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Semantic Shifts in EU Competition Law: A Data-driven Study of Policy Goals

KEY MESSAGES

- **Text mining and corpus linguistic methods are used to analyze 11,000 EU competition law decisions and judgments**
- **This reveals a shift in the competition vocabulary from ordoliberalism in the 1970–80s to neoliberalism in the post-2000s**
- **While the Commission has partly adopted a neoliberal vocabulary, the courts have stuck to ordoliberal rhetoric**
- **This shift in economic thinking is also reflected in enforcement actions and institutional priorities**
- **Understanding semantic shifts in EU law is crucial to aligning policy with underlying theories and doctrines**

Since its inception, European competition law has been a battleground for different interpretations and ideologies. The founding Treaties did not explicitly subscribe to any particular school of competition thought and included many vaguely defined economic concepts (Küsters 2023; Wegmann 2008). As a result, concepts ranging from market integration and individual freedom to socially optimal market structures have constantly vied for influence alongside efficiency-oriented arguments reminiscent of the Chicago School. This tapestry of ideas underscores the multifaceted nature of competition policy – a policy that is inextricably linked to the specific "DNA" of its legal regime and its hierarchy of policy goals (Ezrachi and Stucke 2016).

In order to dissect and understand this DNA for the European case, this article uses natural language processing (NLP), also known as text mining, to examine over 11,000 EU competition law decisions and judgments from 1961 to 2021.[1] As we know from recent corpus linguistic work on US jurisprudence, economic ideas can directly influence legal decisions by persuading judges (Ash et al. 2019). Understanding the dynamic characteristics of the European competition regime is crucial not only for legal interpretation, but also because it influences economic behavior at both the micro and macro levels. For example, the expected approach taken by competition authorities in assessing mergers can have a significant impact on business strategies and ultimately on market dynamics (Lyons 2003).

Methodologically, this strand of research aims to advance the study of EU competition law by introducing distant reading methods. Typically, legal scholars analyze selected cases or focus on specific doctrinal considerations. The comprehensive corpus compiled for this analysis is larger and more diverse than previous datasets (Brook 2020; Stylianou and Iacovides 2022), covers all four pillars of European competition law (cartels, dominant positions, merger control, and state aid), and spans the entire period of application of the law. By using text mining, the study avoids the pitfalls of subjective selection and interpretation inherent in manual coding and provides a more objective, large-scale analysis of legal texts.

The empirical results provide a quantitative perspective on the dynamic relationship between EU institutions and their legal output. Above all, they challenge the notion that EU competition law has consistently adhered to its founding principles, showing instead that the regime has undergone ideological and semantic shifts over time.

DATA

The quantitative analysis of EU competition law relies on the manual creation of a new corpus of texts, compiled from the EUR-Lex website through web scraping and further validated using DG COMP's case search tool. The compilation process involved a carefully tailored search focusing on cases related to the tag "competition policy." Using the relevant search criteria, 8,635 acts for the Commission and 2,391 judgments

[1] This paper draws on a dataset constructed as part of a larger research project on the influence of ordoliberalism on EU competition law. The resulting doctoral thesis, entitled *The Making and Unmaking of Ordoliberal Language. A Digital Conceptual History of European Competition Law*, was accepted by Goethe University, Frankfurt am Main, in June 2022 and has been published as a monograph by Klosterman in late 2023 (Küsters 2023). In essence, this paper presents the main findings from Chapter 8 of this monograph, which introduces the EU competition law dataset. More information on this research project can be found at: https://www.lhlt.mpg.de/phd-project/making-and-unmaking-of-ordoliberal-language.

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for the Court of Justice were identified, resulting in a total corpus of around 11,000 observations, including corrigenda, amendments, and consolidated versions. This approach ensured the extraction of relevant and comprehensive information such as title, date, and full text in English, together with directory codes where applicable.

Transforming this vast collection of documents into a coherent and analyzable dataset presented its own set of challenges, particularly due to the diverse formats of the original documents, ranging from PDFs to HTML files. This diversity required a rigorous conversion process, which occasionally resulted in minor spelling errors. In order to facilitate a detailed corpus linguistic analysis, the data was pre-processed via the programming language R and analyzed using several specific NLP packages related to the *tidyverse* format (Silge and Robinson 2017). This process included tokenization, the removal of stop words, and the appending of important metadata such as the year of the document and the institution responsible for it. For specific types of analysis, such as n-gram segmentation and sentiment analysis, the data was further refined to suit these methods.

Basic descriptive statistics of the corpus shed light on the Commission's focus over time. There has been a trend towards a greater emphasis on merger control in recent years, alongside a shift from restrictive practices to dominant positions and state aid. This temporal pattern is consistent with existing literature and historical analyses of EU competition policy. However, a closer look at the underlying classification reveals certain challenges, such as the potential for bias and data discrepancies. For example, the decline in certain types of cases, such as those under Art. 101 TFEU (which covers agreements between undertakings), could be attributed to regulatory changes such as the abolition of the notification system or increased activity by national authorities. In addition, the potential for classification errors in EUR-Lex could affect the reliability of the text mining analysis.

Still, the corpus is comparatively more comprehensive and detailed than other databases in this field. It is characterized by its focus on the full-text content of decisions and judgments, moving away from the subjective classification criteria often used in previous studies. However, it is important to recognize the limitations inherent in such a large collection of data, particularly when considering potential biases in sampling procedures and the challenges of combining data from different time periods and legal frameworks.

METHODS AND RESULTS

Based on this corpus, the following research makes use of modern NLP methods, including counting and dictionary methods and machine learning applications. These techniques allow a nuanced analysis of large-scale semantic patterns, moving from traditional qualitative analysis to a more data-driven "text as data" approach, which assumes that the frequency of certain words and their concurrence in a corpus are reliable indicators of underlying themes, sentiments, and theoretical discourses (Grimmer et al. 2022).

Counting Policy Goals

The first analysis uses a basic counting approach to evaluate the most prominent hypotheses concerning the objectives of EU competition law. This analysis draws on the diverse literature of historians, economists, political scientists, and lawyers, all of whom have sought to identify the underlying ideas shaping the origins and objectives of European competition law (Schweitzer and Patel 2013; Warlouzet 2010). A common thread in current understanding is that EU competition policy, while based on common principles, has subtle differences in emphasis compared to other jurisdictions.

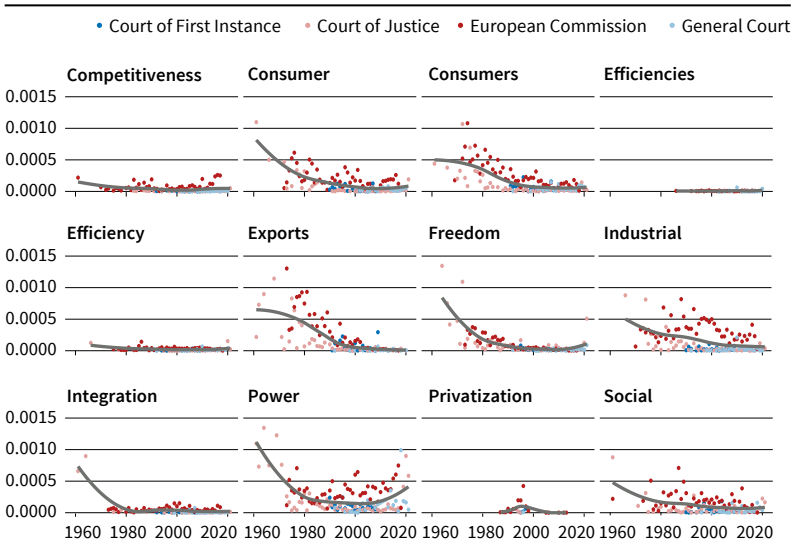
To begin with, Gerber's seminal analysis suggests a strong ordoliberal influence, focusing on minimizing economic power and protecting the competitive process and economic freedom (Gerber 1998). This view has been nuanced by subsequent studies but remains an important hypothesis. Critics such as Buch-Hansen and Wigger (2011) argue for a less decisive role of ordoliberalism in the application of rules, citing influences such as national mercantilism and neoliberal discourse. Other scholars have pointed to the role of market integration as a distinctive feature of EU competition law, often linked to other objectives such as economic freedom, efficiency, and consumer protection.

The corpus linguistic analysis reveals the shifting relevance of different policy objectives (Figure 1). The temporal pattern shows that ordoliberal terms such

Figure 1

Policy Goals in EU Competition Law

% frequency of terms in corpus



Source: Author's analysis in Küsters (2023).

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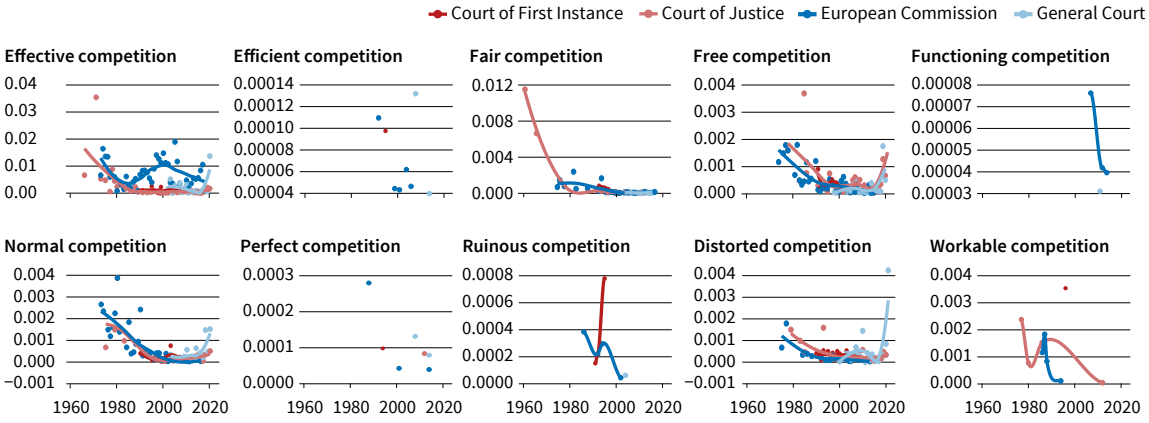
Figure 2

Competition Collocates in EU Competition Law

% frequency of bigram in corpus



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as "freedom" and "power" predominated in the law until 1980, in line with Gerber's chronology. The use of mercantilist-neoliberal language such as "competitiveness" and "privatization" was limited (although "exports" were frequently mentioned), in line with empirical studies negating protectionism in EU law (Cremieux and Snyder 2016). Contrary to Akman and Kassim (2010), "efficiency" was minimally mentioned, especially in the 1960s. The 1970s and 1980s saw an increase in Keynesian themes related to "industrial" and "social" policy and consumer aspects. Since these considerations seem to be present only in the decisions of the Commission during this period, but not in the judgments of the Court, this result supports the argument put forward in the literature that these two institutions were influenced differently by the Keynesian paradigm (Pérez and Scheur 2013). Despite rare explicit mentions of "integration," frequent references to "exports" imply its underlying importance in European trade unification.

However, the methodological limitations of word frequency analysis must be acknowledged. Terms such as "exports" can appear in different contexts, and ordoliberal keywords such as "power" are almost obligatory in certain legal cases. This requires a more nuanced approach for accurate interpretation.

Counting Competition Collocates

In contrast to everyday language or economic theory, European law lacks a clearly defined concept of "competition," with different actors associating the term with different objectives. To better understand this, an analysis of competition collocates – word pairs such as "competition" and an accompanying adjective – was undertaken. This involves breaking down all texts into sequences of two words (collocates) rather than single words (tokens). This approach is particularly useful for capturing ideological nuances in the case law, since qualified nouns and phrases "carry more ideological meaning" in legal language (Dumas 2019, 393).

Based on the historical reconstruction of different schools of thought and the analysis of European treaty negotiations (Küsters 2023), it is possible to trace certain collocates in order to detect subtle intellectual influences in the field of competition law. In particular, key qualifiers such as effective, undistorted, free, normal, complete, efficient, performance, workable, functioning, perfect, fair, and ruinous were examined (Figure 2). The complete absence of distinctively ordoliberal collocates such as "complete competition" and "performance competition" is surprising but may be explained by translation problems (see below), while the other collocates listed above appeared to varying degrees.

Among the frequently used collocates, "effective competition" emerged as the most prominent, appearing significantly more often than "normal competition," "undistorted competition," and "free competition." The quantitative prominence of "effective competition" is unexpected, as legal scholars typically emphasize "free competition" and "undistorted competition" as significant in EU competition law. As a close reading of the identified passages shows, "effective competition" is a plausible translation of the ordoliberal expression *vollständiger Wettbewerb* (literal translation: "complete competition"), suggesting a strong ordoliberal period between the 1970s and the early 2000s, followed by a decline. Similarly, the collocate "normal competition" was often used by European translators in cases dealing with *Leistungswettbewerb* in the ordoliberal sense, especially in the early decades. A landmark judgment of the Court of Justice in this respect is *Hoffmann-La Roche* (1979). The problem of multilingual translation in European law is particularly relevant for ordoliberal terms such as *Leistungswettbewerb*, which is often – but not exclusively – translated as "competition on the merits," as an additional n-gram analysis underlined.

This finding, supported by a close reading, is important as the idea of healthy "competition on the merits" is now back at the center of current competition law discourse. The Court's recent judgment in the *Superleague* case, which will likely set crucial precedents, contains several references to the notion of "competition on the merits." This concept has already been invoked in recent European cases against Big Tech, such as *Google Shopping* (Lindeboom 2022). In this context, it is important to note that the German variant of the concept, i.e., *Leistungswettbewerb*, was strongly influenced by ordoliberal lawyers such as Franz Böhm and Ernst-Joachim Mestmäcker. They believed that only economic actions that do not infringe on the freedom of others are fair contributions to the competitive game. Accordingly, ordoliberals would define dominance as the position of a company that can hinder effective competition by distorting the structure of the market and the resulting ability to compete through actions that do not qualify as true *Leistungswettbewerb*. From an ordoliberal perspective, the reason why this concept is based on the (arguably strong) assumption that it is possible to distinguish between lawful and unlawful behavior ex ante is mainly a political economy argument: if one relies too much on empirical, effects-based analysis, one risks ending up with an enforcement system that is too lenient and leaves too much room for lobbying and vested interests. The ordoliberals recognized this from their personal experience in the 1930s and 1940s. Since then, conflicting translations and variations of this concept have led to divergent legal interpretations, which explains why the ordoliberal origins of the expression are often forgotten outside Germany.

Other collocates such as "perfect competition" and "efficient competition," indicative of Chicago-style neoliberalism, have played only a minor role in European competition language. Similarly, the terms "workable competition" and "functioning competition," both of which originate from US antitrust thinking, were not utilized frequently. This contradicts claims of strong US influence on European competition policy in the 1960s and 1970s. In addition, the collocate "fair competition," often seen as representing a uniquely European perspective on competition, was not prominently used in decisions and judgments. This is in sharp contrast to the development of EU competition policy speeches since the late 1990s, which have often called for "fair competition."

As a robustness check, the use of these competition expressions can be compared with their use in the Common Market Law Review (CML Rev.), a leading European law journal (results not shown here). The convergence towards a small set of key collocates in CML Rev. articles closely followed the trends seen in the legal texts, suggesting that a homogenized, coherent rhetoric emerged over time that paralleled the case law.

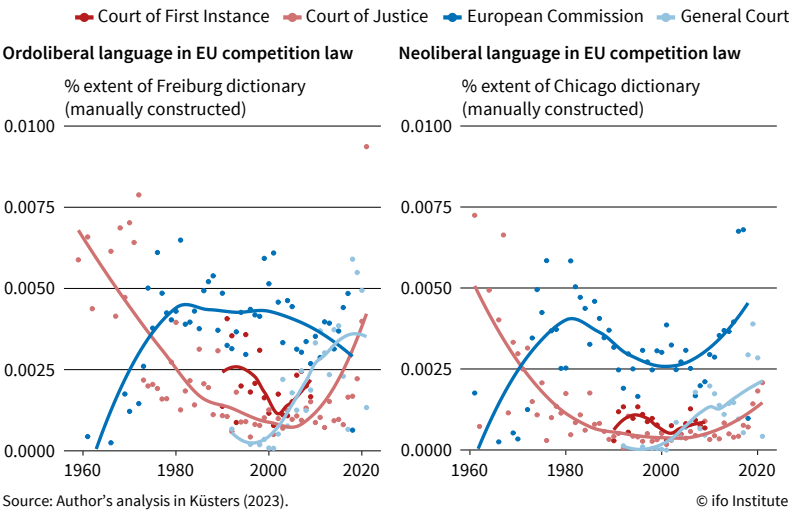
Measuring Competition Language

The analysis of EU competition language through the construction and application of so-called dictionaries offers a more fine-tuned approach to measuring the intellectual influence of different schools of thought on European competition policy than counting individual policy objectives or adjectives. This method involves compiling extensive lists of terms characteristic of particular schools, such as ordoliberalism and the Chicago School, and then quantifying their presence in the corpus of EU competition law over time. This deductive method is in line with Gerber's view that the "leading vehicle" for the influence of the ordoliberals was their "new language" (Gerber 1994).

For this study, dictionaries were constructed in two ways. First, an informed selection of keywords was based on a qualitative analysis of key works from the ordoliberal and Chicago schools. For the latter, it was possible to draw on the "Law & Economics" dictionary recently developed to assess the influence of the Chicago School on legal language in the US (Ash et al. 2019) and to supplement it with typical post-Chicago terms. Second, school-specific dictionaries were automatically extracted from the digital corpora of the schools' flagship journals, ORDO, and the Journal of Law and Economics (JLE). For each journal corpus, an algorithm extracted the 2,000 most distinctive bigrams, where distinctiveness was measured by the commonly used tf-idf metric.[2] In general, the automated dictionaries derived from the ORDO and JLE corpora confirmed the trends identified by the manually constructed dictionaries, particularly in the case of ordoliberal vocabulary.

Figure 3

Policy Goals in EU Competition Law



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[2] The tf-idf method evaluates the importance of a word in a text by considering not only its frequency in that specific text, but also its rarity in a wider range of documents. This approach identifies words as characteristic of an author or document if they are frequently used in that context, but less frequently in a wider collection of texts.

Visual analysis of the trajectories of ordoliberal and Chicago School language in the context of EU competition law reveals three key observations (Figure 3). First, there is a striking similarity in the patterns of these two schools, possibly reflecting their common roots in neoliberalism, as evidenced by their frequent use of economic terminology. However, this similarity is nuanced by the distinct influences of different keywords that drive their respective lexicons: ordoliberalism's presence in case law is characterized by terms such as "power," "choice," and "order," while the Chicago School is more associated with "welfare," "productivity," and "consumer." Second, it highlights the predominance of ordoliberal vocabulary in the Court's early stages, underscoring its initial influence and supporting Gerber's historical account. Finally, the analysis reveals a significant shift over the past twenty years, marked by a decline in ordoliberal language and a concurrent increase in Chicago-style terminology within the Commission. This trend, which is accentuated when considered in absolute terms (results not shown here), suggests a semantic realignment of EU competition law with its US counterpart, a change likely spurred by the More Economic Approach (MEA).

Overall, using large-scale and specialized dictionaries in this way makes it possible to trace the making and unmaking of ordoliberal language within EU competition law. While the ordoliberal vocabulary has had a larger share overall, the influence of the Chicago School has become more pronounced in recent decades. Contrary to the common narrative of a neoliberal turn, Sutherland's term in office (1985–1988) did not contribute significantly to this shift. Instead, it was Monti's term (1999–2004) that saw a more pronounced neoliberalization of the language of EU competition law.

Quantifying Competition Sentiment

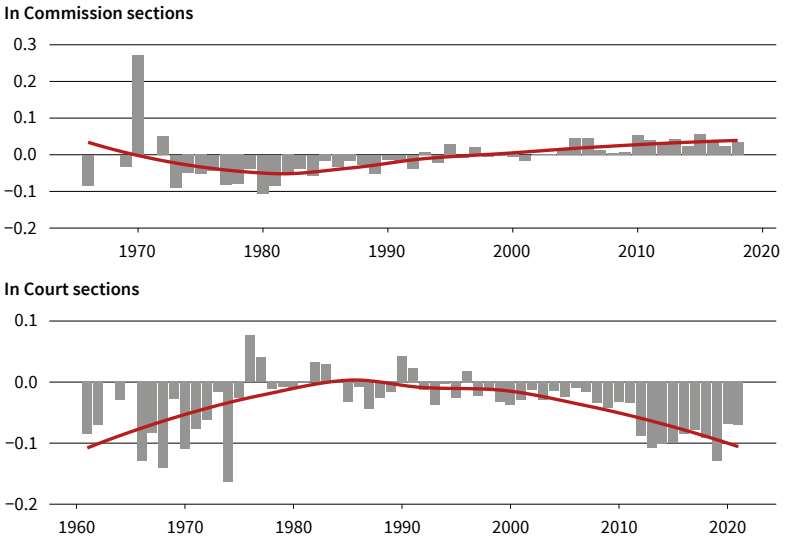
Sentiment analysis in bureaucratic contexts – such as DG COMP – is complex, but can reveal meaningful shifts over time (Ourednik et al. 2018). Accordingly, the study of competition sentiment in EU law offers a fascinating perspective on the emotional tonality and ideological shifts within the language of competition policy. Ordoliberal language, particularly in its initial manifestations, is often characterized by an emotional, negative tonality. This reflects both the ideological nature of the school and the broader context of generally positive attitudes towards anti-competitive behavior in the inter-war period, which early ordoliberals sought to challenge. The use of sentiment analysis could be a useful tool for tracking these tonal shifts over time, with a particular focus on the de-emotionalization of competition language that occurred with the technical MEA reforms.

For this part of the research, a specific sentiment dictionary is used that is capable of handling the complexity of legal texts. The sentiment dictionary chosen here is based on a list of 11,709 words classified as negative/positive in the range [– 2, 1] and implemented with the R *sentiment* package. This algorithm incorporates weighting for valence shifters, i.e., negators and amplifiers or de-amplifiers, which respectively reverse, increase, and decrease the effect of a sentiment word (Naldi 2019). The consideration of this complexity was considered important in the context of long legal sentences. In addition, the analysis is restricted to sections of Commission decisions and Court judgments that deal explicitly with competition, identified by a keyword in context (KWIC) method, in order to avoid averaging over parts of the text that are not relevant to the discussion of the phenomenon of competition. A search for the term "competition" at a distance of ten words yields 43,563 "hits" for the Commission and 42,484 for the courts.

Figure 4

Sentiment on Competition

Average sentiment



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The results of this sentiment analysis show a noticeable shift towards more positively connotated vocabulary in Commission decisions since the early 2000s (Figure 4). This change may reflect the trade-off nature of modern welfare analysis introduced during the MEA period. The positive tone in these contexts is typically related to passages finding no infringement of competition rules. Conversely, earlier Commission decisions in the 1970s and 1980s had a more negative tone, often condemning anti-competitive behavior and calling for strict enforcement and heavy fines. This harsher language, often present in cases classified as "per object" restrictions, is consistent with the ordoliberal preference for per se rules and a broad application of Art. 101 TFEU. In contrast to the Commission, the Court's language has remained negative in almost all years, with recent cases suggesting an even more negative tone. The few positive statements by the Court have typically linked compe-

tition to the fundamental freedoms of movement and establishment, reflecting the ordoliberal strategy of intertwining competition rules with strong protection of the fundamental freedoms.

Despite some ambiguities, the sentiment analysis points to a structural change in the language of competition around the turn of the century, particularly within the Commission. This shift away from the earlier negative tone of ordoliberal language towards a more neutral or even positive tone reflects broader ideological changes in EU competition policy. It suggests a move away from the emotionally charged, interventionist approach of early ordoliberalism towards a more technocratic and possibly more neoliberal approach in line with the MEA.

Detecting Competition Topics

The final section of this article uses structural topic modeling (STM) to aggregate semantic information from Commission decisions and Court judgments in order to infer broader themes about competition as a topical category within the EU competition law corpus. Topic modeling works by identifying groups of terms that frequently appear together in large collections of documents, such as journal corpora and case law, thereby maximizing their distinctiveness (Blei et al. 2003). These term clusters are interpreted as topics. However, the statistical distinctiveness of co-occurring terms does not always correspond to conceptual themes. It is therefore important to interpret the results of topic modeling with caution and to guard against confirmation bias.

STM, a semi-automated approach that incorporates metadata such as responsible institution and year into the topic estimation, offers advantages over traditional legal research by reducing subjectivity in the categorization and interpretation of legal texts (Roberts et al. 2019). The estimated STM, based on a 60-topic model, organizes the large volume of text data into coherent categories.[3] These categories include competition parameters, concrete market examples, geographical boundaries, procedural issues, state aid, and merger control. The topics can be manually grouped into six main categories, each providing insights into different facets of EU competition law.

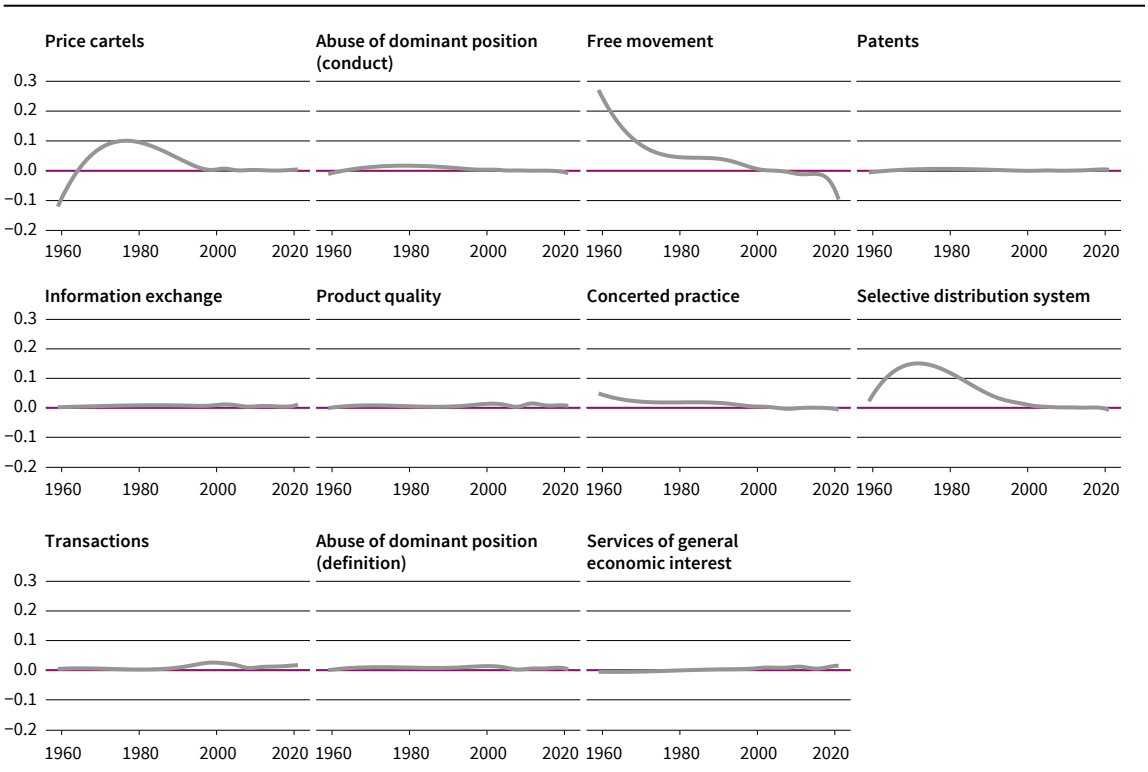
Analysis of these themes over time provides a historical context for the development of EU competition law (Figure 5). Initially, the focus was on cartels, concerted practices, and selective distribution systems, reflecting the early priorities of European competition policy. Between the 1980s and 2000s, the focus shifted to the definition of abuse under Art. 102 TFEU and state aid. The last two decades have seen an increase in issues related to patents, services of general economic interest, and mergers. The results of the STM analysis support the broader narrative of

[3] The literature proposes several metrics for selecting the statistically optimal number of topics when estimating a topic model. Combining these metrics and calculating the so-called held-out likelihood and semantic coherence suggests that in the case of the EU competition law corpus, the optimal number is in the range of 55–60 topics.

Figure 5

Competition-related Topics over Time

Expected topic proportion in corpus



Source: Author's analysis in Küsters (2023).

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a shift from ordoliberal to neoliberal influences in EU competition law around the year 2000. This shift is evidenced by a decreasing focus on issues related to cartel behavior and increasing attention to product quality and transaction-related vocabulary, which is consistent with the Chicago School's emphasis on economic efficiency and quantitative assessments. Moreover, the recent decline in "free movement" rhetoric coincides with neoliberal MEA reforms. This shift may reflect a move away from the ordoliberal concept of an "economic constitution" towards a more market-oriented approach.

Notably, the STM analysis also reveals statistically significant differences in the way the Commission and the courts addressed these topics (results not shown here). For example, the Commission focused more on price cartels, product quality, and transactions, while the Court focused almost exclusively on free movement issues. This suggests that the Commission grounds its cases purely in the competition rules, while the Court of Justice might relate them to other treaty provisions, such as the fundamental freedoms. Moreover, the transaction vocabulary identified by the STM is tied to the Commission variable. This may be explained, at least in part, by the fact that the Court refrains from assessing the "complex economic assessments" made by the MEA and instead checks them only for "manifest errors," which limits its scope for referring to economic concepts (van der Woude 2019).

POLICY CONCLUSIONS

This corpus linguistic analysis of European competition law over sixty years revealed a nuanced evolution, initially marked by ordoliberal influences and later moving towards neoliberalism. This shift was not predetermined by the treaty or by a single dominant school but evolved through the interplay of different intellectual currents within EU competition policy. In particular, the study highlights a strongly ordoliberal period from the 1970s to the early 2000s. This period was characterized by the dominance of "effective competition" as a key concept, a focus on merit-based rhetoric in case law under Art. 102 TFEU, attention to cartel issues under Art. 101 TFEU, and a firm tone sanctioning "by object" restrictions. However, the advent of the MEA in the early 2000s marked a significant shift in the language of EU competition law. This neoliberal phase is characterized by a departure from traditional ordoliberal language, an increase in Chicago-style vocabulary, a growing reliance on quantified merger control techniques, and a shift towards a more positive language indicative of welfare economics.

With its novel quantitative findings, this study underscores the dynamic and evolving nature of competition law in the EU, influenced by the interplay between law and economics and the choices made by members of the Commission and the courts in selecting concepts and arguments for their cases and institutional interests. The analysis shows that while the Court has largely adhered to ordoliberal vocabulary, the Commission initiated the neoliberal shift especially after 2000, which has affected the Court to a lesser extent. Interestingly, the timing of this neoliberal shift in EU competition law contrasts with the traditional narrative that places the shift in the 1980s or early 1990s. This later transition is consistent with changes in Commissioner speeches (Küsters 2023) and suggests that internal factors, such as the MEA reforms and increasingly formalized merger control, played an important role.

Methodologically, this analysis contributes to the understanding of how NLP methods can be applied to legal and economic history. It points to the importance of contextual knowledge in interpreting quantitative results and highlights the challenges posed by politicization, conceptual change, and multilingual translation in European law.

In terms of policy recommendations, the study suggests that recognizing and accepting semantic and conceptual differences in competition law can lead to more effective mediation of these divergent views. The development of a common economic code and vocabulary for competition may be necessary for the next phase of European competition policy. For example, similar efforts to agree on a common language and definitions for regulating artificial intelligence are currently underway in the EU-US Trade and Technology Council. This approach would not only reconcile different visions of how to order European markets, but also contribute to a deeper understanding of the political use of economic concepts within the EU's evolving legal framework.

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