA	12	16.14384	2.5292	16.0764	-.5060	2.6891	11.1562	20.0301
LNBAMF	56	15.8957	1.9181	15.7712	.1089	2.9177	11.1562	20.5960
LNADFA	0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
LNADFF	1	18.1303	N.A.	18.1303	N.A.	N.A.	18.1303	18.1303

Notes: Presents the summary statistics in the same format as *Appendix 4*. All euro denominated variables are transformed by applying the natural logarithm (ln) to their euro value. This serves to control for kurtosis and skewness. Given that ln (0) is impossible, 0 values are reported as .0001; Obs.=Observations & SD= Standard Deviation

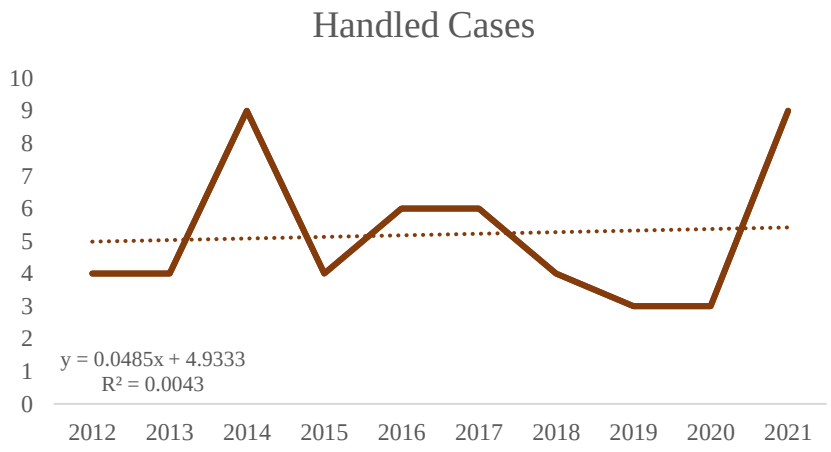
Appendix 6 – Correlation Matrix

Pearson Correlation Matrix

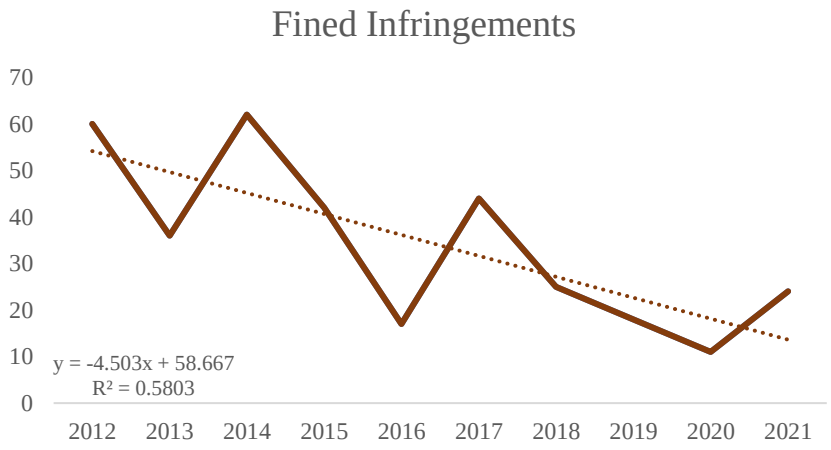
	LNNFIN	LPER	SPER	DURM	SALP	ADDD	DETM	AGGC	MITC	TORP	LNGFIN	LNLEUR	LNSEUR	LNTORE	LNSALF	DURA	LNBAMF	LNADFF
LNNFIN	1.000																	
LPER	-0.8588***	1.0000																
	0.0000																	
SPER	0.1939**	0.4057***	1.0000															
	0.0016	0.0000																
DURM	0.0487	0.0763	0.1967**	1.0000														
	0.3964	0.1837	0.0026															
SALP	0.0782	-0.0965*	-0.1952**	0.2044***	1.0000													
	0.1554	0.0790	0.0017	0.0004														
ADDD	0.0782	-0.0965*	-0.1952**	0.2044***	1.0000***	1.0000												
	0.1554	0.0790	0.0017	0.0004	0.0000													
DETM	-0.0308	0.0251	-0.0450	0.0078	-0.0461	-0.0461	1.0000											
	0.5765	0.6487	0.4751	0.8923	0.4031	0.4031												
AGGC	0.0311	0.0199	0.0843	0.0141	-0.0726	-0.0726	0.1311**	1.0000										
	0.5729	0.7185	0.1805	0.8081	0.1877	0.1877	0.0170											
MITC	0.0856	-0.0659	-0.0301	0.0781	0.0548	0.0548	-0.0110	0.0339	1.0000									
	0.1202	0.2321	0.6333	0.1763	0.3206	0.3206	0.8416	0.5391										
TORP	-0.8183***	0.9921***	0.5923***	0.0956*	-0.1168**	-0.1168**	0.0177	0.0292	-0.0671	1.0000								
	0.0000	0.0000	0.0000	0.0954	0.0333	0.0333	0.7487	0.5961	0.2236									
LNGFIN	0.1019*	0.2459***	0.2701***	0.3424***	0.2012***	0.2012***	0.0553	0.1037*	0.0929	0.2717***	1.0000							
	0.0760	0.0000	0.0000	0.0000	0.0005	0.0005	0.3422	0.0743	0.1102	0.0000								
LNLEUR	-0.2798***	0.7298***	0.4531***	0.2165***	-0.0764	-0.0764	0.0005	0.1198**	0.0492	0.7708***	0.4259***	1.0000						
	0.0000	0.0000	0.0000	0.0003	0.1884	0.1884	0.9927	0.0390	0.3985	0.0000	0.0000							
LNSEUR	0.3070***	0.4005***	0.9837***	0.2327***	-0.1636***	-0.1636***	-0.0272	0.1020	-0.0145	0.5843***	0.3851***	0.4812***	1.0000					
	0.0000	0.0000	0.0000	0.0004	0.0090	0.0090	0.6670	0.1055	0.8187	0.0000	0.0000	0.0000						
LNTORE	-0.2220***	0.6430***	0.6614***	0.2455***	-0.1297**	-0.1297**	-0.0111	0.1082*	0.0536	0.7139***	0.4691***	0.8842***	0.6832***	1.0000				
	0.0001	0.0000	0.0000	0.0000	0.0252	0.0252	0.8495	0.0626	0.3575	0.0000	0.0000	0.0000	0.0000					
LNSALF	0.0594	0.1873**	0.2674**	0.3454***	0.0148	0.0148	-0.0039	0.1045	0.1640**	0.2119***	0.8708***	0.2976***	0.3766***	0.3606***	1.0000			
	0.4293	0.0120	0.0015	0.0000	0.8436	0.8436	0.9583	0.1637	0.0283	0.0044	0.0000	0.0002	0.0000	0.0000				
DURA	0.0530	0.0790	0.1684***	0.9885***	0.1751***	0.1751***	0.0142	0.0089	0.0735	0.0964*	0.3198***	0.2323***	0.2050***	0.2564***	0.3070*	1.0000		
	0.3503	0.1630	0.0092	0.0000	0.0020	0.0020	0.8041	0.8767	0.1993	0.0886	0.0000	0.0001	0.0015	0.0000	0.0000			
LNBAMF	0.1030	0.1638**	0.3311***	0.5769***	-0.0536	-0.0536	0.0079	0.1122	0.2706***	0.1961***	0.8884***	0.4172***	0.4250***	0.4771***	0.8966*	0.5886*	1.0000	
	0.1664	0.0271	0.0001	0.0000	0.4725	0.4725	0.9157	0.1314	0.0002	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
LNADFF	0.2171	-0.1269	-0.5078***	0.6653***	-0.0660	-0.0660	0.0534	0.2082	0.3851**	-0.1835	0.9723***	0.3977**	-0.3221*	0.3785**	0.9647***	0.6996***	0.9767***	1.0000
	0.1842	0.4415	0.0049	0.0014	0.6898	0.6898	0.7468	0.2033	0.0155	0.2636	0.0000	0.0219	0.0884	0.0299	0.0000	0.0001	0.0000	

Notes: Presents the Pearson Correlation matrix (Correlation Coefficient and P-values) between selected numerical variables. Note that LNSALL, LNSALH, LNSALD, LNBAML, LNBAMH, LNBAMD, LNADFL, LNADFH & LNADFD are excluded since they construct the LNSALF, LNBAMF & LNADFF variables. Significance is denoted at the .01, .05 &.1 levels by ***,**&* respectively.

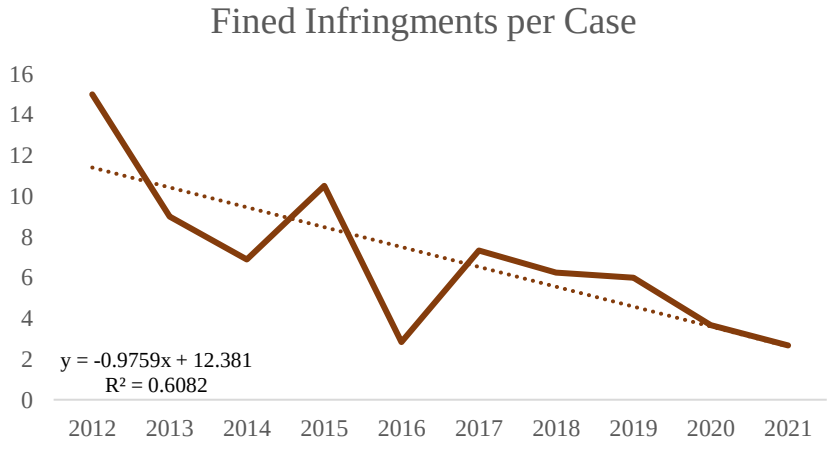
Appendix 7 – Cases and Fined infringements



Graph 10. Handled Cases. Author's Illustration.

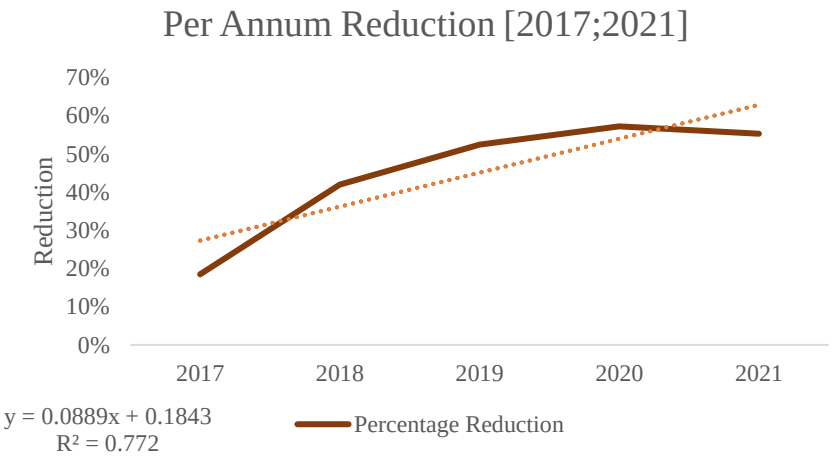


Graph 11. Fined Infringements. Author's Illustration.

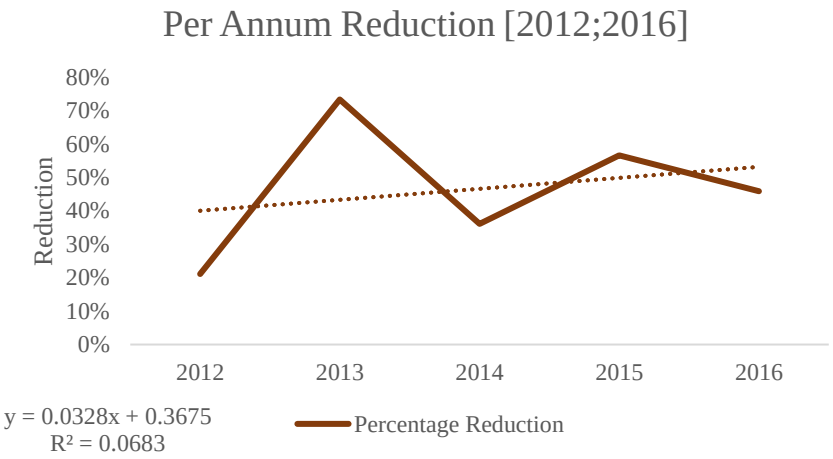


Graph 12. Fined Infringements per Case. Author's Illustration.

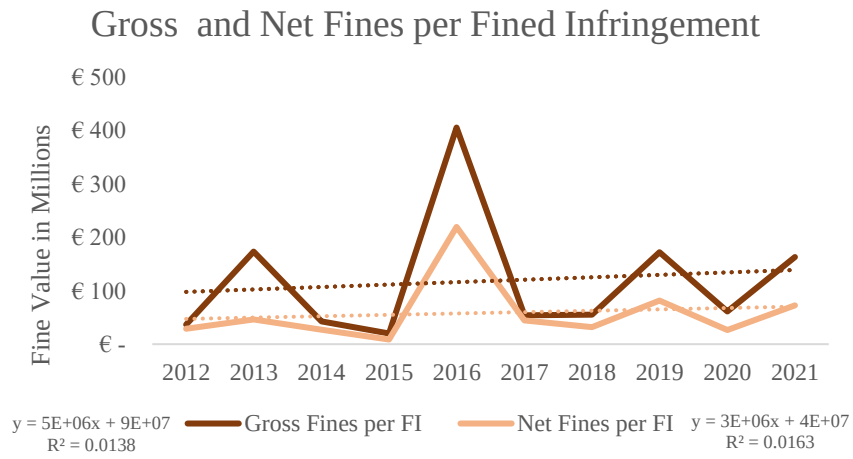
Appendix 8 – Gross/Net Fines & Reductions



Graph 13. Per Annum Reduction [2017;2021]. Author's Illustration.

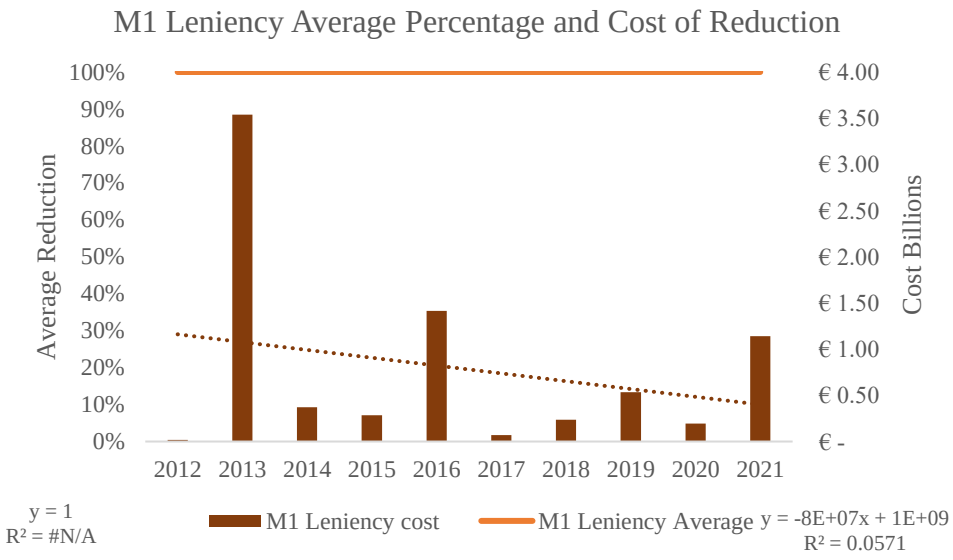


Graph 14. Per Annum Reduction [2012;2016]. Author's Illustration.

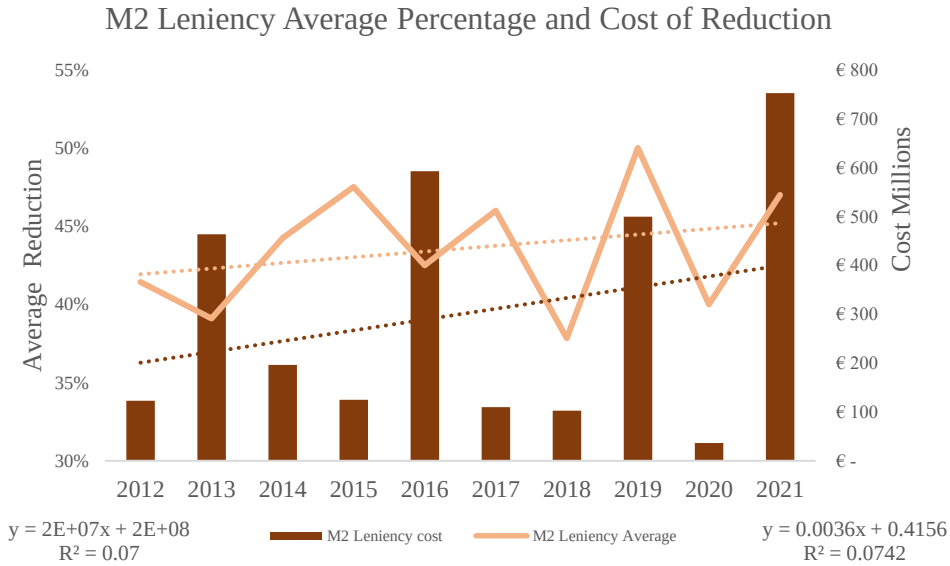


Graph 15. Gross and Net Fines per Fined Infringements. Author's Illustration.

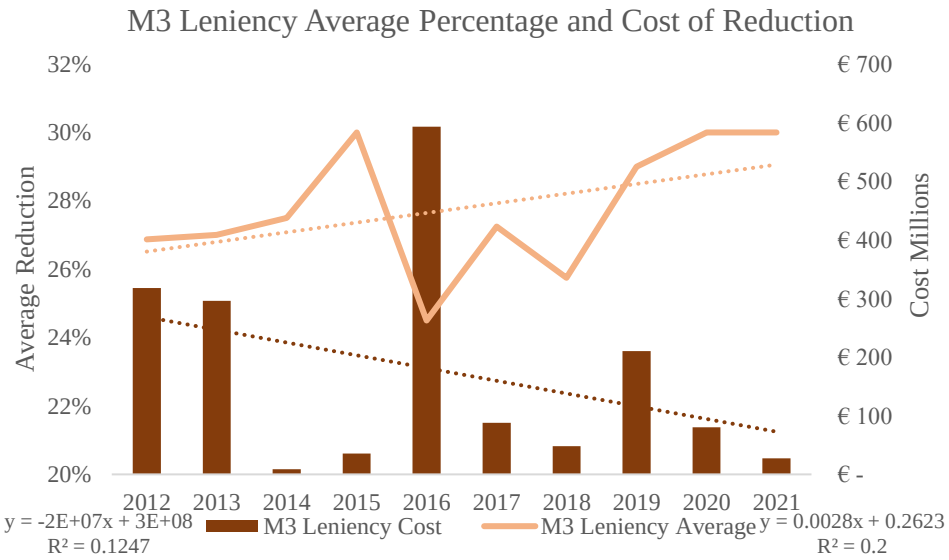
Appendix 9 – Leniency Reductions



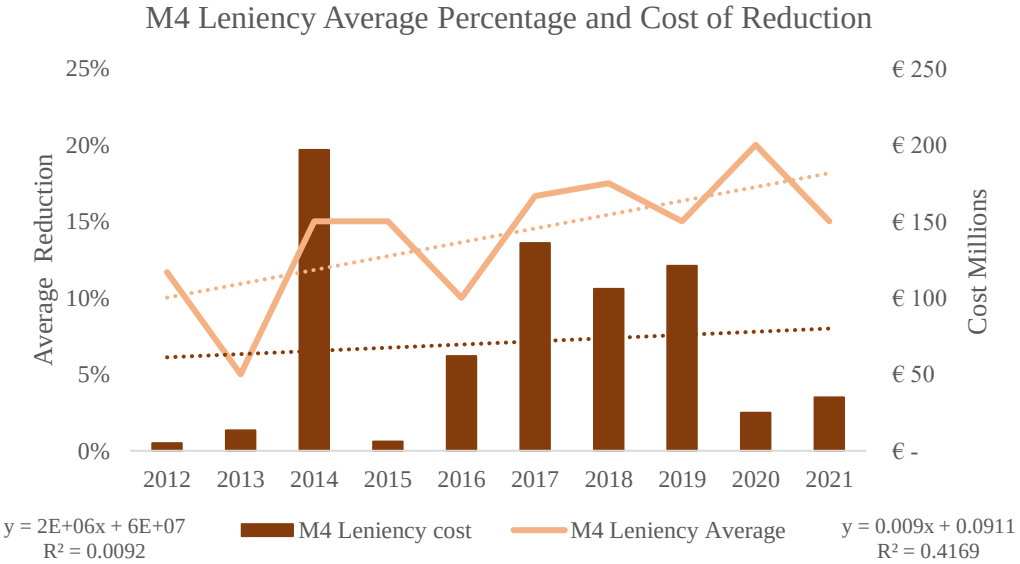
Graph 16. M1 Leniency Average Percentage and Cost of Reduction. Author's Illustration.



Graph 17. M2 Leniency Average Percentage and Cost of Reduction. Author's Illustration.

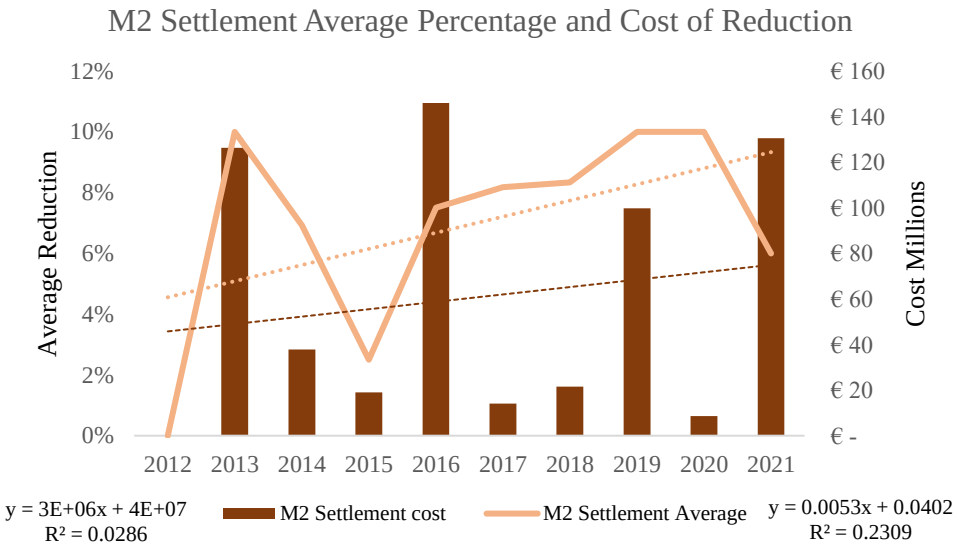


Graph 19. M3 Leniency Average Percentage and Cost of Reduction. Author's Illustration.

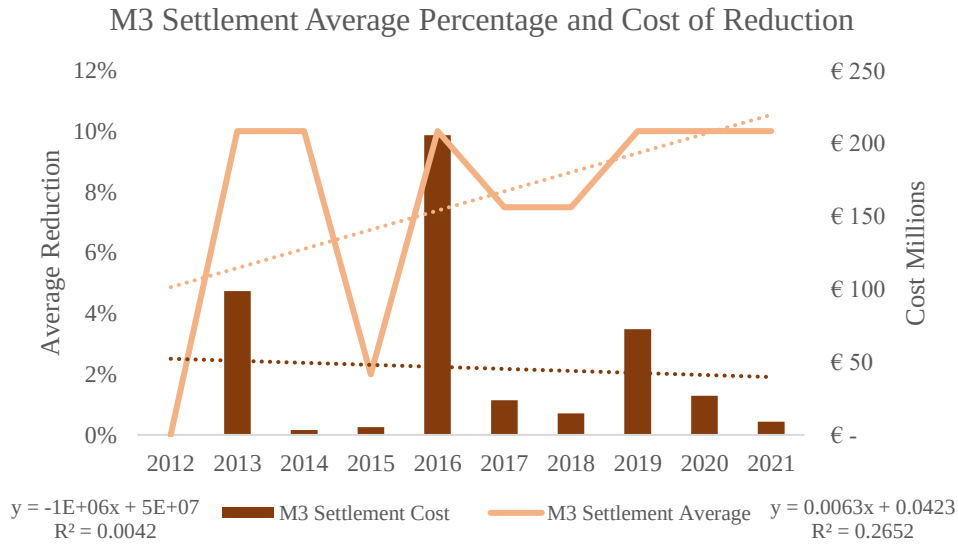


Graph 18.M4 Leniency Average Percentage and Cost of Reduction. Author's Illustration.

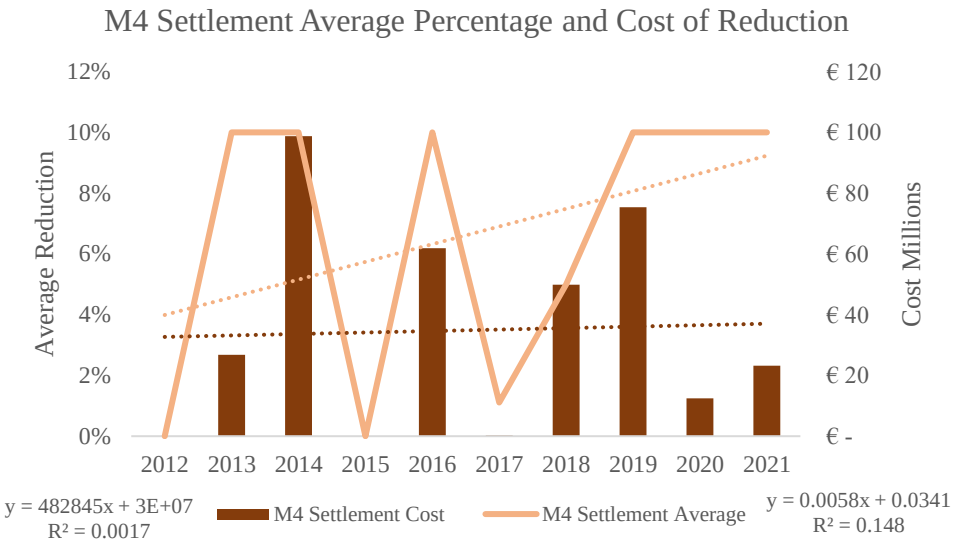
Appendix 10 – Settlement Reductions



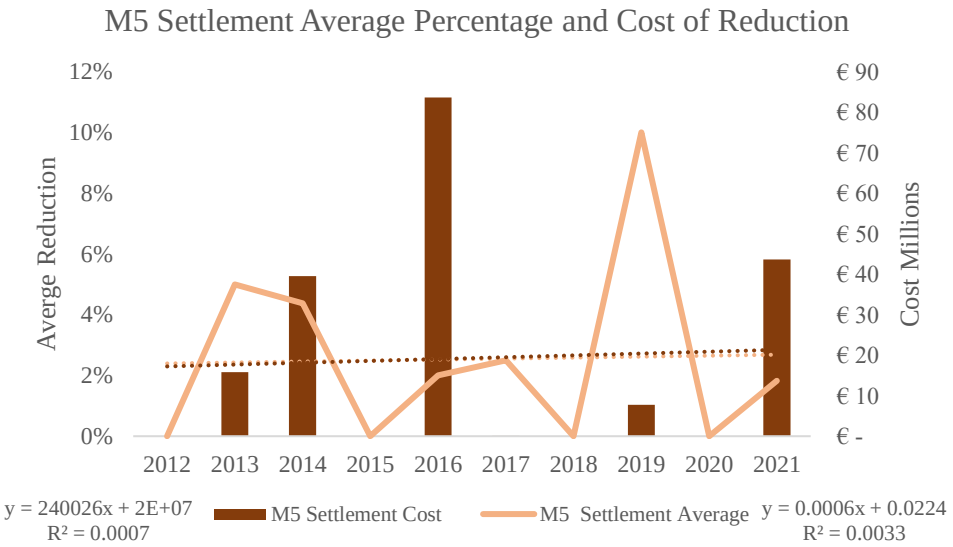
Graph 20. M2 Settlement Average Percentage and Cost of Reduction. Author's Illustration.



Graph 21. M2 Settlement Average Percentage and Cost of Reduction. Author's Illustration.

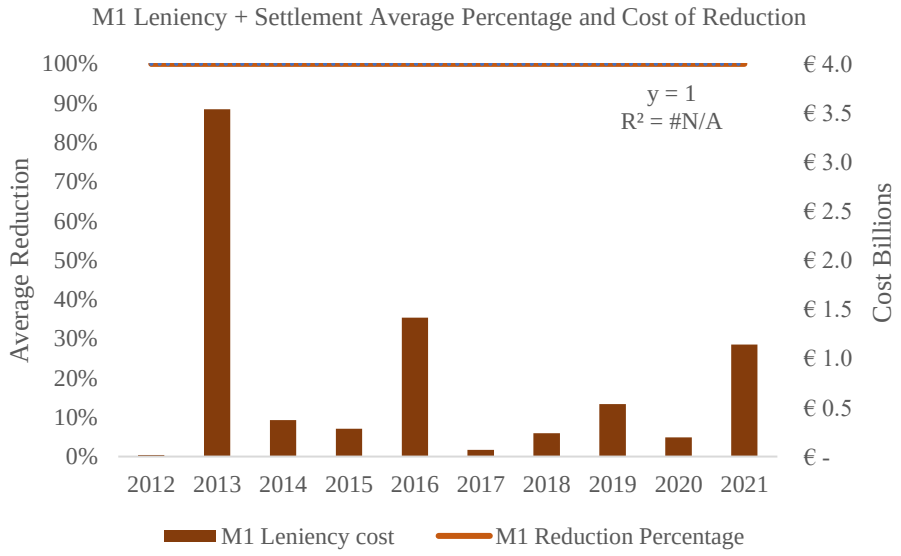


Graph 22. M4 Settlement Average Percentage and Cost of Reduction. Author's Illustration.

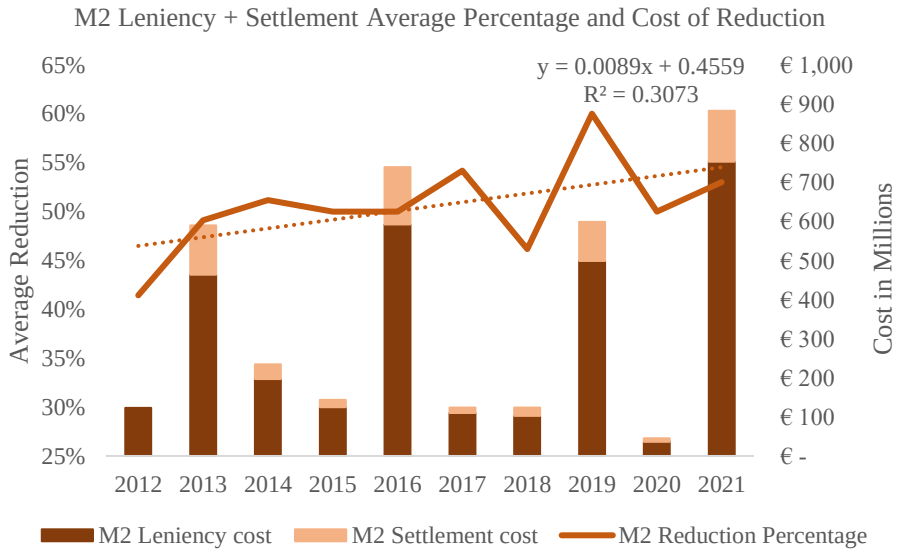


Graph 23. M5 Settlement Average Percentage and Cost of Reduction. Author's Illustration.

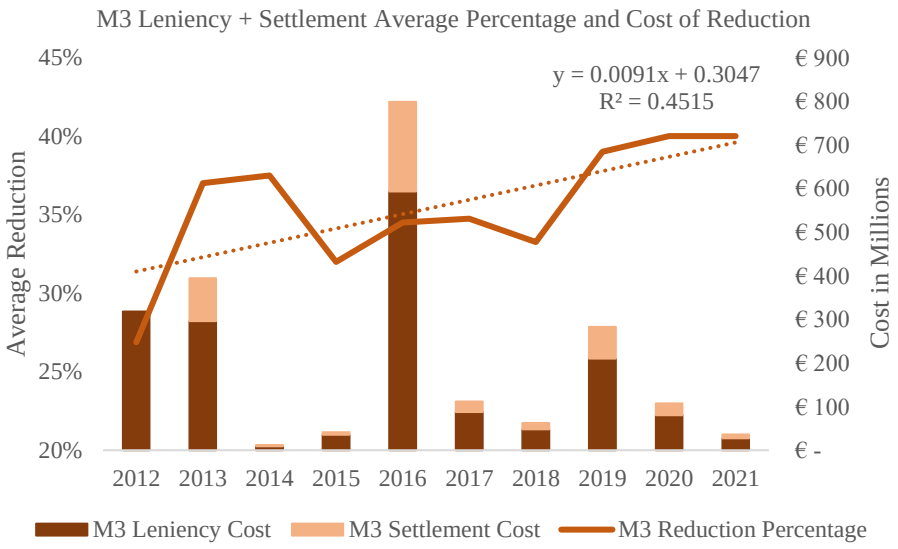
Appendix 11 – Leniency and Settlement Reductions



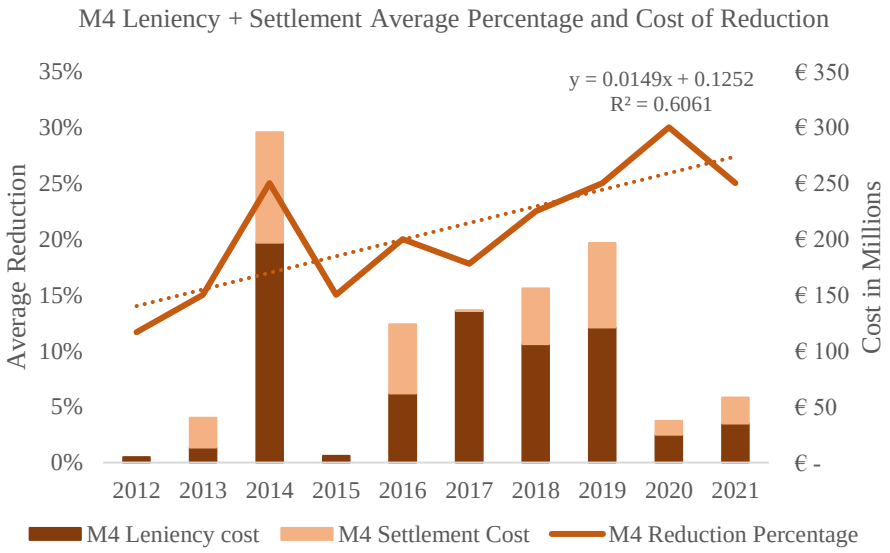
Graph 24. M1 Leniency + Settlement Average Percentage and Cost of Reduction. Author's Illustration.



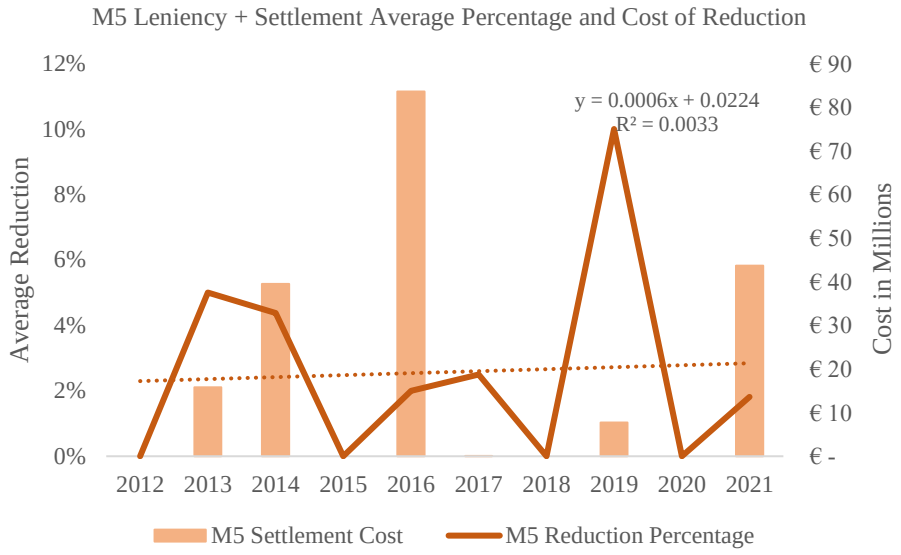
Graph 25. M2 Leniency + Settlement Average Percentage and Cost of Reduction. Author's Illustration.



Graph 26. M3 Leniency + Settlement Average Percentage and Cost of Reduction. Author's Illustration.



Graph 27. M4 Leniency + Settlement Average Percentage and Cost of Reduction. Author's Illustration.



Graph 28. M5 Leniency + Settlement Average Percentage and Cost of Reduction. Author's Illustration.

Appendix 12 – Car Manufacturing Poster

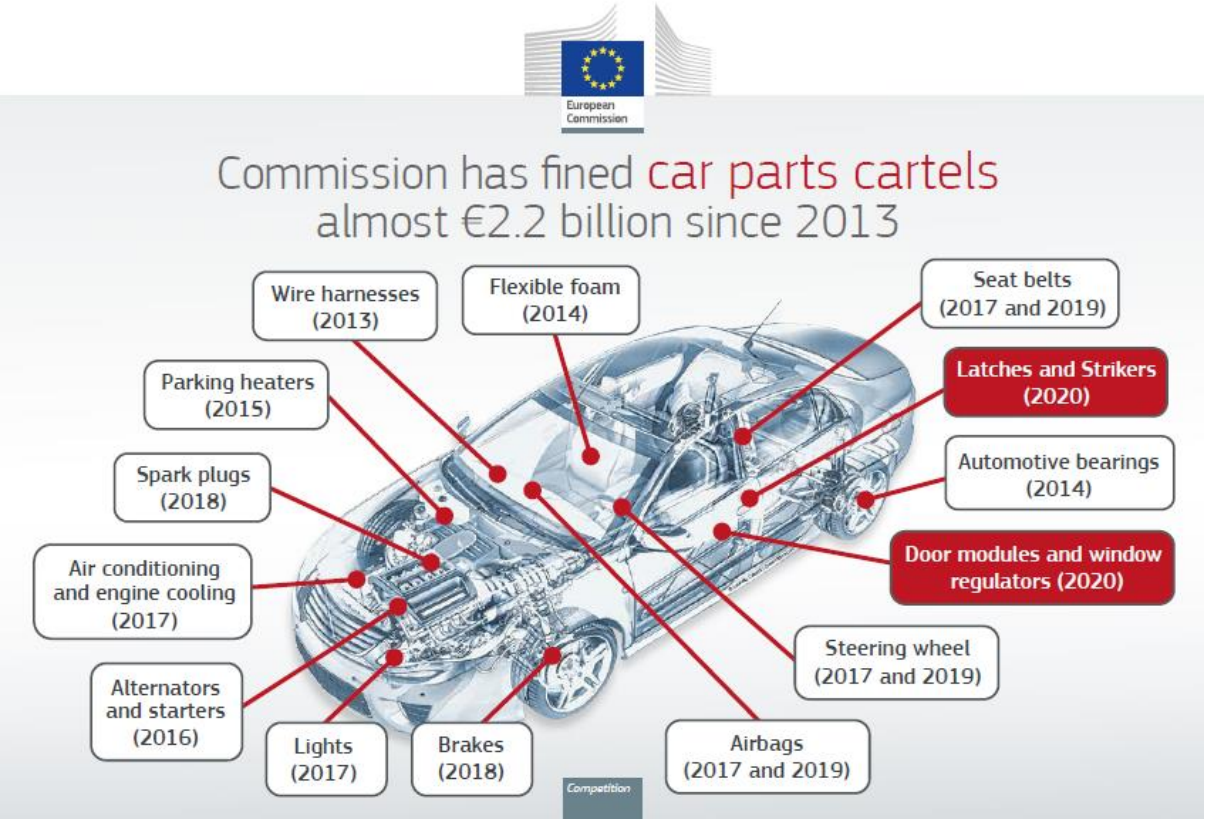


Figure 3. Commission has fined car parts cartels 2.2 billion since 2013. Source: DG COMP

Appendix 13 – MLR Results

Multinomial Logistic Regression: Model 1				
Class	Variables	Coefficient	Relative Risk Ratio	P-value
[100%]	LNGFIN	**.4071*** **	**1.5024*** **	**0.000**
	DETM	.0541	1.0555	0.979
	INTP	-11.6724	8.53e-06	0.987
	TURN	-1.1775	.3080	0.279
	constant	**-7.7293*** **	**.0004*** **	**0.004**
[30%;50%]	LNGFIN	**.2517*** **	**1.2862*** **	**0.002**
	DETM	-1.5288	.2167	0.295
	INTP	**1.9247** **	**6.8531** **	**0.039**
	TURN	.1857	1.2040	0.746
	constant	-3.063	.0467	0.120
[20%;30%]	LNGFIN	**.2515*** **	**1.2860*** **	**0.007**
	DETM	.8151	2.2595	0.714
	INTP	-12.2318	4.87e-06	0.986
	TURN	-.1907	.8263	0.788
	constant	**-5.7701** **	**.0031** **	**0.032**
[0%;20%]	LNGFIN	**.2723** **	**1.3130** **	**0.028**
	DETM	1.9131	6.7747	0.538
	INTP	1.7767	5.9108	0.183
	TURN	.1833	1.2012	0.826
	constant	**-8.0219** **	**.0003** **	**0.032**
[0%]	Base Outcome			
Pseudo R^2 (McFadden)	0.0420			
LR Chi^2	35.61			
Observations	283			

Notes: Presents the results of the Multinomial Logistic Regression taking Model 1 [0%] as the base outcome. Significance is denoted at the 10%,5% and 1% levels by ***, **, * respectively.

Multinomial Logistic Regression: Model 2				
Class	Variables	Coefficient	Relative Risk Ratio	P-value
[100%]	LNSALF	**.3463****	**1.4139****	**0.013**
	DETM	5.3956	220.4512	0.190
	INTP	-14.604	4.54e-07	0.992
	TURN	-15.4031	2.04e-07	0.988
	Constant	**-11.7507*****	**7.88e-06*****	**0.006**
[30%;50%]	LNSALF	**.2684****	**1.3079****	**0.048**
	DETM	-1.2766	.2789	0.399
	INTP	1.4786	4.3871	0.191
	TURN	-15.3827	2.09e-07	0.989
	Constant	-3.8427	.0214	0.170
[20%;30%]	LNSALF	.0873	1.0912	0.549
	DETM	2.4190	11.2356	0.521
	INTP	-14.7752	3.83e-07	0.994
	TURN	-.2639	.7679	0.760
	Constant	-4.7864	.0083	0.294
[0%;20%]	LNSALF	.2131	1.2376	0.239
	DETM	.0421	1.0430	0.988
	INTP	1.0341	2.8126	0.426
	TURN	.2643	1.3025	0.767
	Constant	-5.1756	.0056	0.219
[0%]	Base Outcome			
Pseudo R^2 (McFadden)	0.0652			
LR Chi^2	35.24			
Observations	179			

Notes: Presents the results of the Multinomial Logistic Regression Model 2 taking [0%] as the base outcome. Significance is denoted at the 10%,5% and 1% levels by ***, **, * respectively.

Multinomial Logistic Regression: Model 3				
Class	Variables	Coefficient	Relative Risk Ratio	P-value
[100%]	DURM	**.1002*** **	**1.1054*** **	**0.080**
	DETM	.9490	2.5832	0.613
	INTP	-13.6175	1.22e-06	0.981
	TURN	**-2.0235***	**.1321***	**0.058**
	constant	-1.4586	.2325	0.451
[30%;50%]	DURM	.0860	1.0898	0.149
	DETM	-1.1974	.3019	0.383
	INTP	.5937	1.8107	0.450
	TURN	-.0926	.9115	0.868
	constant	.5648	1.7590	0.686
[20%;30%]	DURM	**.1522** **	**1.1644** **	**0.017**
	DETM	1.9031	6.7071	0.450
	INTP	-13.6882	1.14e-06	0.986
	TURN	-.3657	.6936	0.600
	constant	-3.1893	.0412	0.222
[0%;20%]	DURM	**.1614** **	**1.1752** **	**0.047**
	DETM	3.4947	32.9425	0.291
	INTP	.4099	1.5067	0.731
	TURN	-.0131	.9869	0.987
	constant	-5.6605	.0034	0.103
[0%]	Base Outcome			
Pseudo R^2 (McFadden)	0.0287			
LR Chi^2	25.82			
Observations	298			

Notes: Presents the results of the Multinomial Logistic Regression Model 3 taking [0%] as the base outcome. Significance is denoted at the 10%,5% and 1% levels by ***, **, * respectively.