

Duso, Tomaso; Bernhardt, Lea; Piechucka, Joanna

Working Paper

The Evolution of Theories of Harm in EU Merger Control

CESifo Working Paper, No. 11218

Provided in Cooperation with:

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Duso, Tomaso; Bernhardt, Lea; Piechucka, Joanna (2024) : The Evolution of Theories of Harm in EU Merger Control, CESifo Working Paper, No. 11218, CESifo GmbH, Munich

This Version is available at:

<https://hdl.handle.net/10419/301344>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

The Evolution of Theories of Harm in EU Merger Control

Tomaso Duso, Lea Bernhardt, Joanna Piechucka

Impressum:

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

Editor: Clemens Fuest

<https://www.cesifo.org/en/wp>

An electronic version of the paper may be downloaded

- from the SSRN website: www.SSRN.com
- from the RePEc website: www.RePEc.org
- from the CESifo website: <https://www.cesifo.org/en/wp>

The Evolution of Theories of Harm in EU Merger Control

Abstract

We discuss the main Theories of Harm in EU merger control and their evolution since the 1990s. We present stylised facts and trends using data extracted from EU merger decisions by natural language processing tools. EU merger policy has adapted over time, both in terms of legislation and theories of harm, as well as in terms of the investigative tools and evidence used. The introduction of the new Merger Regulation in 2004, which led to a change in the substantive test, also brought about significant changes in the use of Theories of Harm. Unilateral theories are now used more frequently and have developed further, in particular in relation to the assessment of closeness of competition. Non-horizontal conglomerate and vertical Theories of Harm focusing on foreclosure issues are now much more common and are a standard tool in most in-depth investigations. More novel Theories of Harm related to innovation and digital markets have been developed and implemented since the 2010's. While market shares remain a central tool for merger assessment, the use of internal documents has increased, accompanied by the use of quantitative tools. With respect to Commission interventions, structural remedies are used more frequently, although behavioural remedies are also increasingly deployed, especially in Phase II.

JEL-Codes: K210, L400.

Keywords: merger control, theories of harm, unilateral effects, coordinated effects, non-horizontal effects, foreclosure, innovation, ecosystem, digital market shares, internal documents, structural remedies, behavioural remedies.

*Tomaso Duso**
DIW Berlin
Germany – 10177 Berlin
tduso@diw.de

Lea Bernhardt
Hamburgisches Weltwirtschaftsinstitut
(HWWI), Hamburg / Germany
bernhardt@hwwi.org

Joanna Piechucka
European Commission, Brussels / Belgium
joanna.piechucka@ec.europa.eu

*corresponding author

We thank Nilab Ahmady, Felix Aubele, Akhil Idalgo, and Charlotte Siegmann for excellent research assistance and Szabolcs Lorincz, Peter Ormosi, Hans Zenger, as well as one anonymous referee for their useful comments. The view express in the paper are those of the author and may not in any circumstances be regarded as stating an official position German Monopolies Commission. The views expressed in this article are those of the author and may not in any circumstances be regarded as stating an official position of DG Competition or of the European Commission.

1. Introduction

Since the establishment of the European Community through the Treaty of Rome in 1958, member states have delegated substantial authority in competition matters to European institutions, acknowledging effective competition as crucial for creating a single European market. To achieve these goals, the European Commission's (EC) Directorate-General for Competition (DG COMP) was granted considerable independence and enforcement powers. While all EU member states maintain national competition authorities, the EU holds exclusive responsibility for EU-wide competition issues. The EC can block or modify anti-competitive mergers, even when the companies involved are not European; impose substantial fines for the abuse of market power; penalize cartels; and regulate State aid if it distorts competition. Among these tools, merger control is particularly noteworthy because it is the only area where competition rules are enforced *ex-ante*, as the EC must clear all major mergers before they proceed. This pre-emptive approach helps prevent the formation of dominant positions and excessive market power, which has important implications for other areas of competition law. If the EC fails to block anti-competitive mergers, it may face greater challenges in controlling subsequent abusive behaviour by the merged entities.

European merger control was first formalized through the introduction of the European Communities Merger Regulation in 1990 and has continually and significantly evolved ever since. The legal substantive basis underpinning the regulation and the economic theories used to enforce the law have both undergone significant changes. The original approach, following the German competition policy tradition, used the concept of dominance as the core test to assess the potential anti-competitive impact of a merger. With the modernisation of European merger control, through the adoption of Council Regulation 139/2004 in May 2004 (2004 Merger Regulation), there has been a significant shift toward the so-called "more economic approach" and the introduction of a more flexible substantive "significant impediment to effective competition test" (SIEC) in the Anglo-Saxon tradition.

These amendments signify a substantial change in the legal basis for enforcing merger control in Europe. The new approach is founded on the potentially anticompetitive effects of the merger, with clearly stated Theories of Harm (ToH). This theory elucidates how a merger or acquisition could potentially harm competition and, consequently, impact economic welfare, particularly harming consumers. Additionally, the evidence used to substantiate such ToH are continually evolving with the use of simple structural indicators such as market shares and concentration indices being complemented with more sophisticated tools, for instance trying to assess the degree of substitution between products active in the relevant market.

However, the global discourse on rising concentration and markups has led to substantial criticism of enforcement practices on both sides of the Atlantic in the late 2010's.¹ This has sparked a lively debate on the need to reassess the legal and economic underpinnings of merger policy. This has already had consequences both in terms of changes to the rules and in terms of the development of ToH to address challenges that are perceived to have become more prominent, such as issues of dynamic competition, innovation, and competition in multi-sided digital platform markets. The introduction of the new US Merger Guidelines in 2023, and the new Notice on Market Definition in the EU in 2024, are poignant examples of ongoing efforts to refine these frameworks.

In this paper, we aim to discuss the main Theories of Harm that have been developed and applied by the European Commission during the first 30 years of existence of its merger control regime. We provide a taxonomy as well as a first quantification of ToH, thus providing an empirical basis for the ongoing discussion on what has been done and what still needs to be done, going beyond a case study analysis. To do this, we use a novel dataset covering all merger cases formally notified to the European Commission's DG Competition over the long period from 1995 to 2022.² The main objective is to analyse and quantify

¹ For an overview of the discussion, see the collection of essays summarizing the discussions presented during the 2023 Antitrust and Competition Conference at the Stigler Center of the University of Chicago (<https://www.promarket.org/tag/2023-antitrust-and-competition-conference/>).

² While we collected data from 1990, we start our sample in 1995 since the number of cases and, hence, the base for our textual analysis, especially in phase 2, is very limited for the first implementation years. We exclude 2023 and 2024 from the analysis, as most decisions notified in that period are still not published.

key trends in ToH and to provide an exhaustive examination of their evolution over this period. We use natural language processing (NLP) techniques to provide ToH indicators based on the extensive text provided by the Commission in its public decisions. We then use these indicators to assess developments and changes in ToH over time, particularly in response to regulatory changes. Finally, we elucidate these ToH by providing illustrative examples of cases where they have been applied.

The findings reveal significant changes over time. Since 1995, the number of decisions has increased, as has the length and complexity of decisions over time. The Commission is now more likely to use several parallel Theories of Harm, particularly in the most complex cases. There is a clear shift in the use of ToH following the change in the substantive test through the adoption of the new Merger Regulation as well as the Horizontal Merger Guidelines both introduced in 2004. The development of Theories of Harm appears to be more relevant under the SIEC test than under the dominance test. However, the concept of dominance appears to have made a comeback in recent years, mainly to substantiate vertical and conglomerate concerns, which have become increasingly prominent, particularly towards the end of the 2010s. In addition to the development of the SIEC test, there has also been a significant increase in the use of unilateral effects such as price increases, the degree of substitutability, and the role of switching costs, as well as the Commission's assessment of efficiency claims made by the merging parties. Vertical and conglomerate theories of harm, with the focus on issues of foreclosure but also of tying and bundling, have been increasingly used especially following the introduction of the Guidelines on the assessment of non-horizontal mergers in 2008. They are now very common Theories of Harm, particularly in Phase 2 decisions. Innovation ToH and ToH related to digital markets also appear to have become widely used tools in the competitive assessment of mergers starting in the mid-2010s. Parallel to the changes in ToH, the evidence substantiating them has also evolved over time. Market shares continue to be a key tool used in almost all decisions. The use of quantitative tools and internal documents has steadily increased over time, particularly after the introduction of the new 2004 Merger Regulation. Finally, remedies have evolved to become the most frequently used intervention tool by the Commission, particularly in Phase I cases. While structural remedies, such as divestitures and increasingly carve-outs, remain the preferred approach, behavioural remedies have gained relative importance in the 2010s. Accordingly, the use of monitoring trustees has also increased to ensure compliance with these commitments.

The paper is structured as follows. Section 2 discusses the dataset and the methodology used to construct indicators measuring ToH. Section 3 begins with a discussion of the legal basis for European merger control, focusing on the so-called substantive test. Section 4 is the core of the paper. It categorises and discusses the main ToH used in European merger control and presents descriptive evidence on the evolution of the indicators measuring them over time. The next three short sections deal with relevant related issues in the evolution of EU merger control: Section 5 briefly discusses the role of efficiencies, Section 6 discusses the evolution of the tools used to assess the various ToH, and Section 7 focuses on remedies. Section 8 concludes with some final remarks.

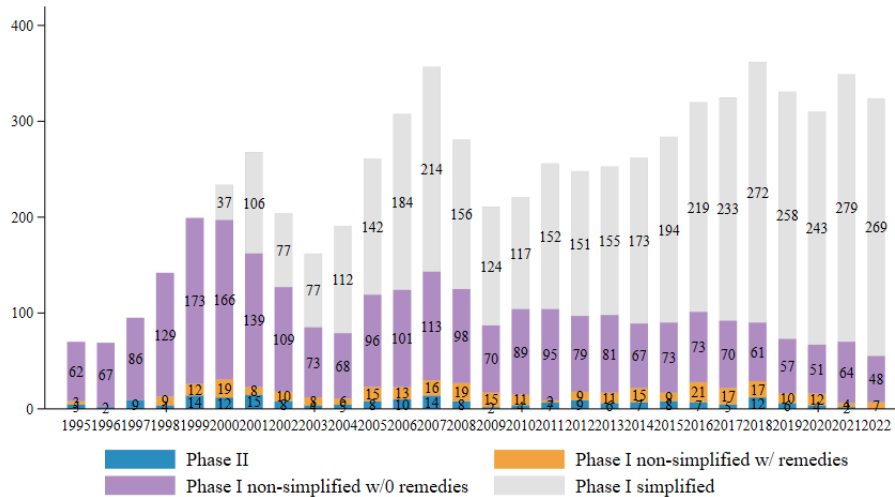
2. The Dataset

The dataset on which our empirical analysis contains all decisions notified to the EU Commission from November 1990 to October 2023, for which there is an available decision document in English. Each decision is systematically downloaded from the official website of DG COMP, including metadata such as decision type, notification and decision dates, and the text data of the decision documents. For the text data, Natural Language Processing (NLP) techniques are utilised for extracting specific keywords embedded within the decision texts. This approach allows us to uncover patterns, trends, and insights regarding the application of ToH and decision-making criteria. It also significantly enhances the efficiency and accuracy of analysing the large volumes of text in the decision documents. The text was processed and analysed within a software environment designed for textual analysis. For all English texts, the textual data as well as the additional information for each merger case was systematically organized into a singular dataset, structured so that each merger decision corresponds to a single row.³

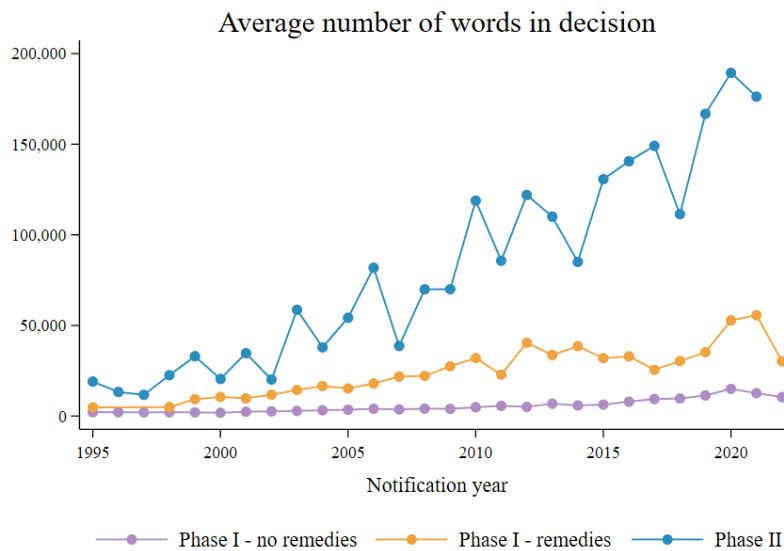
³ Annexes are included in the decision document when available.

In terms of the scope of the decisions included in this dataset, it encompasses every case for which a formal legal decision document in English is available. This includes all mergers that were settled in the first phase of the investigation process,⁴ as well as decisions from the second phase of investigations.⁵ However, it should be noted that some decisions are withdrawn by the parties involved in a merger and, as such, may not be represented in the dataset.⁶ Additionally, data availability varies across time. Our sample comprises a total of 6,897 merger cases spanning from 1995 to 2022.

Figure 1. Number of cases (panel a) and the average number of words per year (panel b), separated by Phase I (purple) and Phase II (orange) decisions.
(a)



(b)



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

⁴ The analysis covers Phase I decisions categorized under 6(1)(b) of EU competition law.

⁵ The analysis covers Phase I decisions categorized under Articles 8(1), 8(2), and 8(3) of EU competition law.

⁶ This is a pity, as these withdrawals are often mentioned as ‘quasi-prohibition’ and, as such, are particularly interesting.

place in that year. While some terms, such as market shares, unilateral effects, innovation and substitutability, are prevalent in both periods, the frequency with which they appear represented by the size of the term changed. For instance, until 2003 the terms related to dominance seems to be more frequent, while after 2004 the related to internal documents and foreclosure become more prominent. The focus of the next section is to analyse groups of terms associated with various ToH to assess how such theories have evolved over time.

3. The Substantive Legal Test

The development of EU merger control followed a different path than the much earlier development of US merger policy, although being certainly influenced by this leading experience at least from the early 2000s.⁸ The first Merger Regulation (Council Regulation 4064/89 on the control of concentrations between undertakings), which entered into force in September 1990, focused on the concept of dominance in the German competition law tradition. The focus was on prohibiting mergers that “create or strengthen a dominant position as a result of which effective competition would be significantly impeded,” the so-called “dominance (substantive legal) test.” It was only with the modernisation of European merger control, which led to the adoption of Council Regulation 139/2004 in May 2004, that a new substantive test was introduced – together with several other changes, most importantly including the introduction of an efficiency defence. The old “dominance test” was revised in favour of the “significant impediment to effective competition” (SIEC) test. This change has often been described as the introduction of a “more economic approach.”

This reform has been accompanied by a significant shift in the application of the economic theories underlying the application of the legal test. The old dominance test was mostly interpreted as a two-tier test under which a merger is prohibited if it leads to the creation or strengthening of a dominant position and, cumulatively, if such a change in market structure significantly impedes effective competition. Under this interpretation, dominance is a necessary but not a sufficient condition for intervention. Therefore, much of the economic assessment has been focused on determining dominance, mostly by focusing on market definition and calculating the market shares of the merging parties. The second condition, i.e. the SIEC, seemed to play a less central role. The change in the legal test brought about a so-called effects-based approach in the competitive assessment of mergers, which focuses directly on the effects of the merger on competition and, in particular, on consumer welfare. In this approach, the development of ToH was certainly more central and elaborated.

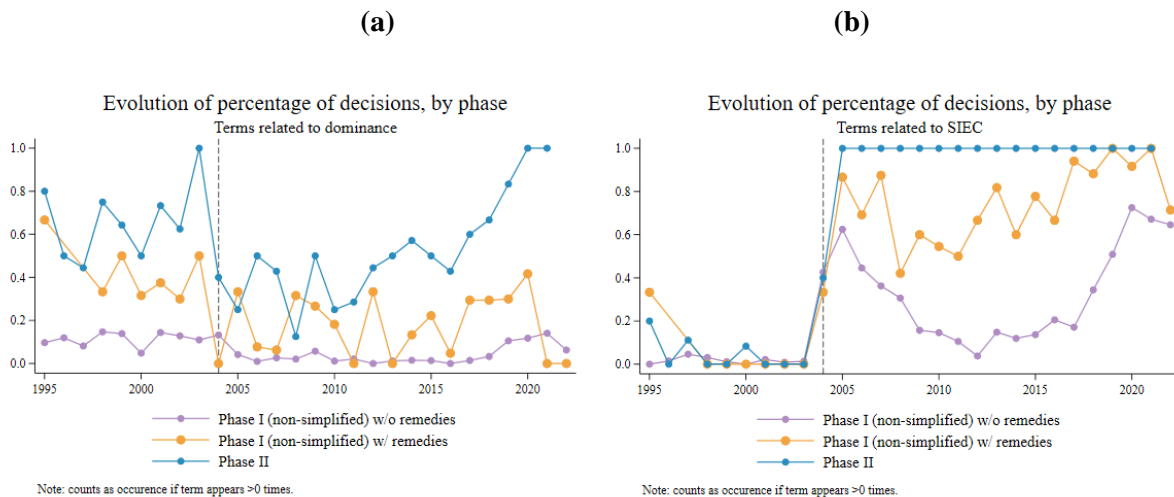
The new test was expected to provide clarity to address perceived problems, such as potential enforcement gaps or the inclusion of efficiencies in merger control (Röller and De la Mano, 1996). Not only was this seen as necessary to increase legal certainty, but it was also expected to have a significant impact on market behaviour, deterring certain mergers from even being attempted. In addition, perhaps an even more extreme expectation of the reform was that the new test had the potential to significantly alter the enforcement of merger control, as the old dominance test may have led to enforcement gaps by potentially overlooking broader market-wide equilibrium effects coming either from competitors’ reaction to the merger or from merger-induced efficiencies.⁹ This oversight may have led to significant errors, as mergers

⁸ The origins of merger policy are found in Section 7 of the Clayton Act of 1914, which prohibits mergers and acquisitions where “in any line of commerce or in any activity affecting commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.” Based on the existing economic theory and, at least until the late 1980s, collusion – or what nowadays in Europe is called coordinated effects – was still seen as the main source of market power and the core theory of anticompetitive effects in merger control (Backer, 1996). Accordingly, the US Department of Justice (DOJ) focused mainly on identifying factors that facilitate collusion. It was first in the 1992 Horizontal Merger Guidelines that the focus was introduced on “lessened competition from unilateral effects.”

⁹ Three telecom mergers serve as notable examples of these so-called “gap cases,” addressed under the SIEC test: Hutchison 3G Austria / Orange Austria, Hutchison 3G UK / Telefónica Ireland, and Telefónica Deutschland / E-Plus. In these instances, the European Commission’s determination of a significant impediment to effective competition was not based on dominance or coordinated effects, although the latter were considered in the Irish and two Austrian cases. The legal criterion for such gap cases

in tight oligopolies may affect prices even though dominance is not established (under-enforcement or Type II errors). On the other hand, it has also been argued that even if a merger led to the creation or strengthening of a dominant position, it may still have generated consumer welfare benefits, in particular through efficiencies. Thus, the dominance test, which allegedly did not allow the Commission to justify an efficiency defence,¹⁰ could also have led to over-enforcement (or type I errors), while the introduction of an efficiency defence, together with the new substantive test, could have addressed this problem.

Figure 3. Substantive test: Dominance (panel a) and Significant Impediment of Effective Competition (panel b)



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

We assess this discussion by looking at how the concepts related to the two substantive tests have evolved over time. The first set of keywords relates to dominance and its evolution (panel a of Figure 3). Between 1995 and 2003, the concept of dominance was mentioned at least once in an average of 75% of Phase 2 merger decisions and 13% of Phase 1 merger decisions without remedies.¹¹ However, the concept of dominance was much more frequently mentioned in Phase 1 decisions requiring remedies, in particular until the early 2000s. After the introduction of the 2004 Merger Regulation, and at least until the mid-2010s, this number drops significantly. This is particularly true for the more complex Phase 2 mergers and also for Phase 1 cases with remedies, where the share of decisions mentioning dominance falls to around 35% and 20% respectively, while the share of Phase 1 decisions without remedies focusing on dominance falls to around 10%. Interestingly, from 2017 onwards, the concept of dominance reappeared more frequently in Phase 2 decisions. From 2005, dominance was mentioned in all Phase 2 decisions.

The picture that emerges from focusing on all terms related to ‘significant impediment to effective competition’ (panel b of Figure 3) is much sharper than that of terms related to dominance. It was only in 2004 that merger decisions began to refer frequently to this concept. Only a small fraction of cases refers to this concept before then, which supports the claim that the dominance test was probably interpreted as

revolves around whether the merger eliminates crucial competitive constraints exerted by the merging parties on each other, alongside reducing competitive pressure on remaining competitors.

¹⁰ See European Commission (1996).

¹¹ All figures on the percentage of cases in which the concept is mentioned are based on the concept appearing at least once in the decision. This choice was made because it would seem subjective to use any other cut-off point. The choice of cut-off is also problematic because the length of decisions – and thus the number of times a term is used – varies considerably, especially between Phase I and Phase II. However, we perform several robustness checks where, instead of one mention, we consider at least stepwise 1/2/3/4/5 mentions to define a decision as having mentioned the concept. This affects the levels but not so much the evolution of the indicators.

a two-step test and that the core of the competition assessment was focused on establishing dominance. Instead, from 2005 onwards, all Phase 2 decisions refer directly to the SIEC criterion, as do most Phase 1 decisions with remedies, while only a fraction of Phase 1 decisions without remedies refer to this substantive test, and this varies over the years with a dip between 2010 and 2015. In later years, this trend is however restored.

4. The Theories of Harm

In this section, we categorize and discuss the most common ToH. In principle, ToH can be divided into horizontal – ToH related to a merger affecting direct competitors – and non-horizontal – ToH related to a merger involving firms that do not directly compete. Each of these can be further divided into unilateral –focusing on the individual behaviour of the merging parties– and non-unilateral –focusing on the coordinated behaviour of the merging parties and their competitors. In what follows, we do not consider all elements of this matrix, but will mainly focus on unilateral and non-unilateral horizontal ToH. We then discuss non-horizontal – i.e. vertical and conglomerate – ToH without distinguishing between unilateral and coordinated effects. We conclude with a brief review of more novel ToH that are at the centre of the current merger policy debate, namely innovation ToH and ToH for digital markets. A brief overview of the taxonomy, together with a list of the keywords used to measure these concepts, is provided in Table 1 of the Annex.

4.1. Horizontal theories of harm

Unilateral theories of horizontal harm serve as the cornerstone of merger policy and are typically the most prevalent ToH used by both the European Commission and its US counterpart, as well as by national competition authorities. While these have been at the heart of the implementation of the EU horizontal merger regime since its inception, they have evolved significantly over time, partly due to the economic interpretation of what drives merger effects and partly due to the role played by the legal test underpinning merger policy. In this section we focus exclusively on horizontal ToH, dividing them into unilateral and coordinated effects, as we will deal separately with non-horizontal unilateral ToH in Section 4.2.

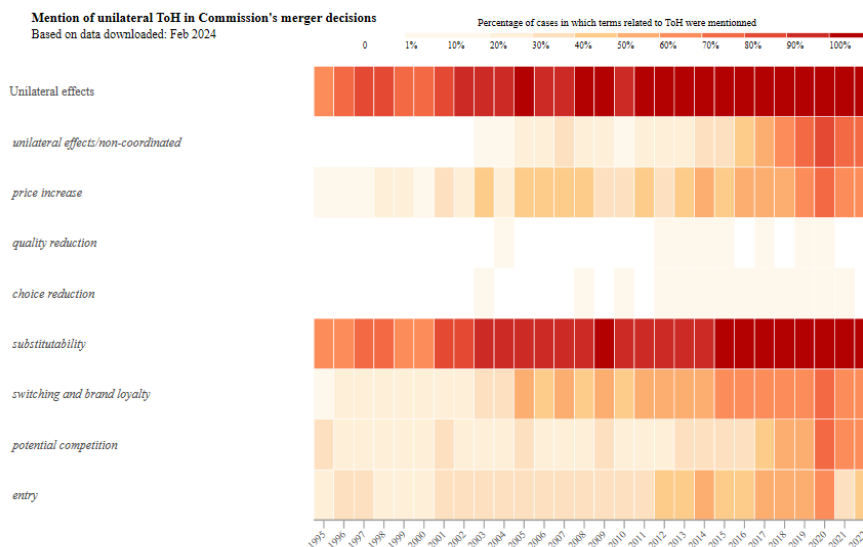
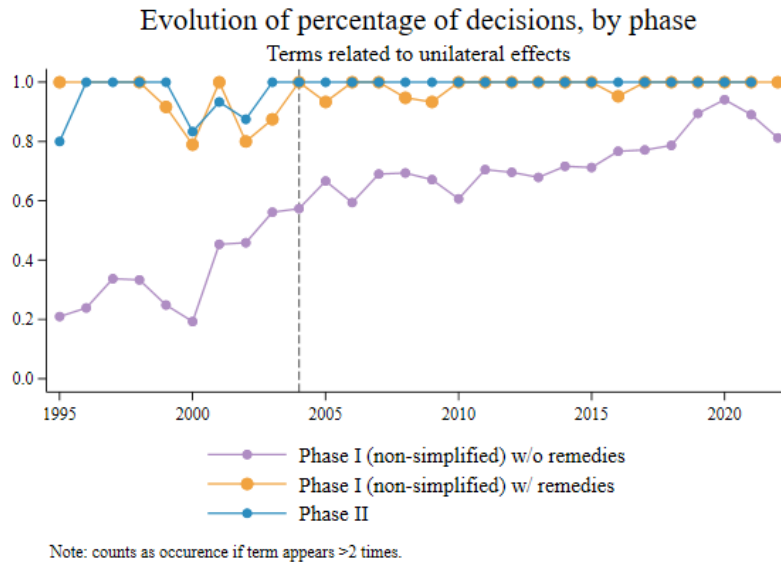
4.1.1. Unilateral effects

There are several possible concerns that are at the basis of horizontal unilateral ToH. The most common concern is that the merger can lead to a price increase, the most traditional dimension of competition. Since competition sometimes occurs also in other non-price dimensions, such as quality or variety, alternative outcomes can, and have, also been considered by antitrust authorities. The unilateral effects of a merger arise because the merged firm can increase its market power by removing an important competitive constraint. The reduction of direct competition between the merging parties may lead them to raise their prices, lower the quality of their products, or reduce the choice of products available to consumers. While the direct effect of the merger is the loss of competition between the merging firms, standard economic theory suggests that the equilibrium effect of such a loss of competition is also to affect the behaviour of competitors. Rival firms may indirectly benefit from the overall reduction in competitive pressure resulting from the merger, as the merging firms' price increase may divert some demand to the rival firms, which in turn may find it profitable to raise their prices (or reduce quality or products' choice). Such equilibrium changes depend on the form of competition in the market, the market structure, and consumer preferences.

In all these cases, the intensity of the effect depends on the degree of substitutability among products – i.e. how close competitors the merging firms are. This might also be affected by switching costs, search costs, brand loyalty, and other characteristics of consumer behaviour. When thinking about potential competition, also concepts like entry barriers or the likelihood of potential entry play an important role. Lately, competition authorities have also been focusing on innovation as a key dimension of competition that might be negatively affected by a merger, which we will separately discuss in Section 4.3. While most unilateral theories focus on the acquisition of existing competitors, the acquisition of potential

competitors might also raise competitive concerns and be an important element of unilateral ToH. This has become a key element of ToH in digital markets, where potential competition might play a much stronger role, as we discuss in Section 4.3.

Figure 4. Terms related to unilateral effects



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022. Term counts as occurrence if it appeared at least 2 times.

Given the focus of the Horizontal Merger Guidelines, terms related to unilateral ToH have been mentioned in practically all Phase II merger decisions as well as Phase I decisions with remedies since the beginning of its implementation. However, before the introduction of the new Merger Regulation in 2004, terms related to unilateral ToH were used less frequently in Phase I decisions without remedies, with only 40-50% of such decisions using one or more of them on average (Figure 4). Essentially all terms related to unilateral effects have been increasingly used by the Commission over time and, by 2020, almost all merger decisions mentioned at least one of them. The most commonly used concepts relate to substitutability and switching. Indeed, the closeness of competition is key in unilateral ToH. Price

increases are also mentioned quite frequently – increasingly so over time – as are terms such as potential competition and entry.¹² Conversely, terms related to non-price dimensions such as quality or choice are not often used.

4.1.2. Coordinated Effects

Originally, coordination between competitors was seen as the main competitive concern in mergers.¹³ However, as discussed above, already in the late 1990s merger policy was mostly focused on unilateral effects. The first EU Merger Regulation was no exception. Indeed, the main competition concern of the Regulation was the creation or strengthening of a single firm’s dominant position. However, the regulation also gave the Commission the power to oppose mergers if they created or strengthened joint dominance, a concept related to the ability of competing firms to coordinate to set prices above competitive levels. In practice, joint dominance – and coordinated effects later on – has rarely played a central role as the main ToH in EU merger control and has been seen as a kind of complementary tool, as depicted in Figure 5.¹⁴ Nonetheless, the controversial use of these ToH has had a fundamental impact on the development of European merger policy.

The interpretation and assessment of joint dominance has been tested by various merger cases in the EU since the late 1990s – for example, the famous Nestle/Perrier merger, the first in which the Commission’s main test focused on joint dominance – as well as by various judgments of the European courts that have had a major impact on the evolution of EU merger control. While in 1998 the European Court of Justice recognised joint dominance but stressed the need for structural links between firms to prove its existence, the Court of First Instance (CFI) in *Gencor v. Commission* instead accepted a broader interpretation, emphasising the economic impact on market structure rather than solely inter-firm relationships. This shift led the Commission to rely more often on joint dominance as a tool to challenge mergers where single dominance did not appear to be a key issue.

The landmark case that significantly changed the use of coordinated effects in EU merger control was *Airtour/First Choice*, where the Commission extended the application of joint dominance to an industry with ambiguous collusive tendencies. This decision led the Court of First Instance (CFI) to scrutinise the Commission’s economic analysis and annul the decision.¹⁵ The CFI clarified the standard of proof for merger prohibition, emphasising the need to demonstrate a high probability of collusive outcomes rather than mere possibilities. In addition, the judgment emphasised that joint dominance refers specifically to pro-collusive effects and set out three conditions for sustainable tacit coordination: market transparency, credible retaliation mechanisms, and limited threats from rivals and consumers. These conditions are consistent with standard economic principles governing collusion.¹⁶

¹² Clearly, the terms ‘price increase,’ ‘entry,’ and ‘potential competition’ could also be classified under non-unilateral effects, as they are also relevant for ToH focusing on coordinated effects as well as for non-horizontal ToH in the case of price increases due to input foreclosure. However, these concepts are central to unilateral effects and, thus, we have decided to group them together here. In any case, ‘substitutability’ appears to be the leading concept related to unilateral effects among those selected, and our analysis would not be affected by focusing on it alone.

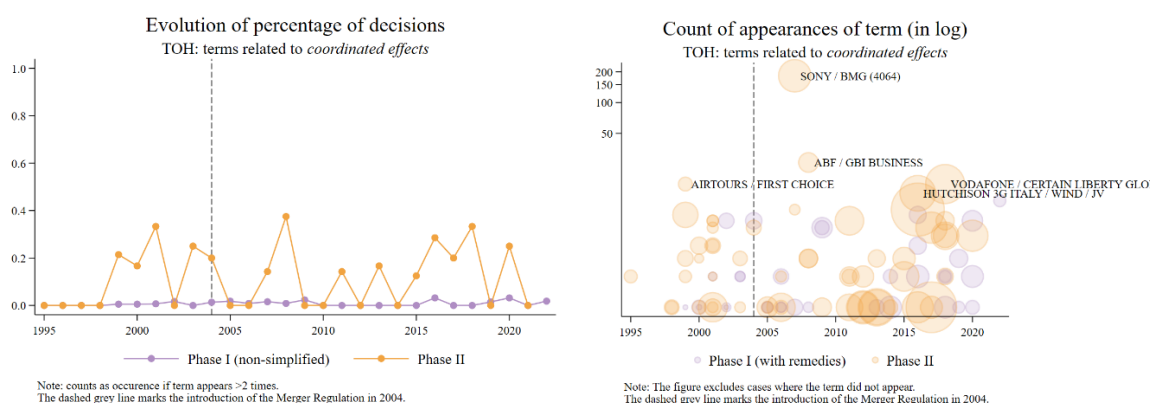
¹³ It was first with the game-theoretic revolution in industrial organization that unilateral effects have surged to become the main concern in merger policy (e.g. Salant, Switzer, and Reynolds, 1983).

¹⁴ For an overview of the framework for the assessment of coordinated effects in the EU Commission’s Horizontal Merger Guidelines, as well as decisional practice in applying them, see Piechucka (2023). We do not differentiate between Phase I cases with or without remedies here, as there is too little variation.

¹⁵ This fundamental judgment was followed by two further setbacks for the Commission, with the annulment of the *Schneider/Legrand* and *Tetralaval/Sidel* prohibition decisions, where the CFI was also highly critical of the Commission’s economic analysis. This led to calls for greater use of economics in EU merger control and, ultimately, to the major reform with the introduction of the new Merger Regulation and the new SIEC substantive test, together with the creation of the Chief Economist’s Office within DG Competition. The Regulation also introduced the new concept of coordinated effects replacing the concept of joint dominance, which attempted to draw closely on developments in the academic literature on tacit collusion.

¹⁶ See, for example, Fabra and Motta (2016) for a comprehensive discussion of coordinated effects and Ivaldi et al. (2003), a report written for the European Commission entailing the main theoretical underpinning for the concept of tacit collusion and coordinated effects.

Figure 5. Terms related to coordinated effects



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022. Term counts as occurrence if it appeared at least 2 times.

The next major decision involving a ToH in which joint dominance and coordinated effects played an important role was Sony’s acquisition of BMG, which the Commission cleared unconditionally in 2004. This decision was challenged before the CFI following a complaint by Impala, an association representing independent music labels. The CFI annulled the European Commission’s decision in 2006, ruling that the Commission had failed to adequately assess the potential impact of the merger on competition in the recorded music market. The CFI criticised the Commission’s analysis, stating that it had not properly considered the impact of the merger on smaller competitors and the diversity of music available to consumers. Overall, the Impala decision not only underlined the importance of conducting a thorough competition assessment in merger cases, but it also clarified the conditions under which coordinated effects can be identified.

The ABF/GBI merger in 2008 was the European Commission’s first challenge on the basis of a coordinated effects ToH since the Airtours case. Although it ultimately cleared with significant remedies, it underlined the Commission’s commitment to thorough industry analysis, adhering closely to the Merger Guidelines and case law, particularly the Impala judgment. The assessment involved analysing market characteristics for potential coordination, assessing the sustainability of coordinated outcomes, and determining the merger’s impact on market transparency and competitive pressure. Similarly, in the Hutchison 3G Italy / Wind / JV case, the Commission scrutinized the reduction from four to three mobile network operators in Italy, highlighting concerns over possible tacit collusion that could lead to higher prices and reduced choices for consumers. This case represented a revival of the significance of coordinated effects in EU merger control.

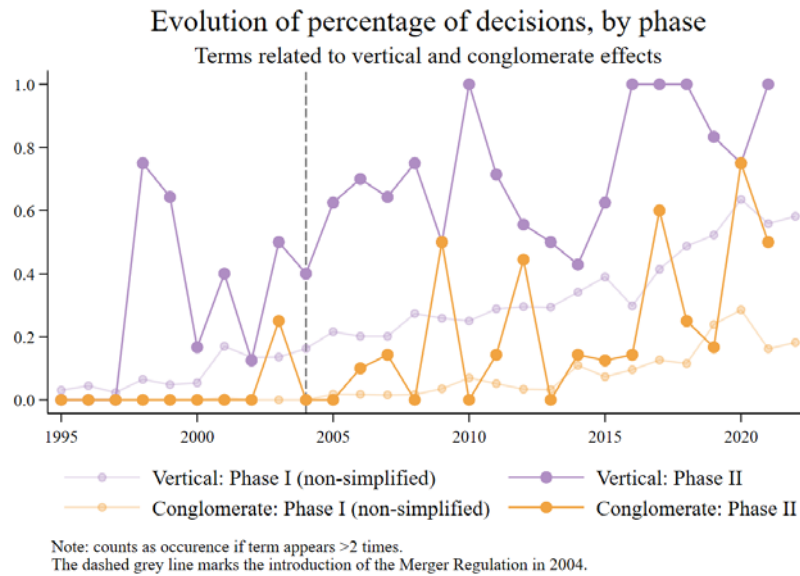
4.2. Non-horizontal Theories of Harm: Vertical & Conglomerate Aspects

Vertical and conglomerate effects were originally not at the core of the competitive assessment under both the old and the new EU merger regulations, which focused more on horizontal concerns, be they unilateral or coordinated effects. However, this seems to have changed over time and, especially, starting in the mid-2010s (Figure 6), partially coinciding with the introduction of the guidelines on the assessment of non-horizontal mergers in 2008. Both vertical and conglomerate effects appear to have increasingly been discussed in the Commission’s merger decisions as an important part of the ToH in merger cases.

Unlike horizontal effects, which are always seen as a competition concern with potentially negative consequences for consumers in the absence of efficiency gains, vertical and conglomerate effects can be both beneficial and/or harmful. Indeed, competition authorities have traditionally highlighted several reasons why the vertical effects of mergers are expected to benefit consumers as also reflected in the non-horizontal merger guidelines. These reasons include the elimination of double marginalisation and a more

aligned set of incentives within a vertically integrated firm, which together enhance efficiency. Yet, vertical integration can also have harmful effects on competition. The main issue is that a merger may help the integrating parties to foreclose rivals either by raising the costs at which they can operate in a downstream market (input foreclosure) or by reducing the expected revenue streams of upstream rivals (reducing rivals' revenues through customer foreclosure).¹⁷

Figure 6. Terms related to vertical and conglomerate effects



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022. Term counts as occurrence if it appeared at least 2 times.

Unlike vertical effects, conglomerate effects occur when the merging firms serve similar or overlapping customer bases, even though they do not compete directly or have a direct buyer-supplier relationship. Therefore, they have also traditionally been viewed as largely pro-competitive, as there is no loss of direct competition and, on the contrary, they have the potential to generate synergies. Indeed, the existence of a significant degree of overlap in terms of customers served often implies the existence of complementary products that are more valuable to the buyer when consumed together and may be less costly to produce as a bundle. However, this overlap in terms of customer base may lead to increased market power and potential anti-competitive effects. Specifically, conglomerates possess an increased ability or incentive to engage in certain market behaviours, including price discrimination and exclusionary practices. With the ability to price discriminate through self-sorting, conglomerates can extract rents from consumers by tailoring prices based on individual preferences or characteristics. Additionally, they may employ exclusionary tactics, such as tying or bundling, which can effectively foreclose competition and limit consumer choice by compelling consumers to purchase a bundle of products or services. These practices can bolster the merged entity's market power and hinder competition.

In the following, we discuss separately three elements that have been key in the development of vertical and conglomerate ToHs: input foreclosure, customer foreclosure, tying and bundling. It is important to note that all these concepts have often been used simultaneously as different aspects of the same ToH.

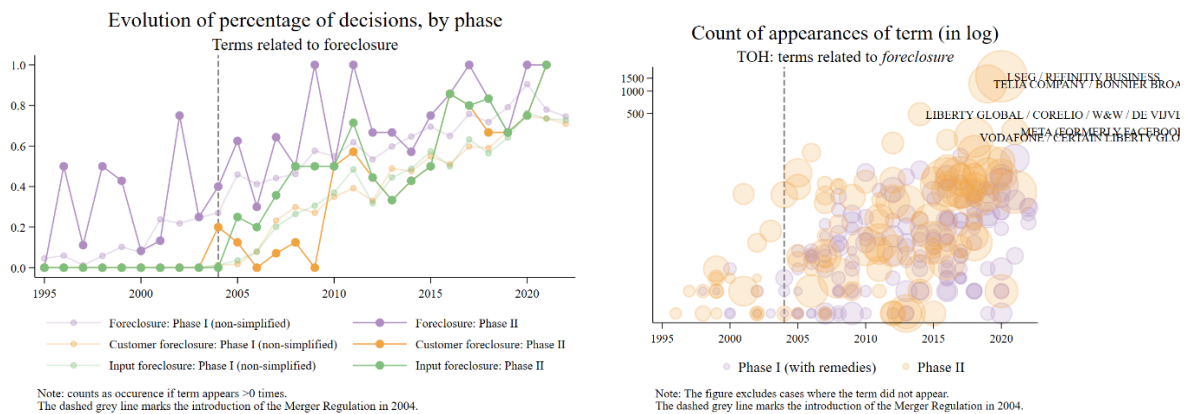
¹⁷ There are other potentially anti-competitive vertical effects of mergers. For instance, vertical integration may give the merged entity access to information about the upstream or downstream activities of competitors, which are commercially sensitive. Vertical integration may also, to some extent, facilitate coordination both upstream and downstream, thereby increasing the likelihood of collusion. Given their less central nature and the limited space available, we refrain from discussing these further.

4.2.1. Input and Customer Foreclosure

When assessing whether a merged entity has the ability and incentive to raise rivals' costs (*input foreclosure*), several factors must be considered. First, the input in question must be of significance to the downstream market in the sense that it plays a crucial role in the production process or final product. Additionally, the merged entity should possess substantial market power in the input market, indicating its ability to control prices or supply. Furthermore, there must be an incentive for the merged entity to raise rivals' costs, typically stemming from the aim to protect or expand its market share or profits. Downstream profits should also be substantial, as this indicates the potential impact of cost-raising behaviour on market dynamics. The effect of increased upstream prices should translate into higher downstream prices for consumers, highlighting the relevance of the cost increase. Furthermore, the impacted rivals must be close competitors to the merged entity, meaning that they operate in the same or similar markets. The rivals whose costs are raised should constitute an important competitive force in the market, while the cost-raising behaviour should have a notable impact on entry barriers, potentially hindering new entrants from effectively competing in the market. Finally, the effect on downstream consumers should be significant, reflecting the potential harm to consumer welfare. These criteria providing a framework for assessing the ability of a merged entity to raise rivals' costs have indeed been used to assess the potential competitive implications of input foreclosure.

While the reduction of competitors' customer base, i.e. *customer foreclosure*, shares similarities with scenarios where rivals' costs are increased, the competitive effects are often more protracted and uncertain. Both the incentive and the ability to foreclose still matter, but the extent of the competitive harm depends on several other elements, including the absence of counterstrategies and reduced investment levels of the affected parties. Thus, the downstream effects of a reduction in rivals' customer base unfold gradually and are subject to various contingencies, making the results less predictable and immediate. Moreover, often both forms of foreclosure might co-exist and are dealt simultaneously when assessing the potential harm that can arise in vertical relations.

Figure 7. Terms related to foreclosure



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

While being used in several, especially phase II, cases during the first decades of EU merger control, foreclosure was a much rarer term in merger decisions then today (Figure 7). This can be attributed to two elements. One is the change in the legal test, which increased the need to develop a clearer ToH based on sound economic theory. This has also led to the introduction of the Non-horizontal Merger Guidelines in 2008. The other is the fact that the theory of vertical foreclosure was formally developed in the late 1980s and early 1990s (e.g. Salinger, 1988; Ordover et al., 1990; Hart and Tirole, 1990), developing further in the following years. Thus, it is reasonable to expect that it took some time for these concepts to find their way into the enforcement practice of the competition authorities. This pattern is even clearer if we focus on the narrower concepts of input and customer foreclosure. The use of these terms essentially

started with the introduction of the new 2004 Merger Regulation and has increased steadily since then. By 2020, concerns about input and customer foreclosure were raised in approximately 70% of all merger cases on average, highlighting them as potential harms.

Again, some cases stand out. In 2021, the Commission cleared the acquisition of Refinitiv by the London Stock Exchange Group (“LSEG”), subject to several remedies. The LSEG/Refinitiv provides a good illustrative example of a complex merger where several ToH played an important role in the assessment of the competitive effects. Beside the horizontal effects – the parties owned the two major electronic trading venues for European government bonds that were very close competitors – the investigation mainly focused on vertical ToH and issues of input and customer foreclosure. The discussion centred on the value of, and access to, data, highlighting the essential nature of this input for many markets such as stock indices, data providers, financial infrastructure providers, trading and clearing service providers, and other financial market intermediaries. The Commission assessed to what extent the merged entity would have the ability as well as the incentive to engage in input and/or customer foreclosure on the various relevant markets, as well as its impact on effective competition. The Commission accepted the far-reaching commitments offered by LSEG including structural divestitures to address the horizontal concerns as well as non-structural commitments to address vertical issues and cleared the merger.

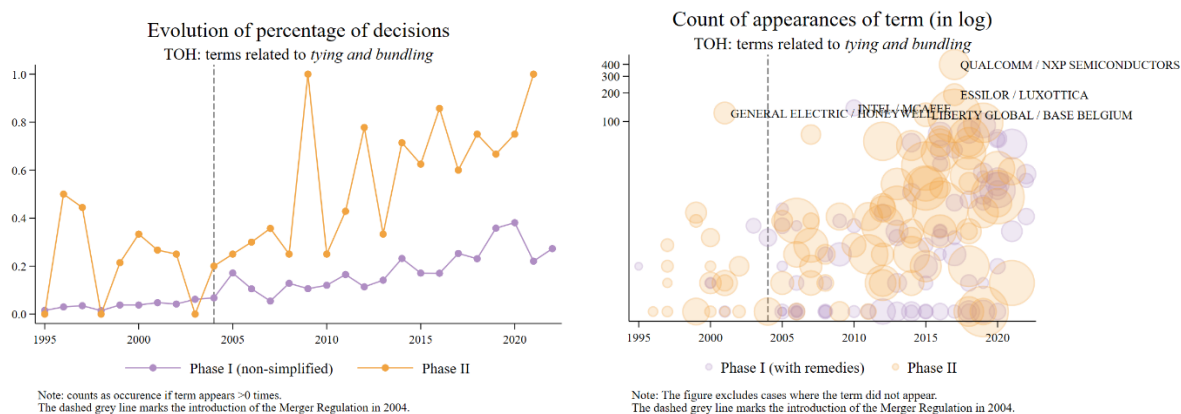
4.2.2. Tying and Bundling

Beside foreclosure, tying and bundling are key concepts underpinning conglomerate ToHs. Bundling refers to the practice of selling two products together in fixed proportions. There are two main types: pure bundling, where products are exclusively available as a bundle, and mixed bundling, where products are offered both individually and as part of a bundle at a discount. Mixed bundling allows consumers to mix and match components from different competitors as long as they are compatible. Bundling offers firms the opportunity to capture more consumer surplus from individuals who assign varying values to the separate goods. By incorporating bundles into their product offerings, firms can mitigate demand variability and capture additional consumer surplus. This effect is most pronounced when consumers’ valuations of the bundled products are negatively correlated.

Tying involves the sale of one product (the tying product) under the condition that the buyer also purchases another product (the tied product). Unlike bundling, tying allows for variable consumption proportions, and buyers have the flexibility to determine the quantities of each product. The tied product is also available for individual purchase, separate from the tying product. Tying can function as a metering device, particularly in cases where a durable good necessitates variable supplies. By marking up the variable inputs above marginal cost, sellers can engage in price discrimination against heavy users of the durable good by using the sale of variable inputs as a metering or monitoring device for usage intensity. Typically, in instances of “metering,” the tying and tied goods are complementary.

While tying and bundling were often used also in the pre-2004 period, their importance has increased over time, both in phase I and phase II cases (Figure 8). A good recent illustrative example on how the Commission examines complex conglomerate issues, particularly regarding mixed bundling and commercial tying strategies, is the Essilor/Luxottica case in 2018 – the merger of two global leaders in the closely related industries of ophthalmic lenses and eyewear. The evaluation of conglomerate effects centred on the potential bundling or tying of Luxottica’s branded eyewear with Essilor’s lenses, potentially reducing competition in the lens market. Furthermore, the Commission analysed the loss of potential competition by assessing the extent to which emerging activities could have developed in the foreseeable future, aiming to gauge the likely future competitive constraints removed by the merger. Notwithstanding these concerns, the Commission ultimately opted to clear the case without conditions.

Figure 8. Terms related to tying and bundling



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022. Term counts as occurrence if it appeared at least 1 time.

4.3. More novel theories of harm

In the 2010s, there was a debate among policymakers and academics on the need for merger policy to move away from its focus on the largely static ToH and to address the increasing challenges in markets where dynamic competition and innovation play a central role. While these discussions were not new, as innovation effects were already mentioned in the original Merger Regulation, they have reached a different level, in particular due to the disruptive emergence and development of digital technologies. In the following sections, we will focus on two sets of ToH that have been at the core of these discussions: ToH of innovation and ToH related to digital markets.

4.3.1. Innovation theories of harm

Innovation Theories of Harm – i.e. the concern that a merger may lead to a decrease in the level of innovation activities by the merging parties or their competitors to the detriment of consumers – are a relatively recent development in antitrust analysis, especially in the context of merger control.¹⁸ Although assessing the impact of competition, particularly mergers, on innovation lacks a simple unifying framework, there are few fundamental principles that can serve as a foundation for developing an innovation ToH (Shapiro, 2011).¹⁹ First, contestability in the innovation space is a crucial element to avoid hampering innovation. Second, the incentive to innovate is related to a firm’s ability to appropriate the benefits of its innovation. And third, the ability to innovate is positively affected by the synergetic combination of complementary assets. These principles are widely understood. However, the impact of mergers on innovation is complex and multilayered, thus it depends on each specific case.

The term “Innovation Theory of Harm” was not used until the European Commission adopted it in its 2017 decision on the Dow-DuPont merger (Federico et al., 2020), where it argued that the merger would reduce innovation in the agro-chemical sector.²⁰ Since then, Innovation Theories of Harm have been applied or discussed in several other cases, such as Celgene/Bristol-Myers Squibb, Illumina/PacBio, Roche/Spark, and Bayer/Monsanto. While the formalisation of an innovation ToH has taken a long time,

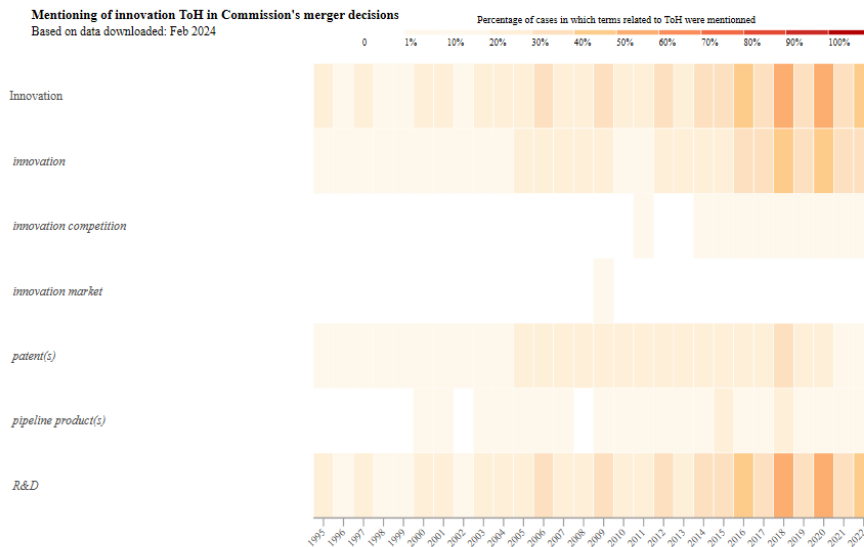
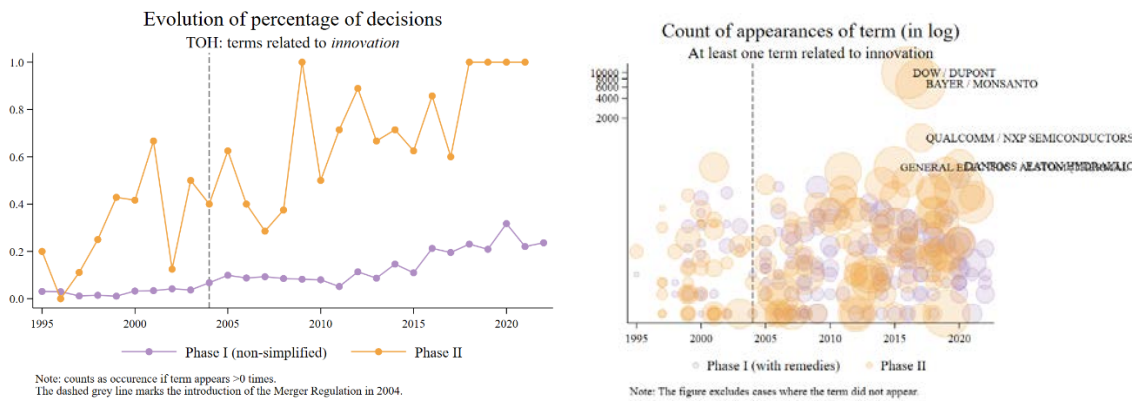
¹⁸ One of the earliest references to this concept is in Gilbert (2006), who surveys the literature on the relationship between competition and innovation.

¹⁹ See European Commission (2016).

²⁰ Since the landmark Microsoft case in 2000, innovation has played an increasingly critical role in merger control, with the Dow Dupont case being the first to utilize a structured innovation theory of harm. The evolution of innovation in merger control can be seen through several stages: starting with the basic concept of innovation, moving to the analysis of innovation pipelines, then examining competition between pipeline products, and ultimately focusing on the race to innovate. While innovation is often associated with the digital sector, its impact extends across all markets, as reflected in the wide variety of sectors where innovation has been assessed. This broad application underscores the pervasive influence of innovation on competition and market dynamics.

the focus on innovation as a potential competitive outcome that may be affected by the merger and has welfare consequences is not so new. Even before the introduction of the 2004 Merger Regulation, the Commission discussed innovation issues in 10-15% of its decisions - and as much as 70-80% of Phase II decisions (Figure 9). The use of these concepts increased significantly after 2004, reaching around 40% of all decisions, and by the end of the 2000s they were mentioned in virtually all Phase II decisions. Among the various elements, the idea of ‘innovation competition’ and the concept of ‘pipeline products’ are almost only used after 2005 and 2000, respectively, representing changes towards more structured or elaborate innovation ToH.

Figure 9. Terms related to innovation



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

The Dow/Dupont merger can be seen as a turning point in the use of innovation ToH, in particular because the entire case, including the remedies, made a clear distinction between product and innovation markets, complete with the investigation focusing on each separately. The merger raised concerns mainly in the crop protection sector, covering both product and innovation competition. Innovation is fundamental in this sector and the merging companies were among the only five global players active in all aspects of the product life cycle. In response to these concerns, the Commission accepted a remedy proposed by the parties to facilitate the creation of another integrated global R&D company. This remedy addressed both the innovation and production concerns, while an additional remedy was necessary to address competition concerns in the petrochemicals sector, which was also affected by the merger.

A subsequent merger where the Commission's analysis was heavily influenced by the Dow/Dupont innovation ToH was the takeover of Monsanto by Bayer. This is a peculiar merger particularly because, given its complexity, the Commission investigated its effects in terms of horizontal overlap, vertical and conglomerate effects, as well as effects on innovation. Concerning the innovation effects, the Commission identified likely harmful effects on product and innovation competition in several seeds, traits, pesticides, and digital agriculture markets.²¹

4.3.2. Theories of Harm in digital markets

The development of digital technologies and the spectacular growth of technology companies, like Microsoft, Alphabet, Meta, Amazon and Apple, to a significant extent also through the acquisition of small start-ups developing complementary products, but also of potential emerging competitors, are leading antitrust authorities to develop ToH capable of addressing the specific concerns that arise in such markets (e.g. Argentesi et al., 2019).²² These markets are characterised by specific features, such as network effects, data-driven economies of scale and scope, multi-sidedness and innovation dynamics, that may pose challenges to not just traditional unilateral horizontal ToH based on price effects and market shares or static efficiency, but also to vertical and conglomerate ToH.

While the conglomerate and vertical nature of digital platform ecosystems has revived the relevance of these non-horizontal ToH, it also necessitates their adaptation to account for the unique aspects of digital markets. A natural evolution is represented by ecosystem ToH, which examine the possibility that a merger could entrench or expand a platform's ecosystem, thereby reducing consumer choice and competition across multiple markets. These are essentially conglomerate ToH. For example, similar to foreclosure ToH, which focus on the ability and incentive of a dominant platform to exclude or discriminate against rivals or customers by leveraging its market power across markets or segments, data-driven ToH are based on the idea that dominant digital platforms that own significant amounts of data can foreclose or discriminate against rivals in multiple markets.²³

Furthermore, the fast-paced development of digital markets and the possibility that mergers may affect markets that do not yet exist has drawn attention to concepts such as potential competition and the likelihood of entry, while the accumulation of data is now seen as creating endogenous barriers to entry. These concepts were also used in more traditional ToH in the past but needed to be adapted. Additionally, innovation is also a crucial factor in digital markets. Concepts such as 'killer acquisition' (Cunningam et al., 2021) were developed to discuss the effects of mergers on innovation, mostly in the pharmaceutical sector, where dominant players buy nascent competitors to kill potential competition. While this concept is frequently discussed in policy circles and among antitrust authorities in relation to digital markets, it does not appear to have made its way to merger enforcement by the EU Commission. Indeed, the term does not appear in any of the analysed Commission decisions up to 2022.

To measure the development of ToH related to digital markets, we collect a wide range of keywords, including 'digital', 'platform', 'ecosystem', 'multi-homing', 'network effects', 'privacy policies', and 'software'. All these terms follow a similar increasing trajectory over time but have different levels (see Figure 10). The terms 'digital', 'software', and 'platform' are more commonly used prior to 2004. While terms related to 'ecosystem', 'multi-homing', 'network effects', and 'privacy policies' are still not used extensively, their use has clearly gone up since 2004. Overall, terms related to digital ToH have become

²¹ While this merger cannot be considered an example of a case in digital markets, the term 'digital' was frequently used in the context of digitally-enabled spraying prescriptions for pesticides, where the evidence collected by the Commission showed that Bayer and Monsanto were potential competitors in these markets.

²² These theories of harm have been developed and applied by various competition authorities in recent years, such as the European Commission, the US Department of Justice and Federal Trade Commission, the UK Competition and Markets Authority, and the Australian Competition and Consumer Commission (OECD, 2023).

²³ Recent discussions argue that new ecosystem theories of harm should be developed that go beyond the 'incentive/capability' framework commonly used in foreclosure cases. In particular, the market-by-market mechanism of such a framework is criticised because multi-product digital firms often operate in multiple overlapping spaces. This requires a shift from a focus on products to a focus on assets and capabilities (e.g. Caffarra et al., 2003).

increasingly prevalent over time, with a frequency of approximately 40% of cases mentioning them at the beginning of the 2020s (in Phase II, 100%). On the other hand, ‘ecosystem’ is a term that is rarely used and only began to appear in the mid-2010s.

Figure 10. Terms related to digital markets.



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

When evaluating the cases that used the concepts assessed above, one observes that the term ‘digital’ is often used in contexts that are not necessarily related to what is commonly interpreted as digital (platform)

markets. For instance, Sony/BMG (digital music) and Bayer/Monsanto (digital agriculture) are among the top cases mentioning ‘digital’. These cases demonstrate that, in many sectors, the merging parties produce and sell digital goods, often in parallel to physical goods. The ToH adopted in these cases are not necessarily related to those discussed above that address the specificities of digital markets.²⁴ However, there are also cases that use the term ‘digital’ and that do cover what is commonly defined as a digital platform market, such as Nokia/Navteq (digital map database), Universal Music Group/EMI Music and Apple/Shazam (digital music platform and digital music streaming applications). In these cases, the merger decisions discuss digital goods but also focus on the platform market that organises the trade in such goods and refer to several of the concepts discussed above that characterise competition in digital platform markets.

For instance, cases like Universal Music Group/EMI Music, and Apple/Shazam (digital music platform) entail the discussion of network effects and the role of access to data as central elements of the ToH. Apple/Shazam offers an especially good example of a merger where the Commission has performed a comprehensive assessment of data-related issues and is the first case in the digital sector where the Commission assessed whether, by vertically integrating, the merged entity would gain access to commercially sensitive information regarding the upstream or downstream activities of rivals and use this information to undertake conducts that would put competitors at a competitive disadvantage. The Google/Fitbit case also provides an example of a merger where the Commission has applied data driven ToH. Indeed, the Commission assessed whether the transaction would lead to an increase in barriers to entry in the online advertising markets, as Google would combine its large database with Fitbit's health and location data to further strengthen its dominant position in these markets. Accordingly, the Commission also accepted a so-called ‘data silo’ commitment proposed by the parties, a behavioural remedy solely focusing on the use of data by the merged entity. The Commission also assessed the potential impact of the transaction on the interoperability of the Android operating system with third party wearable devices, which was addressed by an ‘interoperability’ commitment.

Terms such as ‘ecosystem’ and ‘privacy policy’, which are generally used much less frequently, are instead mostly, but not exclusively, used in cases involving large technology companies. Cases such as Google/Fitbit or Facebook/WhatsApp refer to ‘ecosystems’, as do cases such as Oracle/Sun Microsystems (referring to the ‘ecosystem’ of open-source databases) and ARM/Giesecke & Devrient (referring to the ‘ecosystem’ of trusted applications). In the first two cases - as well as in cases such as Meta/Kustomer, Microsoft/LinkedIn, Amazon/MGM - the Commission developed conglomerate and vertical ToH based on the role of network effects and data access and combination in strengthening the merging parties’ ecosystems, thus harming competition.²⁵ However, a true ecosystem ToH has only recently been fully developed by the Commission to block the acquisition of Etraveli by Booking - which is very recent and not in our database. This ToH argued that the merger would enhance Booking’s ecosystem, transforming it into a comprehensive platform for online travel services. This would strengthen Booking’s dominance in online hotel portals across the European Economic Area, leading to enhanced network effects and increased barriers to entry for potential competitors. As this reasoning appeared to deviate from the focus of the Vertical Merger Guidelines on the extension of an existing dominant position into other areas and to focus on the strengthening of Booking’s existing dominant position, it was considered that the Commission had indeed developed a new ToH. Given that this is the first merger between digital platforms to be prohibited by the Commission and that a new, true ecosystem ToH has been developed, this merger could therefore become a landmark case.

²⁴ Similarly, the term ‘platform’ is frequently mentioned in cases, such as Newscorp/Telepiu (pay TV platform), Siemens/Alstom and Alstom/Bombardier (platform licensing agreements, train platforms), Deutsche Börse/London Stock Exchange (trading platforms), that could be considered more or less traditional markets that are on the verge of being digitized. Again, the ToH entail just few of the aforementioned elements.

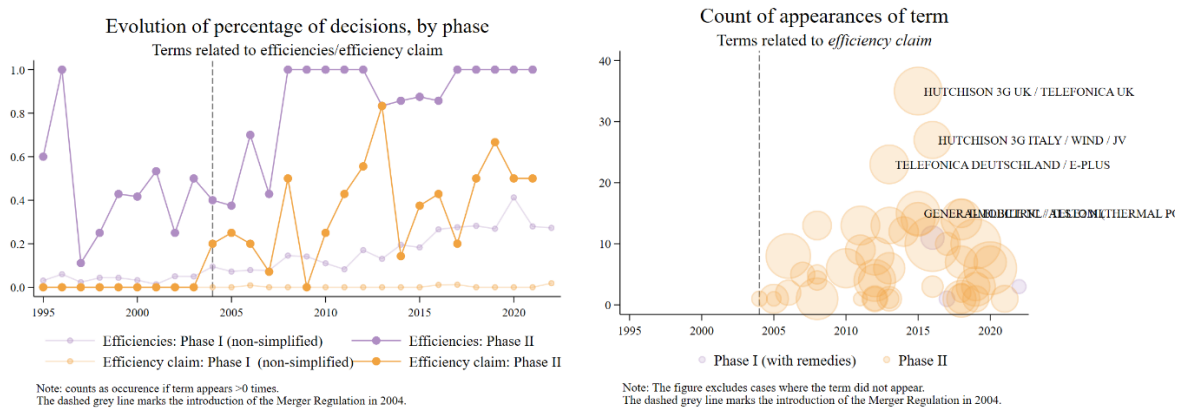
²⁵ See Régibeau and Rockett (2024) in this same issue for an in-depth discussion of conglomerates and eco-systems in competition policy.

5. Efficiencies

While mergers may give rise to anticompetitive effects through unilateral or coordinated behaviour that harms consumers, they may also give rise to efficiencies that may outweigh these negative effects and make the merger beneficial to consumers. While mentioning the concept of efficiencies, before 2004, the Commission very rarely took efficiency gains into account in its analysis, probably because the Commission itself considered that there was no legal possibility to use an efficiency defence.²⁶ Indeed, a major change brought about by the new 2004 Merger Regulation was the introduction of an efficiency defence. This is clearly reflected in our data.

The proportion of cases mentioning terms related to ‘efficiencies’ was low (below 40%) in the period before 2004 and increased significantly thereafter (Figure 11). The picture is even clearer if we restrict ourselves to terms related to ‘efficiency claims’. Such references (almost) only appear after 2004. As expected, Phase II decisions contain more mentions of efficiency claims than Phase I decisions. The peak of these mentions was in 2013, when about 40% of all Phase II cases mentioned terms related to efficiency claims.

Figure 11. Terms related to efficiencies and efficiency claims



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022. Term counts as occurrence if it appeared at least 1 time.

Some cases stand out.²⁷ For instance, in the Hutchinson 3G UK/Telefonica UK merger, which was prohibited by the Commission in 2004, the parties claimed several efficiencies, including fixed cost savings due to economies of scale and increased incentives and ability to acquire spectrum. While the Commission did not accept such claims as they did not meet the standard set out in the Horizontal Merger Guidelines, it did engage in a detailed analysis and discussion of such efficiencies, as evidenced by almost 50 pages of the prohibition decision. Similarly, in the Hutchinson 3G Italy/Wind joint venture case conditionally approved the same year, most efficiency claims did not satisfy the three cumulative criteria outlined in the Horizontal Merger Guidelines.

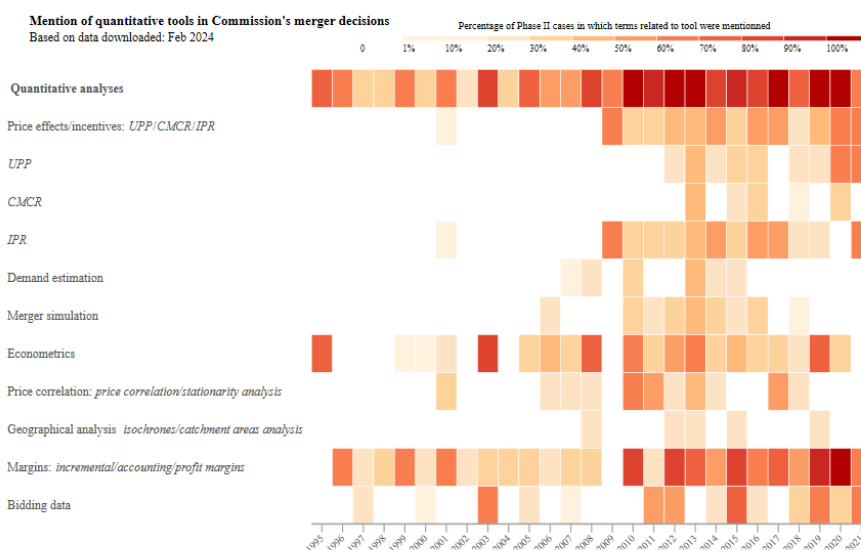
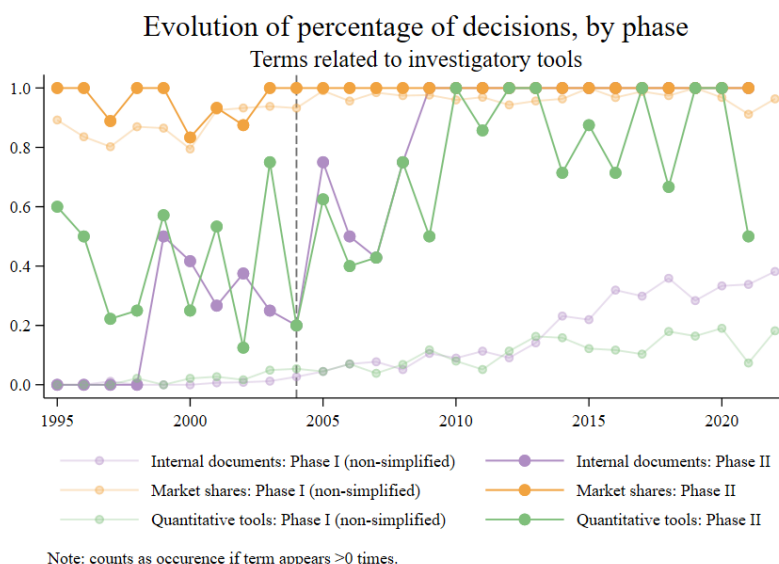
²⁶ Röller and De la Mano (2006, pp. 16-17) nicely note: “As recently as 1999, the Commission stated that “The creation of a dominant position in the relevant markets . . . means that the efficiencies argument put forward by the parties cannot be taken into account in the assessment of the present merger.” This view echoed the categorical position taken by the Commission in 1996: “There is no real legal possibility of justifying an efficiency defence under the Merger Regulation. Efficiencies are assumed for all mergers up to the limit of dominance—the ‘concentration privilege’. Any efficiency issues are considered in the overall assessment to determine whether dominance has been created or strengthened and not to justify or mitigate that dominance in order to clear a concentration which would otherwise be prohibited.”

²⁷ While the y-axis measures the times the specific term was used in the Commission’s decisions, the size of the bubble measures the length of the decision in terms of number of words.

6. Tools and Evidence

Along with the evolution of the ToHs, the tools used by the Commission to substantiate the economic effects of mergers have also evolved over time. Again, the substantive test behind merger decisions was expected to play an important role for the kind of evidence the Commission was supposed to provide. Before the introduction of the 2004 Merger Regulation and the SIEC test, the assessment of dominance in practice relied heavily on market definition and an analysis of the market shares of the merging parties. The well-established case law used a threshold of market shares above 50% as a strong indication of dominance. Market shares between 40 and 50% were also often used to establish dominance, in particular when the merging parties faced weaker competitors, i.e. smaller rivals. With the introduction of the new Merger Regulation and the move to an effects-based approach grounded on more sophisticated ToH, the use of more sophisticated evidence to measure the likely impact of the merger on consumers was expected to become necessary.

Figure 12. Investigatory tools



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

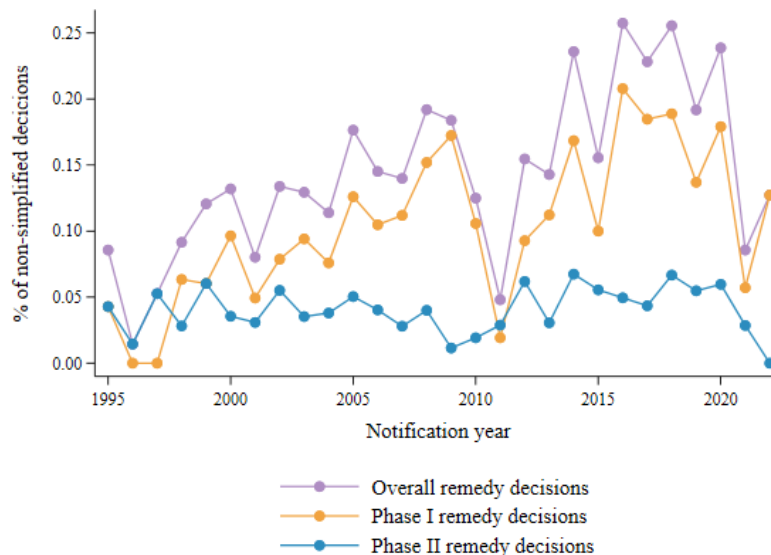
A look at the data partially supports these views (Figure 12). The use of market shares remains a fundamental tool in EU merger control. Indeed, it plays a role in most mergers, whether they are dealt with in Phase I or, more importantly, in Phase II. Interestingly, and perhaps contrary to expectations, market shares seem to be used even more frequently in cases following the 2004 reform. The other striking pattern in the data concerns the use of internal documents. The proportion of cases mentioning the use of internal documents has risen steadily and significantly from less than 10% of all pre-2004 mergers to almost 40% (and almost 100% in Phase II) of mergers. A similar but less pronounced pattern can be observed for the use of quantitative tools. Again, the latter is driven by Phase II investigations, where quantitative tools have become the norm.

Looking at the different tools used by the Commission, it appears that the use of different margin measures as well as the use of different tools to assess price incentives or effects (UPP and GUPPI, CMC, IPR, etc.) has increased over time. In addition, the use of bidding data and, to a lesser extent, econometric tools became more important after 2004. However, more sophisticated tools such as demand estimation and merger simulation are still rarely used.

7. Remedies

When the Commission is concerned that the merger may significantly impede effective competition and has clearly identified the problematic issues, the merging parties may propose remedies, i.e. changes to the transaction that would address these concerns and restore effective competition in the market. This can happen at either Phase I or Phase II. If the Commission considers that the proposed remedies do not effectively address the concerns identified, the merger is either blocked or withdrawn by the parties. This remains the exception.

Figure 13. Remedy decisions as percentage of non-simplified decisions



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

As with the ToH and tools, the use of remedies has evolved over time. Figure 13 shows that the ratio of cases cleared with a remedy in Phase I and in Phase II to the total number of non-simplified cases, has fluctuated over the years, but with an increasing trend. While, in the late 1990s, less than 10% of mergers not cleared under the simplified procedure were remedied in Phase I, this share increased in the following decade, with an outlier of less than 5% of cases in 2011. In the 2010s, the average proportion of non-simplified cases remedied in Phase I was around 15%, always significantly higher than the number of

cases cleared with remedies (or blocked) in Phase II, which remained more constant over the 20-year period in a range between 5% and 10% of non-simplified cases.

Remedies can be either behavioural or structural. Structural remedies involve changes to the merging parties' structures and typically aim to maintain or restore competitive market conditions by modifying their assets or activities. Common structural remedies include divestitures, carve-outs, and spin-offs, which require the merging parties to sell certain assets, subsidiaries, or businesses to third parties, often their own competitors. This may include the sale of brands, production facilities, or distribution networks. Other structural remedies include asset swaps, which require the merging parties to exchange assets with competitors, and licensing agreements, which require the merging parties to license certain technologies, intellectual property, or brands to competitors. Structural remedies are generally preferred by antitrust authorities as they have an immediate market impact, are irreversible, and do not require complex *ex-post* monitoring.

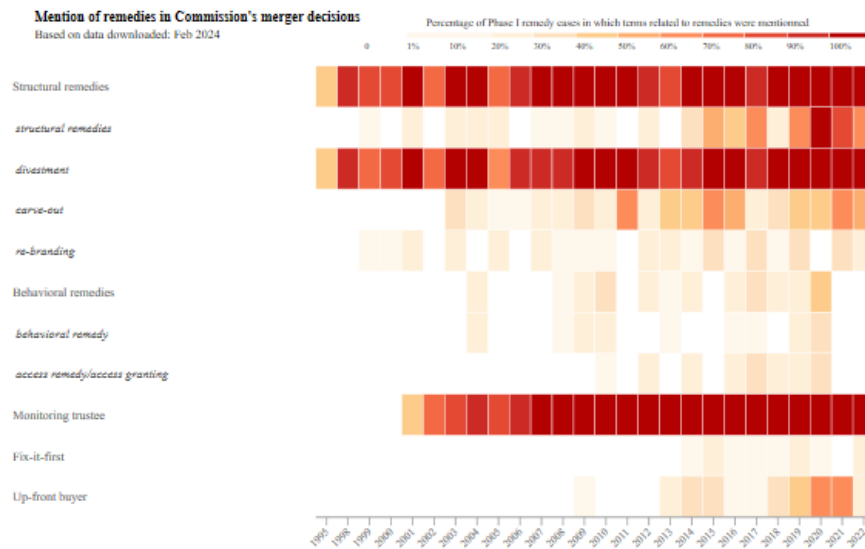
Behavioural remedies are instead designed to address specific competition concerns without requiring the sale or divestiture of assets. They are often used in cases where structural remedies are not possible or sufficient. Behavioural remedies involve commitments by the merging parties to modify their post-merger conduct to address potential anti-competitive concerns, and essentially consist of the regulation of their behaviour. These are considered to be a particularly useful tool in industries where access to certain technologies, networks, or inputs is crucial for maintaining competitive dynamics, such as in digital markets. Indeed, perhaps the most relevant behavioural remedies are market access commitments, which ensure that competitors continue to have access to essential inputs, markets, or infrastructure post-merger. Other behavioural remedies include non-discrimination obligations - commitments to treat all customers and suppliers in a fair and non-discriminatory manner to prevent the merged entity from favouring its own affiliates or imposing unfair conditions on competitors; pricing restrictions, such as price caps, to prevent the merged entity from exploiting its market power by raising prices unreasonably; supply commitments to ensure the continuous and non-discriminatory supply of products or services to competitors or customers and to avoid market foreclosure; and firewalls to prevent the exchange of sensitive information between different parts of the merged entity.

Unlike structural remedies, behavioural remedies require *ex-post* monitoring. Therefore, independent entities are often appointed to monitor and report on the merged firm's compliance with the behavioural remedies. In addition, transparency measures are often imposed on the merging parties, which may include regular reporting to the antitrust agency or sector regulators on compliance with the agreed behavioural remedies.

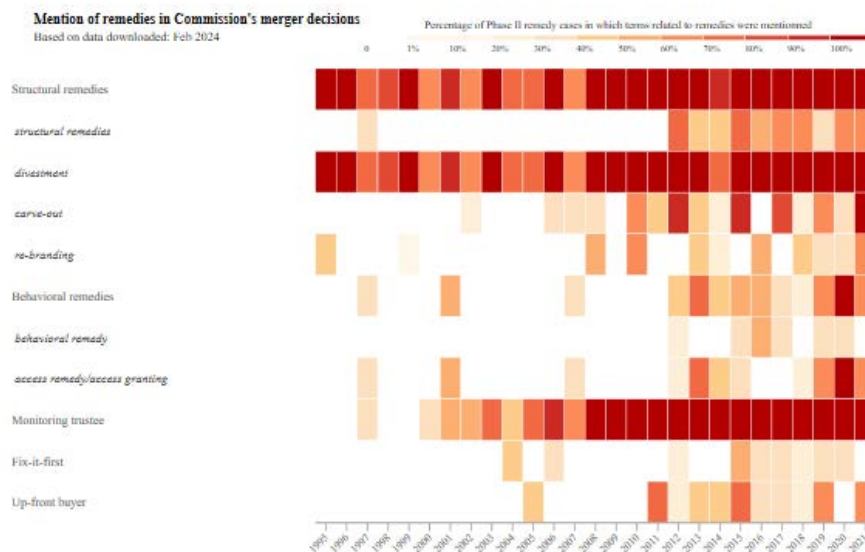
Throughout the sample period, structural remedies were discussed more frequently than behavioural remedies in both Phase I and Phase II cases, as shown in **Figure 14**. Structural remedies are consistently mentioned in more than 80% of phase II remedies decisions, while they are less frequently mentioned in Phase I remedies cases. The vast majority of decisions mentioning structural remedies focus on divestitures. From the 2010s onwards, carve-outs are also increasingly mentioned. The discussion of behavioural remedies is more volatile in both phases. Behavioural remedies were rarely mentioned in the first decades of EU merger control, but are increasingly mentioned in Phase II compared to Phase I and from the 2010s onwards. As expected, access remedies are mentioned most frequently. Finally, monitoring trustees were mentioned more frequently in both phases, although again more so in Phase II, suggesting that the issue of supervising the effective implementation of remedies has become more central over time. To provide the Commission with certainty that the remedy will be implemented, the parties may propose an up-front or fix-it first remedy. These have been mentioned in merger decision, mainly in the last decade, where up-front buyer solutions were more frequently proposed than fix-it-first remedies.

Figure 14. Structural and Behavioural Remedies in Phase I and Phase II

a) Phase I



a) Phase II



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022.

8. Conclusions

EU merger control has undergone many changes since the 1990s. Not only has the legal basis for intervention changed, but the economic theories underpinning the competitive assessment in merger investigations – the so-called Theories of Harm – as well as the tools and instruments used to substantiate such reasoning have also evolved significantly. In this paper, we use a novel database generated by using machine learning natural language processing algorithms to provide a first quantification of these

patterns. We descriptively present such data to add more general stylised facts to a debate that is otherwise mostly driven by opinions or supported by case studies.

We uncover and quantify some clear trends. Decision volume, length, and complexity have all risen. There is a noticeable shift in ToH usage since the adoption of the new EU Merger Regulation in 2004 and following the introduction of the SIEC test. The concept of dominance, which was central in the first 15 years of EU merger control, has never been completely dropped; it has recently resurfaced, especially with respect to vertical and conglomerate issues, which gained prominence in the late 2010s. Unilateral effects, such as price increases and switching costs, alongside efficiency claims scrutiny, have grown in importance as have vertical and conglomerate theories, especially after the 2008 guidelines introduction. Further, innovation ToH and ToH for digital market have gained traction in merger assessments. Evidence backing theories has evolved, with market shares remaining key and the use of quantitative tools and internal documents increasing notably after 2004. Finally, the use of remedies has also increased, with structural remedies, in particular divestitures and carve-outs, appearing to be preferred to behavioural remedies, especially in Phase II. However, behavioural remedies and the use of monitoring trustees seem to have increased significantly since 2010.

The analysis presented in this paper contributes to the policy debate on the fitness for purpose of EU merger control. Although we do not evaluate the effectiveness of merger policy in this paper,²⁸ we illustrate that its enforcement has adapted over time to address new challenges. This is a positive message that underlines the flexibility of the European merger control framework and its ability to adapt to changing market conditions and to incorporate important developments in economic and legal theory.

Like other work assessing the effectiveness of merger control, this paper uses a database created by analysing and categorising publicly available EU merger decisions. This work demonstrates the importance and usefulness of the Commission's policy of transparent reporting on its enforcement activities. The documents published on the Commission's website provide incredibly valuable information for *ex-post* evaluation, which helps to better understand what has worked effectively, but more importantly, what may still need to be changed. Thus, this transparent information can help to improve merger control enforcement, which is a key instrument of European competition policy.

However, the use of this data in this paper represents only the tip of the iceberg. The richness of the database and the methodology employed to analyse a large volume of text and convert it into data hold significant potential for future research. More sophisticated applications of machine learning and artificial intelligence algorithms could be particularly valuable in generating richer and more informative data from textual sources. These advanced techniques could enhance the accuracy and depth of policy assessments, providing more detailed insights into specific issues.

²⁸ Several other papers assess the effectiveness of merger control using data extracted by the EU merger decision, e.g. Duso et al. (2007, 2011, 2013) and Affeldt et al. (2018, 2021a, 2021b).

Literature

Affeldt, Pauline, Tomaso Duso, and Florian Szücs, “EU Merger Control Database: 1990-2014,” DIW Data Documentation, 2018, 95.

Affeldt, Pauline, Tomaso Duso, and Florian Szücs. “25 years of European merger control.” *International Journal of Industrial Organization* 76 (2021): 102720.

Affeldt, Pauline, Tomaso Duso, Klaus Gugler, and Joanna Piechucka. “Assessing EU Merger Control through Compensating Efficiencies.” CEPR Discussion Paper No. DP16705 (2021).

Argentesi, Elena, Paolo Buccirossi, Emilio Calvano, Tomaso Duso, Alessia Marrazzo, and Salvatore Nava. “Merger policy in digital markets: an ex-post assessment.” *Journal of Competition Law & Economics* 17, no. 1 (2021): 95-140.

Baker, Jonathan B. “Unilateral competitive effects theories in merger analysis.” *Antitrust* 11 (1996): 21.

Caffarra, Cristina, Matthew Elliott, and Andrea Galeotti. “‘Ecosystem’ Theories of Harm in digital mergers: New insights from network economics, part 1.” *VoxEU Column*, 5 Jun 2023.

Cunningham, Colleen, Florian Ederer, and Song Ma. “Killer acquisitions.” *Journal of Political Economy* 129, no. 3 (2021): 649-702.

Duso, Tomaso, Klaus Gugler, and Florian Szücs. “An empirical assessment of the 2004 EU merger policy reform.” *The Economic Journal* 123, no. 572 (2013): F596-F619.

Duso, Tomaso, Klaus Gugler, and Burcin B. Yurtoglu. “How effective is European merger control?” *European Economic Review* 55, no. 7 (2011): 980-1006.

Duso, Tomaso, Damien J. Neven, and Lars-Hendrik Röller. “The political economy of European merger control: evidence using stock market data.” *The Journal of Law and Economics* 50, no. 3 (2007): 455-489.

European Commission, “Contribution to Efficiency Claims in Mergers and Other Horizontal Agreements,” OECD/GD(96)65, 1996.

European Commission, Directorate-General for Competition, EU merger control and innovation, European Commission, 2016, <https://data.europa.eu/doi/10.2763/944442>

Fabra, Natalia, and Massimo Motta. “Assessing coordinated effects in merger cases.” *Handbook of Game Theory and Industrial Organization* 2, 5 (2018): 91-122.

Farrell, Joseph, and Carl Shapiro. “Horizontal mergers: an equilibrium analysis.” *The American Economic Review* (1990): 107-126.

Federico, Giulio, Fiona Scott Morton, and Carl Shapiro (2020). “Antitrust and innovation: Welcoming and protecting disruption.” *Innovation Policy and the Economy* 20.1: 125-190.

Gilbert, Richard J (2006). “Competition and innovation.” *Journal of Industrial Organization Education* 1, 1: 1-23.

Hart, Oliver, Jean Tirole, Dennis W. Carlton, and Oliver E. Williamson (1990). “Vertical integration and market foreclosure.” *Brookings papers on economic activity. Microeconomics*: 205-286.

Ivaldi, Marc, Bruno Jullien, Patrick Rey, Paul Seabright, and Jean Tirole (2003). “The economics of tacit collusion.” A report for the European Commission.

OECD (2020), Economic analysis in merger investigations, 2020 OECD Global Forum on Competition Discussion Paper, www.oecd.org/daf/competition/economic-analysis-in-merger-investigations-2020.pdf

Ordober, J. A., Saloner, G., & Salop, S. C. (1990). “Equilibrium vertical foreclosure.” *The American Economic Review*, 127-142.

Piechucka, Joanna (2023). "Coordinated Effects of Mergers: the EC Perspective." *CPI Antitrust Chronicle*, vol. 2(2).

Régibeau, Pierre and Katharine E. Rockett (2024). "Competition Policy for Conglomerates, Platforms and Eco-Systems." *Oxford Review of Economic Policy*, forthcoming.

Salant, Stephen W., Sheldon Switzer, and Robert J. Reynolds. "Losses from horizontal merger: the effects of an exogenous change in industry structure on Cournot-Nash equilibrium." *The Quarterly Journal of Economics* 98, no. 2 (1983): 185-199.

Salinger, Michael A. "Vertical mergers and market foreclosure." *The Quarterly Journal of Economics* 103, no. 2 (1988): 345-356.

Annex

Table 1. Classification of Theories of Harm, Concepts and Terms.

| Concept | Keywords searched |
|---|--|
| | <p>Substantive Test: it refers to the evaluation criteria or legal standard used by competition authorities to assess the potential impact of a proposed merger on competition within relevant markets. The aim of the substantive test is to ensure that mergers do not result in harm to consumer welfare or a reduction in competitive market dynamics. We focus on the two tests adopted by the EU Commission under the merger regulation: ‘dominance test’ and ‘significant impediment of effective competition.’</p> <p><i>Concepts:</i> Dominance, SIEC</p> |
| Dominance | <i>Keywords:</i> dominance (without collective dominance, joint dominance) |
| SIEC | <i>Keywords:</i> siec, significantly impede competition, significant impediment of effective competition, significant impediment to effective competition, significantly impede effective competition |
| | <p>Unilateral horizontal effects: Unilateral horizontal effects arise when a merged firm gains the ability to independently exercise increased market power, thereby eliminating competition between the merging parties. These effects do not require explicit agreements and can occur in both homogeneous and differentiated product markets. We focus on different dimensions of competition along which such unilateral horizontal effects of a merger can arise.</p> <p><i>Concepts:</i> Unilateral Effects/Non-Coordinated, Price Increase, Quality Decrease, Reduced Choice, Substitutability, Switching Costs, Brand Loyalty, Potential Competition, Entry Barriers</p> |
| Unilateral effects/non-coordinated | <i>Keywords:</i> unilateral effects, non-coordinated |
| Price increase | <i>Keywords:</i> higher price, higher prices, higher product price, higher product prices, higher service price, higher service prices, increased price, increased prices, increased product price, increased product prices, increased service price, increased service prices, price hike, price hikes, price increase, price rise, price surge |
| Quality decrease | <i>Keywords:</i> decrease in the quality, decrease in the service quality, decrease the product quality, decrease the quality, decrease the service quality, degradation of product quality, degradation of quality, degradation of service quality, deterioration in product quality, deterioration in quality, deterioration in service quality, drop in product quality, drop in quality, drop in service quality, quality decline, quality depreciation, quality diminishment, quality downgrade, reduction in product quality, reduction in quality, reduction in service quality |

| | |
|---|---|
| Reduced choice | <i>Keywords:</i> decreased product choice, decreased product choices, decreased product variety, decreased product varieties, decreased service choice, decreased service choices, decreased service variety, decreased service varieties, decrease product choice, decrease product choices, decrease product variety, decrease product varieties, decrease service choice, decrease service choices, decrease service variety, decrease service varieties, decrease in product choice, decrease in product choices, decrease in product variety, decrease in product varieties, decrease in service choice, decrease in service choices, decrease in service variety, decrease in service varieties, diminished product variety, diminished service variety, diminished variety, fewer alternatives, less diversity, limited options, limited product selection, limited selection, limited service selection, reduced choice, reduced product variety, reduced service variety, reduced variety, restricted range, smaller selection |
| Substitutability | <i>Keywords:</i> alternative, alternatives, substitutability, substitute, substitutes |
| Switching costs and brand loyalty | <i>Keywords:</i> brand adherence, brand affinity, brand devotion, brand loyalty, brand preference, brand preferences, consumer loyalty, loyalty to brand, loyalty to brands, switching, transition cost, transition costs |
| Potential competition | <i>Keywords:</i> emerging competitor, future competition, future competitor, latent competitor, potential competition, potential competitor, potential competitors, possible rival, possible rivals, prospective challenger, prospective rival, upcoming competitors |
| Entry barriers | <i>Keywords:</i> barrier to entry, barriers to entry, entry barrier, entry barriers, entry restriction, entry restrictions, likelihood of entry, market entry limitations, restricted entry |
| <p>Coordinated effects: Coordinated effects refer to combined market power of firms, where coordination can be tacit or explicit, necessitating agreement among parties. The likelihood of coordination is contingent upon various conditions, including the ability to reach agreement, detect deviations, and impose punishment. Factors such as concentration, cross-ownership, and certain market characteristics such as firm symmetry, price transparency or barriers to entry impact the likelihood of such coordination.</p> | |
| Coordinated effects | <i>Keywords:</i> collusion, coordinated effect, coordinate on, collect dominant position |
| <p>Non-horizontal effects: Non-horizontal Theories of Harm encompass foreclosure through access degradation and leveraging dominant positions in one market to disadvantage competitors in other more competitive markets.</p> <p>Vertical effects: entail leveraging market power in one stage of the supply chain into another, potentially preventing rivals from accessing crucial inputs or customers, operating within an "ability and incentive" framework. Vertical effects are particularly relevant in the context of monopsony power, where a single buyer dominates the market. In case of an employer, this can lead to reduced bargaining power for workers, lower wages, and poorer working conditions due to the lack of alternative employment opportunities.</p> <p>Conglomerate effects: refer to interconnections between goods and services across supply chains that may lead to anti-competitive strategies like tying and bundling. This strategic behaviour may aim to foreclose competition in related markets by leveraging market power from one product market into another. Conglomerate effects were notably prominent in the United States during the 1970s and have regained importance in the 2020s, especially for digital markets.</p> <p><i>Concepts: Vertical, Conglomerate, Foreclosure, Tying and Bundling</i></p> | |

| | |
|--|---|
| | |
| Vertical | <i>Keywords:</i> vertical dimension, vertical effect, vertical effects, vertical integration, vertical merger, vertical mergers, vertical relation, vertically affected market, vertically affected markets, vertically integrated, vertically related |
| Conglomerate | <i>Keywords:</i> conglomerate affected market, conglomerate affected markets, conglomerate dimension, conglomerate dimensions, conglomerate effect, conglomerate effects, conglomerate merger, conglomerate mergers |
| Foreclosure | <i>Keywords:</i> foreclosure |
| Customer foreclosure | <i>Keywords:</i> customer foreclosure |
| Input foreclosure | <i>Keywords:</i> input foreclosure |
| Tying and bundling | <i>Keywords:</i> tying, bundle, bundling, tied product, tied products, tied selling |
| <p>New theories of harm: in recent year specific ToHs have been developed to address competitive effects in dynamic, innovative markets, and digital platform markets. Often there are re-elaborations of existing theories, which are adapted to the specificities of such markets.</p> <p><i>Concepts:</i> Innovation, Digital Markets</p> | |
| Innovation | <i>Keywords:</i> innovate, innovation, patent, patents, pipeline products |
| Digital markets | <i>Keywords:</i> digital, ecosystem, platform, multi home, multi homing, network effect, network effects, software, privacy policies, privacy policy |
| <p>Tools: the Commission uses different tools to define the market and assess the competitive effects of the merger. We collect different terms to capture the main tools used.</p> <p><i>Keywords:</i> accounting margin, accounting margins, bid data, catchment area analysis, cmcr, compensating marginal cost reduction, demand estimation, econometric, econometrics, guppi, illustrative price increase, illustrative price increases, illustrative price rise, incremental margin, incremental margins, indicative price increase, intern document, ipr, isochrones, market share, market shares, margin, margins, merger simulation, partial correlation analysis, price correlation analysis, profit margin, profit margins, stationary analysis, upward pricing pressure</p> | |
| Remedies | <i>Keywords:</i> remedies, remedy |
| Behavioural remedy | <i>Keywords:</i> access commitment, access commitments, access remedies, access remedy, behavioural commitment, behavioural commitments, behavioural remedies, behavioural remedy, commit to provide access to, commitment to provide access to, commitments granting access to, fix it |

| | |
|-------------------|--|
| | first, granting of access to key infrastructure, granting of access to key technology, monitoring trustee, non divestiture remedies, non divestiture remedy, non structural remedies, non structural remedy, upfront buyer |
| Structural remedy | <i>Keywords:</i> carve out, carve outs, divest, divestiture, divestitures, re branding, rebranding, structural commitment, structural commitments, structural remedies, structural remedy |
| Efficiency | <i>Keywords:</i> efficiencies, efficiency |
| Cost efficiencies | <i>Keywords:</i> cost efficiencies, cost efficiency |
| Efficiency claim | <i>Keywords:</i> assessment of efficiencies, efficiency assessment, efficiency claim, efficiency claims, efficiency defence |

Table 2. Summary statistics for all variables (Phase I, no remedies, n=2458).

| Concept | Total terms count across decisions | Total decisions in which terms appears | Mean | Median | SD | Min. | Max. |
|---------------------------------------|------------------------------------|--|------|--------|----|------|------|
| Dominance | 285 | 170 | 0 | 0 | 1 | 0 | 9 |
| SIEC | 1,387 | 476 | 1 | 0 | 2 | 0 | 30 |
| Unilateral effects | 17,857 | 2,014 | 7 | 3 | 13 | 0 | 172 |
| Unilateral/non-coordinated | 1,210 | 283 | 0 | 0 | 2 | 0 | 32 |
| Price increase | 971 | 447 | 0 | 0 | 1 | 0 | 21 |
| Quality decrease | 5 | 3 | 0 | 0 | 0 | 0 | 2 |
| Reduced choice | 11 | 11 | 0 | 0 | 0 | 0 | 1 |
| Substitutability | 11,494 | 1,873 | 5 | 2 | 8 | 0 | 144 |
| Switching costs and brand loyalty | 2,262 | 652 | 1 | 0 | 3 | 0 | 52 |
| Potential competition | 688 | 361 | 0 | 0 | 1 | 0 | 20 |
| Entry barriers | 1,216 | 493 | 0 | 0 | 2 | 0 | 66 |
| Efficiencies/efficiency claim | 363 | 224 | 0 | 0 | 1 | 0 | 10 |
| Cost efficiencies | 21 | 18 | 0 | 0 | 0 | 0 | 2 |
| Efficiency claim | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| Coordinated effects | 154 | 91 | 0 | 0 | 0 | 0 | 10 |
| Vertical effects | 3,956 | 1,145 | 2 | 0 | 4 | 0 | 86 |
| Foreclosure | 10,551 | 961 | 4 | 0 | 16 | 0 | 368 |
| Customer foreclosure | 3,203 | 555 | 1 | 0 | 5 | 0 | 119 |
| Input foreclosure | 3,536 | 557 | 1 | 0 | 6 | 0 | 132 |
| Conglomerate effects | 619 | 178 | 0 | 0 | 1 | 0 | 16 |
| Tying and bundling | 2,480 | 242 | 1 | 0 | 7 | 0 | 234 |
| Innovation | 2,676 | 269 | 1 | 0 | 8 | 0 | 186 |
| Innovation/innovate | 495 | 169 | 0 | 0 | 1 | 0 | 30 |
| <i>Innovation competition</i> | 17 | 6 | 0 | 0 | 0 | 0 | 5 |
| <i>Innovation market</i> | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| Patents | 709 | 130 | 0 | 0 | 3 | 0 | 93 |
| Pipeline products | 134 | 34 | 0 | 0 | 1 | 0 | 23 |
| R&D | 1,338 | 269 | 1 | 0 | 4 | 0 | 93 |
| Digital | 8,035 | 581 | 3 | 0 | 18 | 0 | 455 |
| Digital | 2,017 | 268 | 1 | 0 | 6 | 0 | 134 |
| Ecosystem | 52 | 18 | 0 | 0 | 0 | 0 | 10 |
| Multi-homing | 52 | 13 | 0 | 0 | 0 | 0 | 12 |
| Network effects | 55 | 19 | 0 | 0 | 0 | 0 | 18 |
| Platform | 1,344 | 258 | 1 | 0 | 3 | 0 | 64 |
| Privacy policies | 3 | 1 | 0 | 0 | 0 | 0 | 3 |
| Software | 4,512 | 330 | 2 | 0 | 15 | 0 | 423 |
| Internal documents | 658 | 182 | 0 | 0 | 2 | 0 | 47 |
| Market shares | 37,076 | 2,271 | 15 | 8 | 27 | 0 | 625 |
| Quantitative tools | 365 | 111 | 0 | 0 | 1 | 0 | 24 |
| Price incentives/effects | 113 | 18 | 0 | 0 | 1 | 0 | 24 |
| <i>UPP</i> | - | - | - | 0 | - | 0 | - |
| <i>CMCR</i> | - | - | - | 0 | - | 0 | - |
| <i>IPR</i> | 113 | 18 | 0 | 0 | 1 | 0 | 24 |
| Demand estimation | - | - | - | 0 | - | 0 | - |
| Merger simulation | 2 | 2 | 0 | 0 | 0 | 0 | 1 |
| Econometrics | 5 | 2 | 0 | 0 | 0 | 0 | 4 |
| Price correlation | 5 | 2 | 0 | 0 | 0 | 0 | 4 |
| Catchment area analysis | 23 | 9 | 0 | 0 | 0 | 0 | 8 |
| Incremental/accounting/profit margins | 81 | 45 | 0 | 0 | 0 | 0 | 8 |
| Bidding data | 144 | 40 | 0 | 0 | 1 | 0 | 21 |

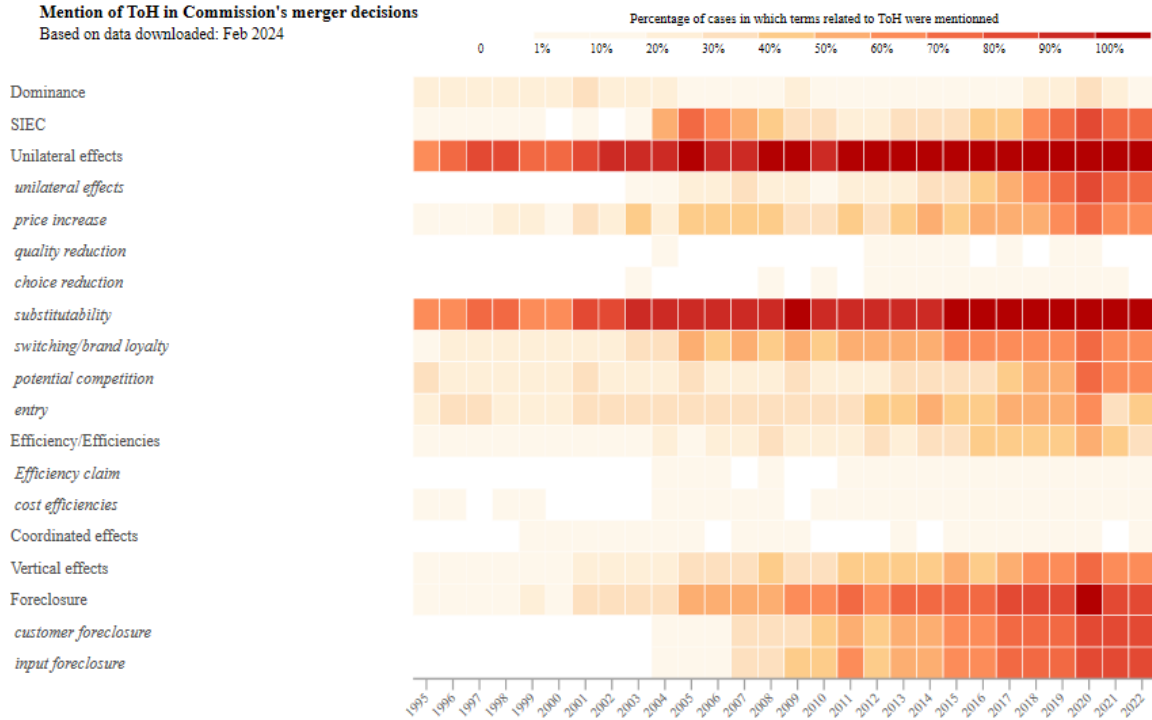
Table 3. Summary statistics for all variables (Phase I, with remedies, n=298).

| Concept | Total terms count across decisions | Total decisions in which terms appears | Mean | Median | SD | Min. | Max. |
|---------------------------------------|------------------------------------|--|------|--------|----|------|------|
| Dominance | 143 | 72 | 0 | 0 | 1 | 0 | 11 |
| SIEC | 638 | 169 | 2 | 1 | 3 | 0 | 21 |
| Unilateral effects | 11,237 | 296 | 38 | 26 | 39 | 0 | 273 |
| Unilateral/non-coordinated | 838 | 107 | 3 | 0 | 6 | 0 | 45 |
| Price increase | 787 | 213 | 3 | 2 | 4 | 0 | 32 |
| Quality decrease | 5 | 4 | 0 | 0 | 0 | 0 | 2 |
| Reduced choice | 29 | 17 | 0 | 0 | 0 | 0 | 5 |
| Substitutability | 6,514 | 292 | 22 | 14 | 26 | 0 | 226 |
| Switching costs and brand loyalty | 1,327 | 191 | 4 | 2 | 9 | 0 | 87 |
| Potential competition | 511 | 156 | 2 | 1 | 3 | 0 | 25 |
| Entry barriers | 1,226 | 199 | 4 | 2 | 7 | 0 | 66 |
| Efficiencies/efficiency claim | 298 | 105 | 1 | 0 | 4 | 0 | 55 |
| Cost efficiencies | 11 | 10 | 0 | 0 | 0 | 0 | 2 |
| Efficiency claim | 15 | 3 | 0 | 0 | 1 | 0 | 11 |
| Coordinated effects | 93 | 34 | 0 | 0 | 1 | 0 | 11 |
| Vertical effects | 1,109 | 177 | 4 | 1 | 5 | 0 | 26 |
| Foreclosure | 2,593 | 161 | 9 | 1 | 18 | 0 | 133 |
| Customer foreclosure | 623 | 103 | 2 | 0 | 5 | 0 | 40 |
| Input foreclosure | 886 | 107 | 3 | 0 | 9 | 0 | 106 |
| Conglomerate effects | 311 | 57 | 1 | 0 | 3 | 0 | 30 |
| Tying and bundling | 1,237 | 82 | 4 | 0 | 15 | 0 | 139 |
| Innovation | 4,102 | 151 | 14 | 2 | 34 | 0 | 330 |
| Innovation/innovate | 496 | 83 | 2 | 0 | 9 | 0 | 136 |
| <i>Innovation competition</i> | 44 | 8 | 0 | 0 | 2 | 0 | 24 |
| <i>Innovation market</i> | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| Patents | 1,241 | 122 | 4 | 0 | 10 | 0 | 67 |
| Pipeline products | 314 | 41 | 1 | 0 | 6 | 0 | 84 |
| R&D | 2,051 | 151 | 7 | 1 | 17 | 0 | 165 |
| Digital | 3,283 | 141 | 11 | 0 | 40 | 0 | 385 |
| Digital | 416 | 51 | 1 | 0 | 7 | 0 | 72 |
| Ecosystem | 28 | 9 | 0 | 0 | 1 | 0 | 18 |
| Multi-homing | 16 | 4 | 0 | 0 | 1 | 0 | 12 |
| Network effects | 63 | 10 | 0 | 0 | 2 | 0 | 22 |
| Platform | 858 | 74 | 3 | 0 | 17 | 0 | 278 |
| Privacy policies | 7 | 2 | 0 | 0 | 0 | 0 | 5 |
| Software | 1,895 | 86 | 6 | 0 | 30 | 0 | 323 |
| Internal documents | 1,129 | 108 | 4 | 0 | 10 | 0 | 99 |
| Market shares | 17,121 | 292 | 57 | 37 | 68 | 0 | 565 |
| Quantitative tools | 296 | 79 | 1 | 0 | 3 | 0 | 37 |
| Price incentives/effects | 47 | 14 | 0 | 0 | 1 | 0 | 23 |
| <i>UPP</i> | 3 | 2 | 0 | 0 | 0 | 0 | 2 |
| <i>CMCR</i> | - | - | - | 0 | - | 0 | - |
| <i>IPR</i> | 44 | 12 | 0 | 0 | 1 | 0 | 23 |
| Demand estimation | 4 | 1 | 0 | 0 | 0 | 0 | 4 |
| Merger simulation | 12 | 1 | 0 | 0 | 1 | 0 | 12 |
| Econometrics | 32 | 11 | 0 | 0 | 1 | 0 | 9 |
| Price correlation | 20 | 8 | 0 | 0 | 0 | 0 | 5 |
| Catchment area analysis | 8 | 4 | 0 | 0 | 0 | 0 | 3 |
| Incremental/accounting/profit margins | 57 | 33 | 0 | 0 | 1 | 0 | 6 |
| Bidding data | 144 | 23 | 0 | 0 | 3 | 0 | 37 |
| Remedies | 14618 | 267 | 49 | 59 | 48 | 0 | 475 |
| Structural remedies | 14523 | 266 | 49 | 59 | 48 | 0 | 475 |
| Behavioral remedies | 95 | 26 | 0 | 0 | 3 | 0 | 45 |

Table 4. Summary statistics for all variables (Phase II, n=197).

| Concept | Total terms count across decisions | Total decisions in which terms appears | Mean | Median | SD | Min. | Max. |
|---------------------------------------|------------------------------------|--|------|--------|-----|------|--------|
| Dominance | 708 | 107 | 4 | 1 | 12 | 0 | 138 |
| SIEC | 4,745 | 124 | 24 | 7 | 55 | 0 | 541 |
| Unilateral effects | 27,505 | 197 | 140 | 72 | 159 | 2 | 781 |
| Unilateral/non-coordinated | 2,043 | 105 | 10 | 1 | 22 | 0 | 143 |
| Price increase | 4,294 | 173 | 22 | 7 | 34 | 0 | 228 |
| Quality decrease | 22 | 10 | 0 | 0 | 1 | 0 | 4 |
| Reduced choice | 36 | 21 | 0 | 0 | 1 | 0 | 7 |
| Substitutability | 11,601 | 197 | 59 | 38 | 67 | 1 | 417 |
| Switching costs and brand loyalty | 4,779 | 160 | 24 | 7 | 43 | 0 | 373 |
| Potential competition | 1,846 | 164 | 9 | 4 | 18 | 0 | 129 |
| Entry barriers | 2,884 | 163 | 15 | 5 | 24 | 0 | 149 |
| Efficiencies/efficiency claim | 4,614 | 131 | 23 | 2 | 63 | 0 | 581 |
| Cost efficiencies | 106 | 39 | 1 | 0 | 1 | 0 | 10 |
| Efficiency claim | 329 | 45 | 2 | 0 | 5 | 0 | 35 |
| Coordinated effects | 413 | 58 | 2 | 0 | 13 | 0 | 183 |
| Vertical effects | 2,181 | 142 | 11 | 4 | 19 | 0 | 127 |
| Foreclosure | 6,846 | 105 | 35 | 1 | 151 | 0 | 1,588 |
| Customer foreclosure | 1,125 | 50 | 6 | 0 | 29 | 0 | 347 |
| Input foreclosure | 2,301 | 63 | 12 | 0 | 62 | 0 | 692 |
| Conglomerate effects | 348 | 37 | 2 | 0 | 8 | 0 | 72 |
| Tying and bundling | 2,109 | 83 | 11 | 0 | 37 | 0 | 398 |
| Innovation | 23,604 | 133 | 120 | 4 | 863 | 0 | 10,030 |
| Innovation/innovate | 4,437 | 109 | 23 | 1 | 144 | 0 | 1,634 |
| <i>Innovation competition</i> | 454 | 13 | 2 | 0 | 22 | 0 | 253 |
| <i>Innovation market</i> | 3 | 2 | 0 | 0 | 0 | 0 | 2 |
| Patents | 6,981 | 75 | 35 | 0 | 275 | 0 | 3,196 |
| Pipeline products | 384 | 17 | 2 | 0 | 15 | 0 | 185 |
| R&D | 11,802 | 133 | 60 | 2 | 431 | 0 | 5,015 |
| Digital | 9,800 | 126 | 50 | 2 | 141 | 0 | 1,225 |
| Digital | 3,630 | 71 | 18 | 0 | 83 | 0 | 767 |
| Ecosystem | 90 | 16 | 0 | 0 | 3 | 0 | 25 |
| Multi-homing | 96 | 11 | 0 | 0 | 4 | 0 | 37 |
| Network effects | 187 | 22 | 1 | 0 | 5 | 0 | 53 |
| Platform | 2,745 | 91 | 14 | 0 | 47 | 0 | 452 |
| Privacy policies | 14 | 7 | 0 | 0 | 0 | 0 | 3 |
| Software | 3,038 | 85 | 15 | 0 | 64 | 0 | 670 |
| Internal documents | 9,904 | 123 | 50 | 4 | 155 | 0 | 1,729 |
| Market shares | 24,323 | 192 | 123 | 61 | 154 | 0 | 837 |
| Quantitative tools | 2,164 | 119 | 11 | 1 | 25 | 0 | 194 |
| Price incentives/effects | 699 | 27 | 4 | 0 | 17 | 0 | 194 |
| <i>UPP</i> | 459 | 14 | 2 | 0 | 15 | 0 | 181 |
| <i>CMCR</i> | 66 | 7 | 0 | 0 | 2 | 0 | 19 |
| <i>IPR</i> | 174 | 23 | 1 | 0 | 4 | 0 | 42 |
| Demand estimation | 124 | 7 | 1 | 0 | 5 | 0 | 52 |
| Merger simulation | 308 | 13 | 2 | 0 | 8 | 0 | 58 |
| Econometrics | 626 | 49 | 3 | 0 | 10 | 0 | 79 |
| Price correlation | 222 | 20 | 1 | 0 | 6 | 0 | 62 |
| Catchment area analysis | 21 | 5 | 0 | 0 | 1 | 0 | 13 |
| Incremental/accounting/profit margins | 431 | 78 | 2 | 0 | 6 | 0 | 48 |
| Bidding data | 749 | 28 | 4 | 0 | 17 | 0 | 177 |
| Remedies | 6146 | 133 | 31 | 7 | 45 | 0 | 242 |
| Structural remedies | 5901 | 131 | 30 | 7 | 45 | 0 | 242 |
| Behavioral remedies | 245 | 36 | 1 | 0 | 4 | 0 | 30 |

Figure A1. Theories of Harm



Source: Own analysis based on merger decisions published on DG COMP website and covering mergers notified by the European Commission in the period 1995-2022. For coordinated effects, vertical effects and conglomerate effects, the term counts as occurrence if it appeared more than 2 times. For the remaining, term counts as occurrence if it appeared at least 1 time.