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The Wealth Effects of the Abuse of Dominance Enforcement

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Abstract

The article investigates the welfare impacts of abuse of dominance enforcement proxied by the stock price evaluations. The European Commission reformed the competition policy at the turn of the new century; however, the reform efforts were more reserved and cautious regarding Article 102 TFEU than in other competition law subfields. The empirical research assesses whether the Commission and the EU Courts' decisions affect the wealth of sanctioned undertakings for the 1990–2014 period by conducting an event study. Only Commission decisions have substantial and statistically significant negative consequences for the market value of infringers. Furthermore, the enforcement effectiveness is assessed by observing the effects of imposed remedies, and the 2004 breakpoint robustly estimates the reforms. The fines do not seem to be sufficiently negatively effective; thus, the results suggest a weaker deterrent effect than could be predicted from nominally high fines, and the more recent cases reflect an even weaker deterrent effect.

Keywords

Abuse of Dominance, EU Competition Law, Event Study, Stock Prices, Enforcement Effects

I. Introduction

The high-tech, high-profile cases on both sides of the Atlantic are dealt with a lot of media and academic attention, and the perception of a more interventionist EU anti-monopoly policy remains, although the recent trend in the US with the Neo-Brandeisian movement points out the convergence of the US counterpart towards the EU (Khan, 2017). This development is even more paradoxical if we consider the judgment from the General Court in January 2022 that annulled the €1.06 billion fine for Intel following the Court of Justice's decision to remand the case in September 2017. According to the as-efficient-competitor test, the General Court decision ruled that the Commission failed to establish convincing evidence of the anticompetitive effects of conditional rebates to original equipment manufacturers (OEM). Something that would be unthinkable to even

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optimistic critics of the formalistic EU approach to abuse of dominance cases a decade ago has been realized.

Although Posner's (1974) proposition for the as-efficient-competitor test found its fertile grounds even in the EU Courts, there are still Transatlantic discrepancies on predatory pricing, margin squeeze, and the resolution of the dilemma of regulation impact on the legality of business activity (Geradin, Layne-Farrar and Petit, 2012; Van den Bergh and Camesasca, 2006). While the theoretical competition law and economics literature is numerous, the empirical research is almost non-existent for the EU abuse of dominance (Decker, 2009; Dethmers and Blondeel, 2017), nonetheless more frequent for US monopolization cases, for which also focused event studies have been conducted (Bittlingmayer, 1992; Bittlingmayer and Hazlett, 2000; Burns, 1977; De Vany and McMillan, 2004; Huth and MacDonald, 1989; Mullin, Mullin, and Mullin, 1995; Wright, 2011).

Event studies are a highly effective use of econometrics in policy research, evaluating the effects of events on investor wealth and elucidating the welfare implications of both private and governmental activities (Bhagat and Romano, 2002a). They allow a researcher to quantify the wealth effect of litigation, statutory modifications, or regulatory alterations (Bhagat and Romano, 2002b) and are also extensively utilized in evaluating the effects of antitrust enforcement (Cichello and Lamdin, 2006). The article's research will provide new insight into the effectiveness of enforcement against abuse of dominance because no standalone event study on EU abuse of dominance has been found. Nevertheless, preexisting event studies constitute only a small part of the broader cross-sectional analyses by Aguzzoni, Langus, and Motta (2013) and Günster and van Dijk (2016).

Assessing antitrust investigations provides insights into case selection and remedy design (Kovacic, 2006). Agency performance can be measured by welfare effects or descriptive statistics (J. Davies, 2018), but oversimplified evaluations risk promoting inefficient intervention (Neven and Zenger, 2008). Selection bias often limits policy assessment, as case samples may not represent broader effects (S. Davies and Ormosi, 2012). For example, Veljanovski (2014) found that the UK Office of Fair Trading's self-assessed deterrent impact was likely overstated. This research, therefore, seeks to offer a more objective, external evaluation of enforcement effects.

The 2004 EU competition policy reform, led by Commissioner Mario Monti, aimed to align EU competition law with US antitrust law. The reform, which took effect in May 2004, replaced Regulation 17/62 and was part of a broader reform initiated by Commissioner for Competition Karel Van Miert. The Commission's modernization efforts focused on reorienting enforcement towards the most harmful anticompetitive activities, especially cartels, freeing up resources previously used for ineffective administrative tasks (Venit, 2003). The main reforms included decentralization of powers, modernization of cartel enforcement, initiatives to increase private antitrust enforcement, revision of the Merger Regulation 4064/89 into the Merger Regulation 139/2004, and the incorporation of effects-based approaches into anticompetitive behavior assessment (Bartalevich, 2014).

The research analyzes the impact of dawn raids, Commission decisions, and General Court and Court of Justice judgments on the stock prices of undertakings in 18 abuse of dominance Commission cases for the 1990–2014 period. The most recent cases primarily

investigating US new tech giants, for example, the Google trilogy, are excluded from the research due to ongoing judicial proceedings and the introduction of the Digital Markets Act (DMA), for which the impacts should be addressed in further research. The analysis examines the remedial effects of fines, concrete behavioral remedies, and a combination of remedies on the value of convicted monopolists. The effects of the 2004 reform are assessed in relation to the Commission's decisions and the subsequent development in judicial proceedings.

The paper investigates three clusters of research questions. Firstly, there is an examination of the market response to the different antitrust events for abuse of dominance cases. The dawn raids, the final decisions of the Commission, and the possible following judgments on the legality of decisions are compared. Secondly, the Commission's remedial activity is assessed. The Commission imposes fines and behavioral remedies on the infringers, and the investors' reactions show whether the desired deterrent effect is, in fact, accomplished. Finally, the 2004 breakpoint demonstrates whether the EU competition reform process affects the market value of infringers differently after the implemented reforms.

The article begins with a literature overview of recent trends regarding the abuse of dominance in the literature (Section II.), followed by the empirical literature, mainly US monopolization event studies (Section III.). In Section IV., the theoretical foundation for law and economic deterrence in light of EU law principles is established. The data, sample, and event study methodology are described in Section V. Then, the event study evaluates the impacts of different enforcement events and sanctions on the value of processed infringers (Section VI.). Then, Section VII. explores the effects of the 2004 reform, and the article concludes with a discussion of the results.

II. Recent Trends in Abuse of Dominance Enforcement

The EU and the US differ notably in competition law, especially regarding exclusionary practices like predatory pricing and loyalty rebates. The EU's exploitative abuse of unfair prices has no US equivalent. The EU adopts a more interventionist stance, while the US is cautious due to false positive errors, though the EU fears false negatives (Martin, 2015). When the EU attacked Google in several cases, the US FTC closed its investigation into Google's search, which Salinger (2014) praised for supporting innovation without leveraging. Despite these differences, a convergence is emerging. The EU is modernizing its abuse of dominance doctrine to be more economics-based, now accepting some efficiency justifications. Meanwhile, the US sees a Neo-Brandeisian shift, led by FTC Chair Khan (2017), advocating a tougher stance against big firms, previously met with skepticism. The post-2009 Guidance shift from a form-based to an economics-based approach, as seen in Intel (Federico, 2011), remains incomplete in addressing leverage and consumer harm.

In a recent paper, Geradin and Huijts (2025) are critical of the enforcement developments of effects-driven Commission enforcement. In 2008, the European Commission adopted an effects-based approach to abuse of dominance, using the as-efficient competitor test for price exclusion, but cautioned against rigid interpretation. The effects-based approach is still developing due to legal uncertainties and resource constraints, especially in resource-heavy, time-limited investigations. The EC could enhance enforcement via interim measures,

commitments, and structural remedies, and improve investigation procedures despite no formal time limits. Lessons from the US and UK, where enforcement delays occur, are relevant. Post-2008, focus shifted to digital markets, where some concepts were less suitable, leading to the Digital Markets Act (DMA) for ex ante regulation, which addresses the concerns that digitization has increased competition but also created dominant digital platforms, posing new challenges for antitrust policy (Funta, 2019).

The debate over anticompetitive behavior by big tech firms reveals opposing views on the appropriate economic-based approach to dominance abuse. Modern enforcement focuses on high-tech industries, but ignoring dynamically competitive markets with innovation efforts may lead to overly interventionist antitrust policy (Evans and Schmalensee, 2002; Manne and Wright, 2011). The EU is adopting a more regulatory approach by introducing the Digital Markets Act.

Recent US Microsoft and Intel cases show that behavioral remedies can deal well with interoperability issues (Page and Childers, 2012). Predatory innovation by big tech giants can be punished only if it excludes a nascent rival without providing consumer benefits. Heiner (2012) overviews the remedies in the US and EU imposed on Microsoft to improve integration and interoperability. The interoperability measures can potentially benefit subsequent new technology giants with fewer barriers to entry to Microsoft platforms.

III. The Empirical Literature on the Abuse of Dominance and Monopolization

The empirical literature on EU abuse enforcement is scarce (S. Davies and Ormosi, 2012); there are only a few US event studies on monopolization enforcement, and this area of US study is equally underrepresented. The limited incidence of current abuse of dominance and monopolization cases appears to define the scope of existing research.

Dethmers and Blondeel (2017) review EC decisions on abuse of dominance from 2000 to 2017, mostly in energy, IT, and telecoms sectors, focusing on "super-dominant" firms with over 70% market share and €5 billion turnover. Most are multinational, based in Germany, France, Belgium, and the US. Only three cases involved exploitative abuses; most were exclusionary, mainly refusals to supply. Effects-based reasoning has declined, with investigations triggered mostly by complaints. Only 7 of 50 cases were abandoned after investigation, which lasted an average of 61 months. Firms lost in most GC proceedings, with most appeals dismissed by the ECJ.

The US event studies are mostly about historical litigation, and contemporaneous cases are in the minority. Burns (1977) analyzes the Sherman Act dissolution cases against Standard Oil, American Tobacco, and American Snuff in 1911 and their effects on stock prices. G. L. Mullin, Mullin, and Mullin (1995) investigate the stock market effects of the unsuccessful United States Steel dissolution case for enforcement events from 1911 to 1920. De Vany and McMillan (2004) examine for the 1938–1949 period eight actions of the DOJ against the major motion picture studios that eventually had to break up. Huth (1989) studies the events of the US district and appellate court's decision on monopolization cases and the Telex vs. IBM litigation in more detail. Chen and Merville (1986) analyze the breakup of AT&T and its effects on the stock and bond prices. Baker and Yandle (1994) also conduct

an event study about the DOJ's 1982 settlement with AT&T that resulted in the breakup of that giant.

Bittlingmayer and Hazlett (2000) examine the effects of US federal antitrust enforcement targeting Microsoft from 1991 to 1997 regarding the value of 159 computer firms. If there was a negative event from the enforcer's perspective, the value of the computer sector index rose. It can be interpreted that Microsoft's conduct was not anticompetitive and that the antitrust enforcement did not produce net efficiency gains. Wright (2011) conducts an event study regarding the US Intel prosecution and observes trends in product markets (prices and outputs). He compares the stock price movement of Intel, its main competitor AMD, and their market shares over the 1999–2009 period. He does not find evidence that Intel's behavior harmed consumers.

In their cross-sectional event study of EC infringement decisions under Articles 101 and 102 for the 1979–2009 period, Aguzzoni, Langus, and Motta (2013) find a significantly negative market reaction to dawn raids (3 observations) and EC decisions (12 observations) within the (−20, 10) event window. Additionally, in their cross-sectional research, Günster and van Dijk (2016) did not find significant negative returns for EC decision for the event window (−25 3) for the sample of 18 observations in the 1974–2004 period.

IV. Theoretical Framework of Deterrence in Abuse of Dominance Enforcement

The assessment of competition law enforcement cannot be limited to the observation of imposed sanctions or their nominal magnitude. Instead, it requires a theoretical benchmark against which enforcement outcomes can be evaluated. In the context of abuse of dominance under Article 102 TFEU, this benchmark is typically provided by the economic theory of optimal deterrence, complemented by the error-cost framework and the principle of proportionality embedded in EU law.

The standard law-and-economics approach to enforcement is grounded in Becker's (1968) model of optimal deterrence, according to which sanctions should be calibrated so that the expected penalty equals the expected social harm, adjusted for the probability of detection (Becker, 1968; Polinsky and Shavell, 2000). In this framework, fines are generally considered the most efficient enforcement instrument because they avoid the social costs associated with imprisonment or structural remedies.

However, applying optimal deterrence theory to abuse of dominance presents several complications. First, the probability of detection and successful prosecution in Article 102 cases is inherently difficult to estimate due to the complexity, duration, and selectivity of investigations (Wils, 2007). Second, the harm caused by exclusionary practices is often uncertain and contingent on counterfactual market developments, making precise calibration of fines problematic (Evans and Schmalensee, 2002). Third, large multinational undertakings may internalize fines as a cost of doing business, particularly when sanctions are not proportionate to the firm's size or the expected gains from the infringement (Motta, 2004; Wils, 2007). These limitations suggest that even nominally high fines may fail to achieve effective deterrence in practice. If the expected penalty remains below the expected gain from anticompetitive conduct, rational firms may continue to engage in such behavior (Becker, 1968; Polinsky and Shavell, 2000).

The design of sanctions for abuse of dominance must also be assessed through the lens of the error-cost framework. Unlike cartel conduct under Article 101 TFEU, which is widely treated as per se illegal, abuse of dominance cases require a nuanced assessment of market power, competitive effects, and potential efficiency justifications (Easterbrook, 1984; Hovenkamp, 2008). This creates a significant risk of false positives (condemning procompetitive conduct) alongside false negatives (failing to sanction harmful exclusionary behavior). The costs of false positives are particularly high in dynamic and innovation-driven markets, where aggressive competition may resemble exclusionary conduct (Evans and Schmalensee, 2002; Manne and Wright, 2011). As a result, enforcement policy in Article 102 cases traditionally exhibits greater caution compared to cartel enforcement. This caution has direct implications for the design of sanctions: excessively severe or inflexible penalties may amplify the risk of over-deterrence, discouraging legitimate competitive strategies and innovation (Easterbrook, 1984).

EU competition law is further constrained by the principle of proportionality, which requires that sanctions must be appropriate, necessary, and not excessive in relation to the objectives pursued (Craig and De Búrca, 2020). This principle limits the adoption of punitive measures that are not closely linked to the gravity and duration of the infringement (Wils, 2006). While such an approach ensures legal certainty and consistency with fundamental rights, it may also reduce the perceived severity of enforcement, particularly when fines are insufficiently tailored to the economic realities of dominant firms (Geradin, Malamataris and Wileur, 2013; Lianos, 2013).

The combination of optimal deterrence theory, error-cost considerations, and proportionality constraints suggests that the effectiveness of abuse of dominance enforcement depends not only on the level of fines but also on the structure and composition of remedies. Monetary sanctions alone may be insufficient when firms can absorb them without a significant impact on expected profits. Behavioral remedies may play a crucial role by directly constraining anticompetitive strategies (Lianos, 2013). The calibration of sanctions relative to firm size and market position is essential for maintaining deterrence (Motta, 2004; Polinsky and Shavell, 2000; Wils, 2006). These theoretical insights provide the framework for interpreting the empirical findings of this article, particularly regarding the observed discrepancy between nominally high fines and their limited impact on firm valuation.

V. Data, Sample, and Methodology

The data regarding the EC decisions that found abuse of the dominant position was found on the Commission's website. There were 30 cases during the 1990–2014 period in which the Commission recognized the violation of Article 102 TFEU as the sole infringement. The Curia website was accessed to check whether the infringers appealed the Commission decision before the first instance General Court or even before the second instance Court of Justice. Whether or not the persecuted undertaking was listed, it was found in the Factiva database. The Factiva database also provides further data on the financial figures for listed corporations. Most cases include listed corporations (70%) being part of the stock market listing at least at one moment of the investigation timeline (Table 1). The number of abuse of dominance cases corresponds to the number of undertakings convicted; hence, the mean

number of undertakings per case is exactly one. However, more legal entities (firms) within the same undertaking that are formally addressed for the same offense can be fined jointly (on average, 1.37 per undertaking).

Because the event study narrows the sample to the listed undertakings only, the non-listed undertakings are compared with the listed ones on specific descriptive procedural statistics to assess how far the event study's research results can be generalized. Thus, the risk of the biased out-of-sample interpretation is minimized. The listed undertakings seem to represent the overall sample quite well because they are in the majority of the sample and characterize the most heavily sanctioned infringers. The descriptive statistics also indicate that the cases with listed undertakings are the most complex, according to procedural properties. Listed undertakings are more likely to repeat the infringement; they are subject to higher fines and are more frequently appealing against the Commission's decision than private ones. There is no Japanese undertaking in the whole sample; however, Japanese undertakings are frequent cartel infringers. On the other hand, the US undertakings are relatively regular infringers of Article 102.

Table 1: Listed vs. non-listed undertakings – mean statistics for Article 102

	Not listed	Listed	Total
Infringement duration (years)	8.022	6.904	7.173
Number of firms within the undertaking	1.111	1.476	1.367
Founding Member State undertaking origin	0.778	0.476	0.567
USA undertaking	0	0.143	0.100
Japan undertaking	0	0	0
Concrete behavioral remedy dummy	0.778	0.095	0.300
Fine imposed (million €)	9.277	101.725	73.991
May 2004 EC decision dummy	0	0.381	0.267
General Court filing action	0.444	0.857	0.733
Duration of General Court procedure (years)	3.584	4.551	4.375
Total loss dummy in General Court procedure	1	0.556	0.636
Filing an appeal before the Court of Justice	0.333	0.619	0.533
Duration of Court of Justice procedure (years)	1.841	2.575	2.427
Total loss dummy in Court of Justice procedure	1	0.667	0.733
Observations	9	21	30

Source: Own elaboration

Then, the research focuses on the available stock market data for four enforcement event dates:

* Dawn raid – a surprise inspection of the premises of investigated undertakings. Commission officials enter the premises with accompanying national authorities, collect the documents and software evidence, and interview the employees and management.
* Commission decision (EC decision) – Commission decisions on infringement under Article 102 are the most important acts of antitrust enforcement because not every investigation ends negatively for scrutinized undertakings. EC decision is a principal breakpoint for the inclusion of the undertaking in the sample. The EC decision is

the result of a longer procedure after the investigation began; thus, the element of surprise is diminished, but there is uncertainty regarding the remedies imposed.

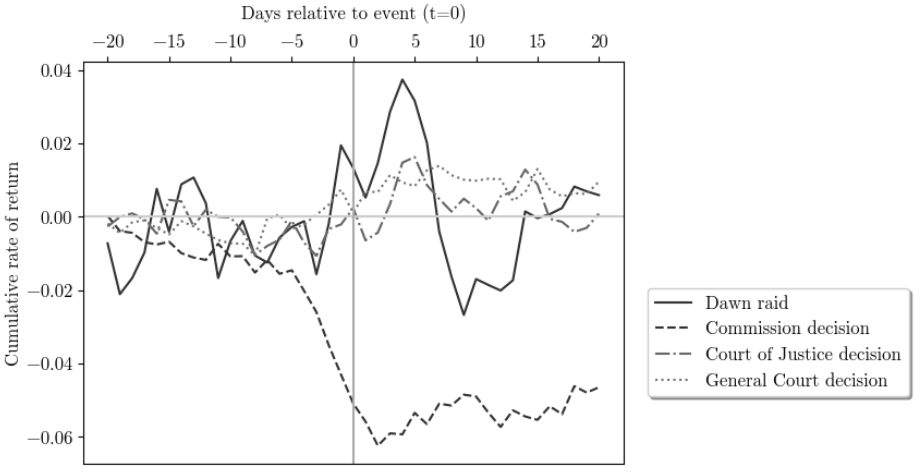
* General Court decision (GC decision) – if the undertaking files an action against the Commission decision, then the GC has to decide on the legality of Commission activities. The court decision can have negative effects if the action is dismissed or positive effects if the Commission decision is completely or partially annulled.
* Court of Justice decision (ECJ decision) – if there is an appeal against the GC decision, the ECJ issues the decision on the merits of the appeal. Like the GC decision, the ECJ decision can have positive or negative effects depending on the outcome of the appeal proceeding.

The classical event study method was applied with the OLS market model, where the stock prices of infringers for 250 trading days before the event were gathered alongside the corresponding local market index (MacKinlay, 1997); hence, the market model was estimated. The abnormal returns were found to be the difference between observed stock returns and estimated returns by the market model. Cumulative average abnormal returns (CAAR) were finally calculated for the observed groups of listed undertakings. The statistical significance was estimated by Kolari and Pynnönen's (2011) GRANKT test, which is robust to serial correlation, event-induced volatility, and cross-sectional correlation of returns, and also by the Patell (1976) test of standardized residuals for robustness control. Different event windows are observed within the 20 trading days before and 20 days after the event, which account for possible pre-event information leakage, the immediate effects of narrow windows around the event, and the echoing effects after the event is made public. At the end of the sampling, there was sufficient stock market data for 18 of 21 listed undertakings to be used in the event study.

VI. Event Study Results for Main Enforcement Events

Paralleling the events of the dawn raid, EC, GC, and ECJ decisions show that GC and ECJ decisions do not significantly affect the market value of dominant undertakings (Figure 1 and Table 2). Also, the dawn raid provides rather weak evidence of effective enforcement, with only the immediate window (0 1) showing a significantly negative response of −1.42%; however, the estimate's significance is not robust, and the returns in other event windows are positive and mostly insignificant. The sample for dawn raids is small, with only five observations; thus, that could also be the reason for the insignificant results. Only the Commission's decision represents a meaningful event for abuse of dominance, for which the estimated negative market reaction is significant across all event windows, and the most destruction of the infringers' market value −5.59% – occurs in the most extended pre-event window (−20 1). That indicates a probable information leak before the final decision is publicly announced, and a prevailing negative market expectation. The widest post-event echoing window (−1 20) has only a −1.15% drop in value with no robust significance, so the event's publicity does not have substantial adverse effects. However, the immediate short event window (0 1) includes a significant value decrease of −1.28%.

Figure 1: CAAR trending for the event window (−20 20) for main events (dawn raid, EC, GC, and ECJ decisions)



Source: Own elaboration

Table 2: CAAR significance for main events (dawn raid, EC, GC, and ECJ decisions)

	t	Obs.	CAAR	GRANKT	Patell
Dawn raid	(0 1)	5	−0.01425	**	
	(0 3)		0.00926		
	(−5 5)		0.03733		
	(−1 20)		0.00791	*	
	(−20 1)		0.00518	**	
Commission decision	(0 1)	18	−0.01284	***	***
	(0 3)		−0.01605	**	***
	(−5 5)		−0.03791	***	***
	(−1 20)		−0.01154		***
	(−20 1)		−0.05588	***	***
General Court decision	(0 1)	15	−0.00060	**	
	(0 3)		0.00394		
	(−5 5)		0.00778		
	(−1 20)		0.00628		*
	(−20 1)		0.00679		
Court of Justice decision	(0 1)	10	−0.00434		
	(0 3)		0.00561		
	(−5 5)		0.02255		
	(−1 20)		0.00416		
	(−20 1)		−0.00648		

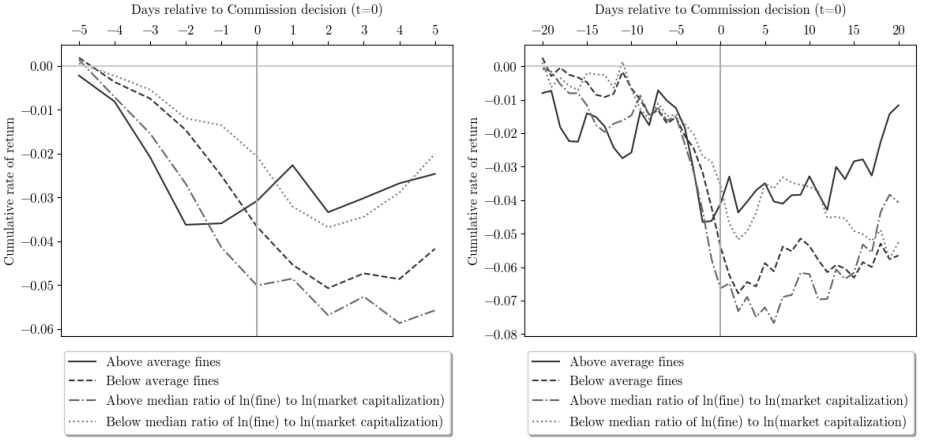
Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: Own elaboration

In order to evaluate the deterrent effect of the Commission's enforcement, it is essential to measure how the fines affect stock prices. The fines represent the most commonly used remedy by the Commission, and nominally high fines significantly impact public perception of rigorous enforcement. In the law and economics literature, fines are recommended as the enforcement tool due to their relative efficiency and presumed deterrent effect (Becker, 1968). In the following analysis, there is an evaluation of the relationship between monetary penalties and the returns in event windows by categorizing the groups of undertakings using two different measures:

* nominal fines by the above and below mean distinction,
* normalization of fine with a ratio of logarithms of fine to market capitalization value, and the median value as the criterion due to outliers.

The normalization of fines addresses the time value of money and accounts for a corporation's size, since larger corporations are relatively less affected by the same amount of fines than smaller ones. The findings of this methodological evaluation of the fining policy are presented in Figure 2 and Table 3.

Figure 2: CAAR trending for event windows (−5 5) and (−20 20) for fines



Source: Own elaboration

The below-average fines group of undertakings experiences more negative reactions than the above-average ones, making the measure counterintuitive. That already shows the problem of fines' effectiveness for the largest corporations, subject to nominally higher fines, for which the fines hurt them less due to their robust size than nominally lower fines affect smaller undertakings. Quite similar findings are for the fine-to-market capitalization ratio, except for the symmetrical window (−5 5), which provides expected results with greater negative impacts for the more fined undertakings. Also, the above-average ratio group of undertakings for the widest pre-event window (−20 1) exhibits somewhat more negative effects; however, the significance of returns is not robust, and in the post-event echoing window (−1 20), the market reaction to more sanctioned ones is even positive.

Table 3: CAAR significance for fines

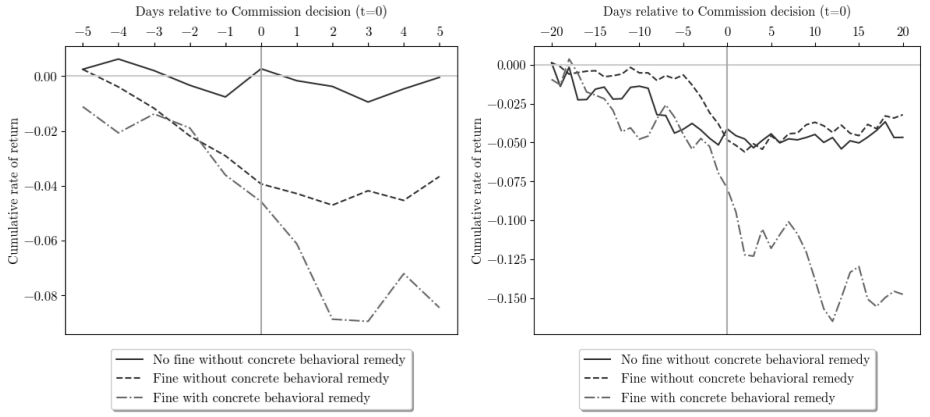
	t	Obs.	CAAR	GRANKT	Patell
Above average fines	(0 1)	4	0.01327		*
	(0 3)		0.00576		
	(−5 5)		−0.02463		
	(−1 20)		0.03484	**	**
	(−20 1)		−0.03294		**
Below average fines	(0 1)	14	−0.02030	***	***
	(0 3)		−0.02228	***	***
	(−5 5)		−0.04170	***	***
	(−1 20)		−0.02479	*	***
	(−20 1)		−0.06244	***	***
Above median ratio of ln(fine) to ln(market capitalization)	(0 1)	9	−0.00713		**
	(0 3)		−0.01122		**
	(−5 5)		−0.05576	***	***
	(−1 20)		0.00248		
	(−20 1)		−0.06477		***
Below median ratio of ln(fine) to ln(market capitalization)	(0 1)	9	−0.01855	**	**
	(0 3)		−0.02088		***
	(−5 5)		−0.02006		**
	(−1 20)		−0.02556		**
	(−20 1)		−0.04699	***	**

*Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*
Source: Own elaboration

Furthermore, not only fines but also the combination of remedies imposed by the Commission can be a factor influencing the stock price performance of infringers. Therefore, the impact of concrete behavioral remedies in which the Commission imposes concrete obligations onto the infringers in the remedial part of the final decisions, alongside the fines that are imposed as the most commonly applied remedy in infringement decisions, is examined (Figure 3 and Table 4).

The group of undertakings without fines and behavioral remedies experiences the least negative returns; there is a significantly negative market reaction only in the whispering period (−20 1). The group of undertakings with fines suffers more substantial market losses than those without fines and concrete behavioral remedies. Undertakings with only fines imposed lose −1.38% at the immediate window (0 1) and −3.66% at the symmetrical window (−5 5). Only the echoing window (−1 20) returns are insignificant. Sanctioned undertakings with both fines and behavioral restrictions lose the most value, and the estimated returns are significant except for the narrowest window (0 1).

Figure 3: CAAR trending for event windows (−5 5) and (−20 20) for a remedial combination



Source: Own elaboration

Table 4: CAAR significance for a remedial combination

	t	Obs.	CAAR	GRANKT	Patell
No fine without concrete behavioral remedy	(0 1)	2	0.00593		
	(0 3)		−0.00186		
	(−5 5)		−0.00044		
	(−1 20)		0.00059		
	(−20 1)		−0.04557	**	**
Fine without concrete behavioral remedy	(0 1)	14	−0.01377	***	***
	(0 3)		−0.01274	**	***
	(−5 5)		−0.03661	***	***
	(−1 20)		−0.00133		
	(−20 1)		−0.05181		***
Fine with concrete behavioral remedy	(0 1)	2	−0.02506		
	(0 3)		−0.05337		***
	(−5 5)		−0.08443	**	***
	(−1 20)		−0.09510		***
	(−20 1)		−0.09471	**	***

*Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*
Source: Own elaboration

Research indicates that monetary sanctions can effectively reverse the stock price performance of penalized entities, while behavioral sanctions may also serve as a significant deterrent against illegal activities and reduce the likelihood of monopoly profits. Thus, behavioral remedies are an underutilized enforcement opportunity for the Commission, and they can be applied more frequently to put more consequential pressure on the infringers.

VII. Event Study on the 2004 Reform

After the 2004 reform, only eight listed undertakings were sanctioned by the Commission, and only three public undertakings were fined as a final outcome of the procedure that started after 2004. Before May 2004, 22 undertakings in the whole sample (including non-listed undertakings) were punished, indicating a drop in activity as measured by the number of issued decisions (Table 5). After May 2004, the fines rose according to the fines mean measure, and they also increased when comparing the ratios of fine to market capitalization and net sales. Also, in the recent period, the sanctioned listed undertakings have grown in market capitalization and sales, are more likely to file an action or appeal and suffer more losses in the subsequent court proceedings. The US corporations are more likely to be sanctioned than in the pre-2004 period. However, the small sample size does not allow us to make general conclusions that are too robust.

Table 5: May 2004 listed undertaking mean and median statistics

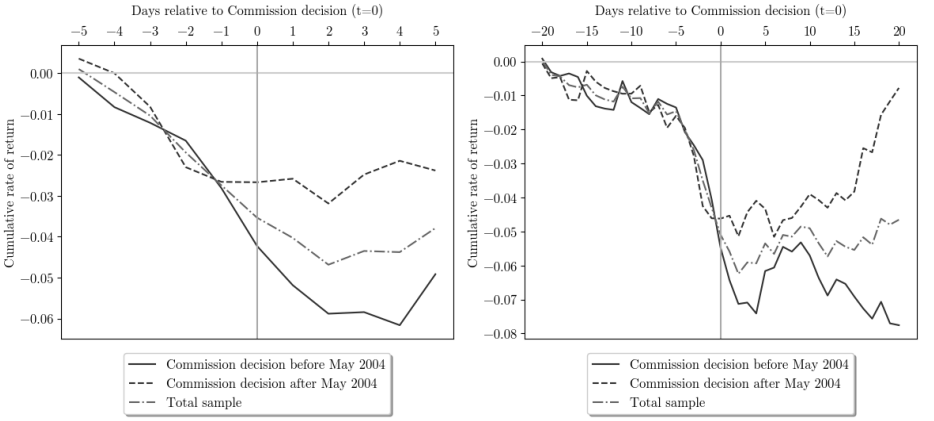
	Before 2004		After 2004	
	Mean	Median	Mean	Median
Infringement duration (years)	3055	2557	1601	1826
Number of firms within the undertaking	1	1	2.250	2
Founding Member State undertaking origin	0.615	1	0.250	0
USA undertaking	0.077	0	0.250	0
Japan undertaking	0	0	0	0
Concrete behavioral remedy	0.2	0	0	0
Fine imposed (million €)	49.4	10.3	186.7	64.9
General Court filing action	0.846	1	0.875	1
Duration of General Court procedure (years)	4.553	4.129	4.551	4.496
Total loss dummy in General Court procedure	0.455	0	0.714	1
Filing an appeal before the Court of Justice	0.538	1	0.750	1
Duration of Court of Justice procedure (years)	2.822	2.310	2.230	2.227
Total loss dummy in Court of Justice procedure	0.571	1	0.800	1
Market capitalization (million €)	37511	13278	45504	50944
Net sales (million €)	23914	22862	27491	23569
Ratio of fine to market cap value	0.00306	0.00134	0.00806	0.00171
Ratio of fine to net sales	0.00430	0.00084	0.01594	0.00290
Observations	13		8	

Source: Own elaboration

The wealth effect of the 2004 reform is tested for the event of the Commission decision (Figure 4 and Table 6). The pre-2004 group of undertakings experiences significant negative returns for all five event windows, while the post-2004 group sometimes experiences even positive reactions. For narrower windows, the estimated positive returns are insignificant; they are even significantly positive for the echoing period (−1 20). That is exactly the opposite of the desired outcome of effective deterrent enforcement. The largest pre-event

window (−20 1) returns for the post-2004 group are negative and significant, but smaller than those for the pre-2004 group.

Figure 4: EC decision CAAR trending for event windows (−5 5) and (−20 20) for the 2004 reforms



Source: Own elaboration

Table 6: EC decision CAAR significance for the 2004 reforms

	t	Obs.	CAAR	GRANKT	Patell
Commission decision before May 2004	(0 1)	10	−0.02372	***	***
	(0 3)		−0.03031	**	***
	(−5 5)		−0.04917	***	***
	(−1 20)		−0.04856	**	***
	(−20 1)		−0.06432	**	***
Commission decision after May 2004	(0 1)	8	0.00076		
	(0 3)		0.00178		
	(−5 5)		−0.02383	**	
	(−1 20)		0.03475	*	*
	(−20 1)		−0.04534		**

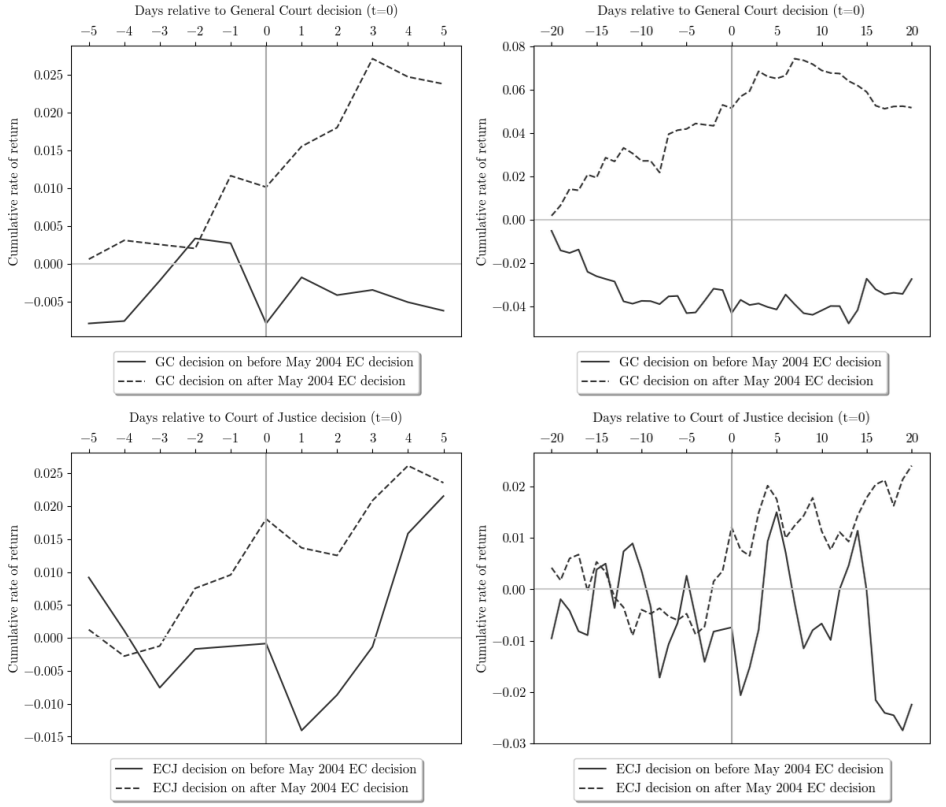
Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: Own elaboration

Despite rising fines, the deterrence effect of dominance control even shrinks after the 2004 reform. Given the small sample size, definitive generalized inferences based purely on empirical findings cannot be established. Nevertheless, results indeed contradict the widely accepted notion of the Commission being (too) aggressive enforcer for abuse of dominance cases.

The spillover effect of the 2004 reform can be further observed in the EU Court of Justice decisions on the legality of Commission decisions. The success of parties at the General Court (GC) and Court of Justice (ECJ) regarding decisions before and after 2004 is balanced

by the frequency of winning rates. For GC decisions, there were 8 decisions on pre-2004 EC decisions: infringers lost 5, won 2, and won 1. For the after-2004 decisions, two of seven undertakings partially won, and five totally lost. At the ECJ on the pre-2004 decisions, appellants totally lost in four cases and partially won in one case, and on the post-2004 decisions, they totally lost four times and totally succeeded in one case. Therefore, the effect of litigation success across subsamples is minimized by their balanced, analogous characteristics, allowing the effect of the 2004 decision to be reliably observed.
The market reaction to GC decisions on before-2004 EC decisions is more negative than for decisions on after-2004 EC decisions for all event windows (Figure 5 and Table 7). It is positive in absolute terms only for the echoing window (−1 20) – although insignificant. On the other hand, all GC decisions on post-2004 EC decisions are associated with positive stock price changes, which are also significant across most event windows.

Figure 5: GC and ECJ decision CAAR trending for event windows (−5 5) and (−20 20) for the 2004 reforms



Source: Own elaboration

Table 7: GC and ECJ decision CAAR significance for the 2004 reforms

	t	Obs.	CAAR	GRANKT	Patell
GC decision on before May 2004 EC decision	(0 1)	8	−0.00452	**	
	(0 3)		−0.00619	**	*
	(−5 5)		−0.00624		
	(−1 20)		0.00445		
	(−20 1)		−0.03695	**	***
GC decision on after May 2004 EC decision	(0 1)	7	0.00388		
	(0 3)		0.01551		*
	(−5 5)		0.02380	**	***
	(−1 20)		0.00838		***
	(−20 1)		0.05679	***	***
ECJ decision on before May 2004 EC decision	(0 1)	5	−0.01278		
	(0 3)		−0.00007	*	
	(−5 5)		0.02153		
	(−1 20)		−0.01418		
	(−20 1)		−0.02061		*
ECJ decision on after May 2004 EC decision	(0 1)	5	0.00410		
	(0 3)		0.01130		
	(−5 5)		0.02356	***	**
	(−1 20)		0.02250		**
	(−20 1)		0.00766		

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Own elaboration

Moreover, the ECJ decisions on the 2004 decisions provide a similar pattern to GC decisions. The market value of pre-2004 convicted infringers decreases more than for post-2004 sanctioned undertakings. However, the results are less frequently significant than for GC decisions, but for significant estimated returns, the finding of more positive returns for post-2004 EC decisions holds.

VIII. Conclusion

The article examined the effectiveness of abuse of dominance enforcement under Article 102 TFEU by analyzing stock market reactions to key enforcement events between 1990 and 2014. The empirical findings demonstrate that only Commission decisions elicit a consistent, statistically significant negative market response, whereas other enforcement stages – such as dawn raids and judicial review – have limited impact on firm valuation.
More importantly, the results raise fundamental questions regarding the deterrent capacity of the current enforcement framework. Despite increasingly high fines, the evidence suggests that monetary sanctions do not systematically demonstrate stronger negative market reactions. In some cases, larger fines appear to have weaker effects, indicating that their deterrent function may be diluted for large undertakings. This finding is consistent

with the theoretical expectation that fines, when not sufficiently calibrated to firm size and expected gains, may be internalized as a cost of doing business.

By contrast, the analysis shows that behavioral remedies are associated with more substantial and persistent reductions in firm value, suggesting that they may represent a more effective enforcement instrument. This result highlights the importance of remedy design, rather than solely the magnitude of financial penalties, in achieving deterrence.

The findings also indicate that the 2004 modernization of EU competition law did not strengthen the deterrent effect of enforcement in abuse of dominance cases. On the contrary, the post-reform period is characterized by weaker market reactions, despite higher nominal fines. While the limited sample size calls for caution, this pattern challenges the prevailing perception of increasingly aggressive enforcement and suggests a potential gap between formal sanctioning and effective deterrence.

From a policy perspective, these results support a more nuanced approach to enforcement design. First, greater emphasis should be placed on calibrating fines relative to firm size and economic impact, rather than relying on nominal increases. Second, the Commission may consider expanding the use of behavioral remedies, particularly in complex and dynamic markets where financial penalties alone may be insufficient to alter firm conduct. Third, enforcement policy should remain attentive to the balance between deterrence and over-deterrence, given the significant risk of error in Article 102 cases.

At the same time, more radical proposals – such as criminal sanctions against individuals or structural dissolution – must be approached with caution. Unlike cartel conduct, abuse of dominance involves inherently ambiguous and effects-based assessments, making the application of severe punitive measures potentially disproportionate and legally problematic within the EU framework.

The research contributes to the growing literature questioning the effectiveness of competition law enforcement by providing empirical evidence that nominally strong sanctions do not necessarily translate into effective deterrence. Future research should extend this analysis to more recent cases, including digital markets, and further explore the interaction between different types of remedies and firm behavior.

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