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The Making of An Antitrust API: Proof of Concept

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Abstract. Computational antitrust promises not only to help antitrust agencies preside over increasingly complex and dynamic markets, but also to provide companies with the tools to assess and enforce compliance with antitrust laws. If research in the space has been primarily dedicated to supporting antitrust agencies, this article fills the gap by offering an innovative solution for companies. Specifically, this article serves as a proof of concept whose aim is to guide antitrust agencies in creating a decision-trees-based antitrust compliance API intended for market players. It includes an open access prototype that automates compliance with Article 102 TFEU, discusses its limitations and lessons to be learned.

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I. Introduction

Computational antitrust promises to “help antitrust agencies in the context of increasingly complex and dynamic markets (...) [and to] provide companies with the tools to assess and ensure compliance with antitrust laws.”¹ If research in the space has been primarily dedicated to supporting antitrust agencies, this article fills the gap by offering an innovative solution to companies.

Specifically, this article serves as a proof of concept to guide antitrust agencies in creating a decision-trees-based compliance antitrust API² (the “API”) intended for market players. The present study explains how to create an antitrust API with little to no computer science expertise (II.) before exploring the limits of such APIs (III.). The conclusion takes the form of a research agenda (IV.).

II. The Making of An Antitrust API

There are several reasons why agencies should want to create an antitrust API (A.). These reasons are non-contentious, which lead our focus to lay down a methodology for creating such an API (B.).

A. Rationale

The present article is built from two observations. First, the vast majority of market players do not wish to infringe antitrust laws. As such, if they are provided with tools to comply with antitrust laws, market players are likely to use them. This is all the more true if these tools are proven efficient, easy to use, and inexpensive. Second, antitrust agencies are building computer science expertise, but budgets remain limited. Even when budgets increase, agencies must justify expenses, i.e., explain how helpful new computational tools will be. The more expensive they are to develop, the greater the evidence must be to justify that computational antitrust solutions are worth the expense. At the same time, agencies are reluctant to rely on private solutions to avoid the capture of computational tools by companies.³

Against this background, developing a tool that is efficient and freely accessible for companies while also being inexpensive to develop for agencies appears to be an optimum target—especially in the early days of computational antitrust.⁴ Enter the API developed for the purpose of the present article.

An antitrust API can take different forms. The API developed as part of this article comprises automating antitrust laws using decision trees. It offers an

¹ See STANFORD COMPUTATIONAL ANTITRUST, <https://law.stanford.edu/computationalantitrust>.

² “API” stands for application programming interface, i.e., a digital intermediary that allows two applications to communicate.

³ Catalina Goanta & Jerry Spanakis, *Discussing the Legitimacy of Digital Market Surveillance*, 2 STANFORD COMP. ANTITRUST 44, 54 (2022) (argues that “outsourcing public interest technology to market actors can have a long-term role in the development of capacity and architecture in public authorities”).

⁴ *The Adoption of Computational Antitrust by Agencies: 2021 Report*, 2 STANFORD COMP. ANTITRUST 78 (ed. Thibault Schrepel & Teodora Groza, 2022) (for an overview of computational antitrust implementation).

interface that, proceeding with questions and answers, leads companies to assess compliance with antitrust laws. At a minimum, the API helps users understand the logic of antitrust rules, ask themselves the right questions, and better identify when to ask experts to assist them. At a maximum, the API enables users to flag pro- and anti-competitive practices independently.

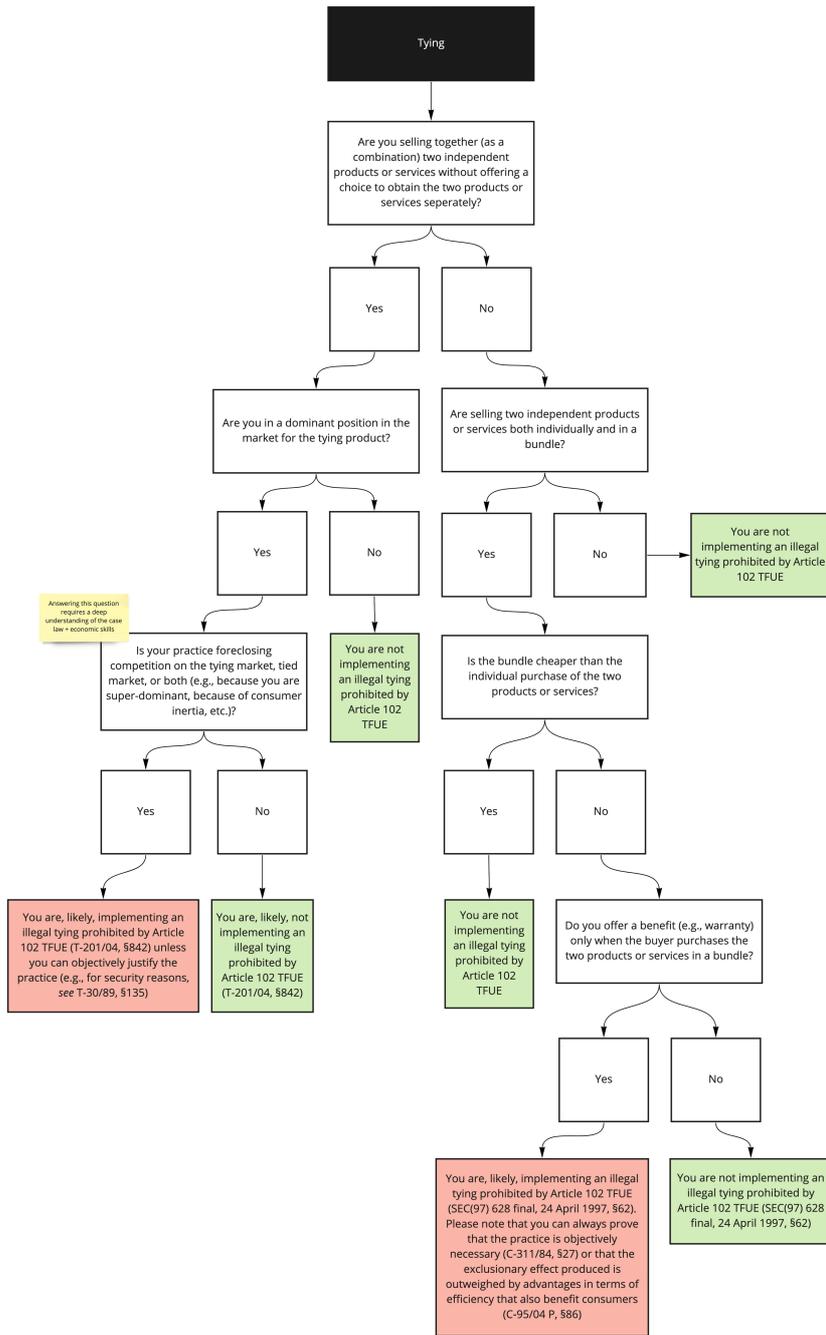
B. Methodology

The antitrust API this article introduces has been voluntarily developed using a “no-code” solution. The goal is to offer a method that all 100+ competition authorities can use. The following method requires little to no computer science expertise, a small team (one or two employees), no dedicated budget, and only a few weeks of work.

The first step comprises analyzing the case law. Access to the latest court decisions is essential. Agencies operating in jurisdictions where court cases are not centralized into databases should push for creating such databases.

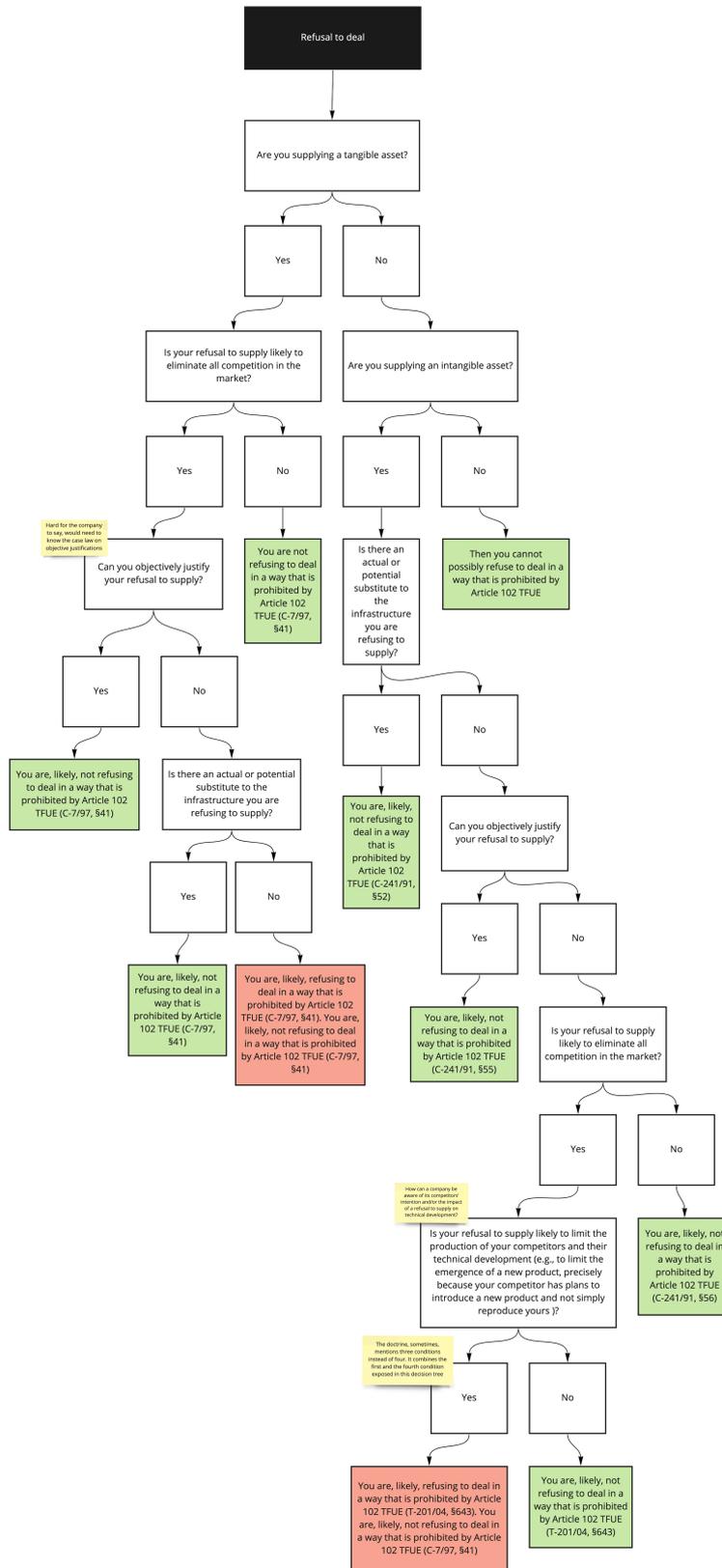
Secondly, agencies translate the current state of the (case) law into decision trees. Several solutions can help create decision trees, such as Miro, Diagrams, Creately, Zingtree, etc. The translation process requires expressing court decisions in layman’s terms. Otherwise, market players will face questions they do not understand. For example, instead of referring to “pure” and “mixed bundling,” the API should refer to products that are sold jointly (“pure bundling”) and products sold both separately *and* in a bundle (“mixed bundling”).⁵ Importantly, agencies should be careful not to answer unanswered questions. Should the tree lead to a dead end, agencies should not fill in the blanks. The result will resemble the two trees listed below.

⁵ Guidance on the Commission’s Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings, 2009 O.J. (C 45/7), §45.



Title: Tying in EU competition law as a decision tree
 Thibault Schrepel, 2022 ©

The Making of An Antitrust API: Proof of Concept



Title: Refusal to deal in EU competition law as a decision tree
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Third, agencies combine all decision trees (e.g., one for defining dominance, one for each of the illegal practices, etc.) into one and make connections between them. This step implies identifying what differentiates practices from each other and what ties them together. In concrete terms, agencies factor in questions to decide which branch of the tree to explore, such as “are you interested in assessing the compliance of your pricing policy?” or “are you interested in assessing the compliance of your exclusivity policy?”. Agencies also create loops to direct users between branches. For example, when a company reports that a competitor is using its patent with consent, but the patent is not incorporated in an industry standard, the agency creates a loop to redirect the user from “patent hold-up” to the “refusal to deal.”

Four, the agencies transpose their decision tree into an interactive one. There are free solutions for creating interactive decision trees, such as Berkeley Bridge⁶ or GraphDoc.⁷ These solutions may have fewer functionalities than the ones mentioned in step 2, so agencies should be careful not to lose essential functions. For example, Berkeley Bridge requires the creation of one single graph, and sub-graphs for each of the practices—as opposed to connecting graphs. Once the interactive decision tree is finished, agencies deploy it on their servers.⁸ The agencies then test the tree and debug it where necessary.

Completing these four steps leads to the creation of an antitrust API that allows companies to assess compliance with antitrust law in a free, anonymous, user-friendly, comprehensible, and rapid way. Below, readers will find screenshots and full access to the proof of concept developed for this article:

Access the API: [click here](#)
Password: thibaultschrepe

Predatory pricing

Is the price of your product above your long-run average incremental cost (i.e., the average of all the variable and fixed costs you incur to produce a particular product)?



Predatory pricing

Is the price of your product below your average incremental costs (i.e., costs that will disappear in three to five years if you stop producing the good or offering the service at stake)?



⁶ BERKELEY BRIDGE, Experts in Knowledge-Based Systems, <https://www.berkeleybridge.com>. Berkeley Bridge is the solution that has used for the purpose of this article.

⁷ GraphDoc, Free, Open-Source, And User-Friendly Graphical Interface to Build Your Decision Trees, MAASTRICHT UNIVERSITY (26 July 2022) <https://perma.cc/8TNY-MWFA>.

⁸ Alternatively, agencies can deploy the API on Berkeley Bridge’s servers and embed the API code on their website.

III. Limitations

This article serves as a proof of concept, but that does not prevent criticisms of the concept. A decision-tree-based antitrust API has several limitations. These limitations do not preclude the usefulness of the API, but they should *not* be overlooked if one wants to ensure that the API increases compliance rather than proving ineffective. Some of these limitations are linked to the use of the API (A.), while others are tied to the dissonant nature of such an API with legal rules (B.). They lead to consider long- and short-term actions (C.).

A. Limitations Regarding the Use of the API

The use of the API requires knowing which path to choose, that is, navigating competition law through questions and answers. API users (i.e., companies) may find this exercise difficult. There are two reasons for this: companies may lack information about the practice and market, or they may lack expertise in competition law and economic skills.

First, the lack of information about a practice or market may be due to the **poor collection of data by companies**. For instance, companies should know whether their final prices are above long-run average incremental costs.⁹ Should they not, companies will not be in a position to use the API to assess predatory pricing but, despite this fact, should not expect antitrust agencies to provide any support.

Alternatively, companies may lack **information that they cannot possibly have**. In this situation, one may question whether agencies should provide the information, change the criteria so that the information is no longer required, or simply abandon the idea of using the API. Consider the following examples. When evaluating market dominance, companies should know whether their turnover accounts for more than half of their relevant market turnover.¹⁰ But companies do not (precisely) know what the turnovers of their competitors are per market segment—should they even know which segmentation antitrust agencies are using. In other words, companies are facing a question that they cannot possibly answer and, outside of super dominant positions, they may doubt whether article 102 TFUE applies to them. Louis Kaplow argued that market definitions should be abandoned for this very reason.¹¹ Others have proposed that agencies should publish an open-source database which details all market segmentation by industry.¹²

Similarly, when assessing margin squeeze, companies are expected to know if the difference between the retail price they charge consumers and the wholesale

⁹ See Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings, 2009 O.J. (C 45/7), §26; C-209/10, §37.

¹⁰ See Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings, 2009 O.J. (C 45/7), §14.

¹¹ Louis Kaplow, *Why (Ever) Define Markets?*, 124 HARV. L. REV. 437 (2010) (arguing that defining the relevant market is unproductive).

¹² Nicolas Petit & Thibault Schrepel, *Evaluation of The Commission Notice on Market Definition In EU Competition Law*, Feedbacks to the European Commission (May 15, 2020).

price they charge competitors is sufficient for these competitors to cover their costs.¹³ Companies do not possess this information as long as they do not charge a price that is disproportionate and explicitly prohibitive. In fact, companies *should not* have this information because it could foster collusion or give rise to price increases.

Finally, the legality test for price discrimination requires companies to assess whether applying different prices to competitors is creating a significant impact on competition between downstream companies precisely because these prices represent an important part of downstream companies' total costs. One cannot expect dominant companies to know about downstream companies' total costs. Were they to have this information, it would distort competition in the market.

Second, companies may **lack the expertise to navigate the API**. Several examples drive the point home. First, evaluating dominance—except in cases of super dominance where market shares border on monopolistic situations—requires an analysis of quantitative factors, such as whether competitors have high market shares, whether price elasticity is low, etc.¹⁴ Then, qualitative factors can be analyzed; companies are required to assess whether the market is dynamic if there are high barriers to entry, etc.¹⁵ In short, analyzing dominance requires knowing the criteria recognized in competition law cases as well as having the expertise to assess them. Most companies do not.

The same goes for price discrimination. The substitutability criterion requires a multifactorial qualitative analysis or a SSNIP test.¹⁶ These tests require internalizing competition law and economic expertise, which small and medium companies often struggle to do.

Similarly, the assessment of exclusive dealing calls for deep competition law expertise. The legality test requires assessing if the company enjoys “substantial market coverage,” a concept whose interpretation depends upon the case law.¹⁷ Then, companies should evaluate if they are imposing exclusive dealings on “many” customers and over the “long term;” again, two terms so vague they require substantial case law analysis.¹⁸ The analysis of patent hold-ups holds similar issues. The company must address whether it sent a concrete license offer on “FRAND” (fair, reasonable, and non-discriminatory) terms and whether the competitor made a concrete counteroffer that met FRAND conditions.¹⁹ No company can assess these conditions without intellectual property expertise.

¹³ See Case C-52/09, *Konkurrensverket v. TeliaSonera Sverige AB* [2011] ECR I-0527, §32.

¹⁴ See Case T-76/76, *United Brands v. Comm'n* [1978] ECR 207, §109-110.

¹⁵ See *Id.*

¹⁶ See Case COMP/A.36.568/D3-*Scandlines Sverige AB v. Port of Helsingborg*, Comm'n Decision (July 23, 2004), §284

¹⁷ See Case T-604/18, *Google and Alphabet v. Commission (Google Android)*, §683; Case C-413/14 P, *Intel Corp. v. Comm'n*, §138.

¹⁸ See Case T-604/18, *Google and Alphabet v. Comm'n (Google Android)*, §640.

¹⁹ See Case C-170/13, *Huawei Techs. Co. Ltd. v. ZTE Corp.*, 2014 E.C.R. 2391, §664.

In the context of refusals to supply tangible assets, companies should answer whether the practice can be objectively justified, which requires knowing the case law on objective justifications.²⁰ With pure bundling, a company is required to address if the practice is foreclosing competition on the tying market, tied market, or both.²¹ Here again, a company can only evaluate the criteria should it know the case law, the degree of foreclosure that is recognized as sufficient, and have economic expertise.

The analysis of loyalty-inducing rebates, or rebates conditioned on exclusivity, is no easier.²² Companies are first required to assess if the rebate covers a substantial share of the market, a qualifier—“substantial”—whose analysis requires competition law expertise. Then, companies must evaluate whether the arrangements for granting the rebate can restrict competition. The criterion is unclear—i.e., it requires a great understanding of the case law in the space—but also calls for economic expertise. Should the two criteria be fulfilled, companies are tasked with analyzing whether they granted the rebate for a long duration and whether its amount is significant. Here again, the vagueness of the concepts can only be compensated with thorough knowledge of jurisprudence. Finally, the case law requires companies to address whether the rebate is likely to exclude a competitor that is as least as efficient from the market. One can hardly imagine someone other than a qualified economist answering this question.

Lastly, the analysis of excessive pricing calls for competition and economic expertise where companies are required to assess whether they have charged a price that is excessively disproportionate compared to the actual costs they have to bear, and, if they are charging a price that is excessively disproportionate in itself (i.e., unrelated to the economic value of the product or service) or when compared to competing products (e.g., prices in neighboring member states).²³ All in all, it feels like we, collectively, have designed competition law for lawyers and economists to navigate together, not companies.

B. Limitations Regarding the Nature of the API and Legal Rules

Regardless of the difficulties associated with using the API, the very nature of an API—capturing the state of a legal system in computer code—conflicts with the very nature of the legal rules—resulting from a perpetual discovery process. Even if the law is changed to simplify compliance, difficulties inherent in trying to formalize the law, which is an evolving subject, within a fixed framework will continue to persist. Namely, three limitations emerge from the conflicting nature of APIs and legal rules.

²⁰ See Case C-7/97, *Oscar Bronner GmbH & Co. KG v Mediaprint Zeitungs- und Zeitschriftenverlag GmbH & Co. KG* [1998] ECR I-7791, §41.

²¹ See Case T-201/04, *Microsoft Corp. v. Comm'n*, 2007 E.C.R. II-3601, §842.

²² See Case T-286/09, *Intel Corporation v. Comm'n*, §119; Case C-209/10, *Post Danmark A/S v. Konkurrencerådet*, §29.

²³ See Case C-27/76, *United Brands v. Comm'n*, 1978 E.C.R. 207, §252; Case C-177/16, *Autortiesību un komunikēšanās konsultāciju aģentūra vs. Latvijas Autoru apvienība v. Konkurences padome*, §51.

First, competition legality tests often probe the future and thus depend on agencies' and courts' discretionary powers. Although it may appear logical to replace future-based rules with more present-day-based rules, "almost everything of importance about antitrust relates to the future," and, therefore should be future-oriented.²⁴ For example, price discrimination legality tests require assessing if the strategy may eliminate at least one of a company's competitors.²⁵ Also, when companies refuse to supply intangible assets, they should assess whether their decision is likely to limit the production of their competitors and their technical development (e.g., to limit the emergence of a new product, precisely because their competitors have plans to introduce a new product).²⁶ But companies, rightfully, ignore their competitors' future market strategies, and therefore cannot answer the question. The same goes for predatory pricing, where companies should know whether the pricing strategy excludes, or is likely to exclude, a competitor as efficient as the dominant company.²⁷

Courts and agencies can require specific proof that exclusion is ongoing or possible, but they cannot eliminate the need to rely on prospective analysis. Otherwise, antitrust would become a simple compensation machine in which anti-competitive practices triumph and losers are bought out. There is a balance to be struck between grounding antitrust in facts and anticipating these facts. The API suffers from the tension between these two objectives and the fact that antitrust, rightfully, cannot neglect anticipation of future competitive states.

Second, individual facts matter. One, the practices listed in articles 101 and 102 are not limitative—the same goes for competition law regimes worldwide. This means no decision tree can possibly be complete. Competition law decision trees can, at best, list practices that competition agencies have sanctioned. Still, they ignore illegal practices as of yet undiscovered by the case law—either because they have never been implemented before or because they were never brought before legal institutions. The emergence of cases sanctioning self-preferencing is a good example. Before the General Court's Google Shopping case in November 2021, self-preferencing was *not* recognized as a stand-alone anti-competitive practice and, therefore, would have escaped our decision tree.²⁸ To some degree, regulations such as the Digital Markets Act address this criticism as they comprise a limitative list of prohibited practices.

Two, in recent years, EU competition law has witnessed several case law reversals and changes in legality tests (e.g., the *Intel* saga²⁹). This means that decision trees are, by default, providing the state of current interpretations without being able to guarantee courts and agencies will align with these interpretations in the future—although, to be fair, this pitfall in legal compliance holds true even outside of decision trees.

²⁴ Albert A. Foer, *Prediction and Antitrust*, 56 ANTITRUST BULL. 505, 505 (2011).

²⁵ Case C-209/10, *Post Danmark A/S v. Konkurrencerådet*, §38 & §40.

²⁶ See Case T-201/04, *Microsoft Corp. v. Comm'n*, 2007 E.C.R. II-3601, §643.

²⁷ Case C-209/10, *Post Danmark A/S v. Konkurrencerådet*, §44.

²⁸ Case T-612/17, *Google and Alphabet v. Comm'n* (Google Shopping).

²⁹ The latest ruling to date is T-286/09, *Intel Corporation Inc. v. Comm'n*, from 26 January 2022. It has been appealed for the second time.

Three, companies can justify Article 102-like practices for objective reasons. These objective reasons are non-limitative. A competition law decision tree often reaches a state of uncertainty about whether the justification is good enough to be admitted by courts and agencies.

Third, competition law does not exist in a vacuum. The simple fact of putting competition rules in a decision tree denies the field's complexity, whereby rules and standards impact each other and create a feedback loop. Take the Digital Markets Act ("DMA") as an example.³⁰ The DMA applies "without prejudice to the rules resulting from other acts of Union law regulating certain aspects of the provision of services covered by this Regulation, in particular Regulations (EU) 2016/679¹ and (EU) 2019/1150² of the European Parliament and of the Council and a Regulation on a single market for digital services, and Directives 2002/58/EC³, 2005/29/EC⁴, 2010/13/EU⁵, (EU) 2015/2366⁶, (EU) 2019/790⁷ and (EU) 2019/882⁸ of the European Parliament and of the Council, and Council Directive 93/13/EEC⁹, as well as national rules aimed at enforcing or implementing those Union legal acts."³¹ Creating a complete decision tree for the DMA would imply codifying all of these other acts, the acts referred to in these acts, and therefore, ultimately, the entirety of European Law.

C. What to Make of The API's Limitations

Against this background, using a competition law decision-tree-based API seems compromised. But it does not have to be. These limitations call for well-reasoned use of the API, as opposed to not using it at all.

The first type of limitations (i.e., limitations regarding the use of the API) calls for **long-term** reflections on the substance of competition law. The creation and use of the API highlight where policymakers can improve competition law rules and standards, that is, where rules and standards could be changed such that companies can better assess compliance without distorting the substance of these rules. Evidently, "law as code," i.e., the process of converting legal rules into code so computers can arrive at a legal diagnosis, is limited by the inherent nature of legal rules.³² That said, policymakers and enforcers can clarify antitrust rules and standards. The formation of the API underlines where improvements are needed and possible.

Apropos of that, we should recognize that economizing antitrust law constitutes, to a degree, placing companies in a difficult situation whereby economic expertise becomes central to evaluating the legality of a practice. However, we should not therefore conclude that antitrust must return to strict legal formalism as the field's economization also helps reduce type 1 errors. Policymakers must strike a balance between reducing type 2 errors through economic analysis and making antitrust rules and standards comprehensible to companies.

³⁰ Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act).

³¹ *Ibid.*, at 12.

³² Thibault Schrepel, *Law + Technology*, TEX. TECH LAW REV. (forthcoming) (exploring the meaning of "law as code").

Still, regarding the first type of limitations, the API highlights a new role for agencies and governments: providing companies with more information, where possible and necessary, to better assess compliance. As stipulated in previous sections of this article, agencies could reduce compliance costs by providing companies with an open-source dataset of all market segmentations, a comprehensive list of commonly accepted objective justifications, guidelines specifying what would constitute a long-term and significant rebate, what would render an exclusivity agreement substantial and long-term, what would constitute “many” customers, etc.

In the **short-term**, the first (i.e., use-related) and second (i.e., nature-related) types of limitations call for a specific, well-reasoned API use. Specifically, a competition law decision-tree-based API should serve as a counsel, not as a decision-maker. One, the API contributes to pre-assessing the most obvious practices—according to the current case law, competition rules only, and known facts. In a sense, the API helps assess the *risk* of EU competition agencies sanctioning these practices. Should the API conclude that the risk is extremely low, it would be reasonable for companies to implement the practices. On the contrary, companies should refrain from implementing the practice when the API indicates high risks.

Second, the API helps companies flag more ambiguous behaviors where the risks of being sanctioned cannot possibly be assessed—because the legality test is forward-looking, this will depend upon specific circumstances to a great degree, etc. In a sense, the API helps identify where companies face legal *uncertainty*—i.e., situations where the probability of getting fined cannot be quantified—and nudges them to investigate these situations further. Experts and firms themselves will make investigations, for instance, by reaching out to agencies and requesting comfort letters or pre-assessment analyses. The API will thus foster dialogue between companies and agencies.

In practice, and considering these limitations, it seems reasonable to advise companies to create a wall between the API outputs and the actual implementation of practices instead of automating the implementation of business strategies based on the API result. The wall should consist of having a human in the loop to monitor the API results and deciding on business strategies independently (a practice labeled the “boxing method”³³). Although boxing methods reduce speed and increase decision-making costs, they also safeguard against the API’s pitfalls.

³³ NICK BOSTROM, *SUPERINTELLIGENCE: PATHS, DANGERS, STRATEGIES*, 129 (Oxford, 2014).

IV. Next Steps

The endeavor to automate antitrust law introduced in this article calls for several next steps. First, one should complete the decision tree underlining the API with article 101, market definition, a careful study of objective justifications under article 102, merger control, remedies, procedural aspects, etc. Second, antitrust agencies should develop and offer a similar API in their jurisdiction, regardless of whether they are based on a civil or common law system. If civil law rules are convenient for coding purposes, the formation of this EU competition law-based API exhibits that APIs can also be designed in common law systems where the case law is more detailed than the regulation. Notably, the API should remain free and open source, as opposed to an API that is offered under a paywall. Third and finally, one should deploy more advanced NLP techniques to improve the API content and updateability. These techniques are not accessible to antitrust agencies without computer science expertise. Still, they can be developed by experts and then licensed such that all agencies can use and deploy them easily. The Stanford Computational Antitrust project will share its progress in this field.