A Game-Theoretical Assessment of Monopolization and the Exclusionary Abuses: Predatory Pricing and Tying

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A paper in law and economics
I. Abstract

The difficulty with cases regarding monopolization is that no matter what the outcome is, it is always the worst possible outcome. It will receive criticism now, and for decades to come.

The problem is that the theories behind the cases—regardless of whether it is a US case or an EU case—are not anchored in reality. This pertains especially when the abuses are somewhat murky; a low price seems like a good idea for consumers, and an extra application installed on their new computer seems like an added bonus. The old theories would agree. A game theoretical assessment (strategic theory) is not so quick to judge, but takes the analysis one step further.

We have already seen strategic reasoning applied in the US with the recoupment criterion in Brooke Group, and the systematic approach of the court in the Microsoft Internet Explorer case. On the other side of the Atlantic we have seen strategic intent requirements mixed with pricing standards in the AKZO case, and attempts at efficient behavioral remedies in the Microsoft Windows Media Player case. While these cases all have elements of game theoretical reasoning, there is still an element missing. There needs to be a coherent framework that can guide the courts and help them evaluate the factors.

This article explores the hallmark cases that underpin the theories of monopolization by predatory pricing and technological tying with a critical assessment and lists not only the strengths but also the weaknesses of each case. With this as a base, I break down the cases and perform a strategic analysis of the different decisions of the firms to construct a Nash equilibria-oriented method for solving cases.

By using the refined economic determination established in the US, and the progressive strategic thoughts that have recently started to develop in the EU, I argue that this is the winning combination as game theory gives the structure and foreseeability that lawyers need, while still being accurate and efficient in the economic field. The paper offers both a legal and economic analysis of the exclusionary abuses, and introduces economic strategic thinking to enable the reader to deduce the intent a firm has when offering a product or service to a certain price, or when offering an extra product free of charge. The paper culminates in two tests based on the common approach, showing how one can assess the pro-competitive and anti-competitive elements of a case and how to weigh them against each other to determine the lawfulness of a firm’s actions in the market.

This paper presents decades of advanced strategic and behavioral research by scholars across the world, but answers to the cry for simplicity demanded by the critics, by connecting the thoughts behind the numbers, to the stories told in courts.

**Keywords**

Antitrust, competition law, game theory, strategy, abuse of a dominant position, monopolization, exclusionary abuse, predatory pricing, tying, technological tying, intent, post Chicago, EU, US, Treaty on the Functioning of the European Union, TFEU, article 102, Sherman Act, Section 2.
### III. Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AAC</td>
<td>Average Avoidable Cost</td>
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<tr>
<td>AC</td>
<td>Average Cost (Average Variable Cost + Average Fixed Cost), same as ATC</td>
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<td>AG</td>
<td>Advocate General</td>
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<td>API</td>
<td>Application Programming Interface</td>
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<td>ATC</td>
<td>Average Total Cost, see AC</td>
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<td>AVC</td>
<td>Average Variable Cost</td>
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<td>CA</td>
<td>Court of Appeals</td>
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<td>CFI</td>
<td>Court of First Instance of the European Union, see GC</td>
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<td>CJEU</td>
<td>Court of Justice of the European Union (formerly ECJ)</td>
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<td>CS</td>
<td>Consumer Surplus</td>
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<td>DL</td>
<td>Deadweight Loss</td>
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<td>DOJ</td>
<td>Department of Justice</td>
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<td>EC</td>
<td>European Commission</td>
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<td>ECJ</td>
<td>European Court of Justice, See CJEU</td>
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<td>ECSC</td>
<td>European Coal and Steel Community</td>
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<td>EEC</td>
<td>European Economic Community</td>
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<td>EP</td>
<td>European Parliament</td>
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<td>EU</td>
<td>European Union</td>
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<td>FTC</td>
<td>Federal Trade Commission</td>
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<td>GC</td>
<td>General Court of the European Union (formerly CFI)</td>
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<tr>
<td>IAP</td>
<td>Internet Access Providers</td>
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<td>IC</td>
<td>Incremental Cost</td>
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<tr>
<td>IE</td>
<td>Internet Explorer</td>
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<td>IO</td>
<td>Industrial Organization</td>
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<td>ISP</td>
<td>Internet Service Providers</td>
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<td>LRAIC</td>
<td>Long-Run Average Incremental Cost</td>
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<td>MC</td>
<td>Marginal Cost</td>
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<td>MS</td>
<td>Member States</td>
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<td>NE</td>
<td>Nash equilibrium</td>
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<td>OEM</td>
<td>Original Equipment Manufacturer</td>
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<td>OJ</td>
<td>Official Journal of the European Union</td>
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<td>OS</td>
<td>Operating System</td>
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<tr>
<td>PC</td>
<td>Personal Computer</td>
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<td>PS</td>
<td>Producer Surplus</td>
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<td>SC</td>
<td>Supreme Court of the United States</td>
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<td>SPE</td>
<td>Sub-game perfect (Nash) equilibrium</td>
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<td>TFEU</td>
<td>Treaty on the Functioning of the European Union</td>
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<tr>
<td>UI</td>
<td>User interface</td>
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<tr>
<td>US, the</td>
<td>United States of America, the</td>
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<td>WL</td>
<td>Welfare Loss</td>
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<td>WMP</td>
<td>Windows Media Player</td>
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1. Introduction

This paper is an attempt to nuance the field of antitrust policy and single-firm conduct by using new economic models. It is aimed at researchers, graduate students, and anyone else interested in antitrust law and policy and/or the economics of industrial organizations. It will provide the reader with the legal, economic and mathematical tools needed to comprehend the conclusions, however a fundamental understanding of antitrust law as well as basic microeconomic principles is presumed.

1.1 Thesis

In this paper I will try to show that the use of game theoretical reasoning and tools can build an interpretative method that provides an efficient and foreseeable application in regards to the exclusionary abuses predatory pricing and technological tying within single-firm conduct.

1.2 Purpose

The purpose of this paper can broadly be stated as to examine how article 102 TFEU on abuse of a dominant position, as well as Section 2 of the Sherman Act on monopolization should be applied in relation to predatory pricing and technological tying. To understand antitrust policy one can first make the assumption that the law should be sufficient. Competition law however is underpinned by economic considerations and therefore an understanding of economic principles is needed. However, if one with economic principles mean the traditional schools of economics used in competition law (the Chicago school and ordoliberalism), it is not enough. I will instead use a game theoretical method to try to give structure to the strategic reasoning and identification of intent behind predatory pricing and tying.

This means that the purpose of this paper can be further defined as investigating how the use of game theoretical reasoning and tools within competition policy can affect the efficiency behind, and predictability of these exclusionary abuses.

1.3 Method, materials and delimitations

The economic analysis of the law is a complex area requiring knowledge of both law and economics to explain the effects and efficiency of laws. This paper will apply a cross-scientific method analyzing exclusionary abuses from both an economic and legal perspective. The exclusionary abuses being discussed will be predatory pricing and technological tying as the

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1 Antitrust is the American term for what in the EU has been referred to as Competition law. Lately however, antitrust has become more accepted and more widely used also within the EU. The terms are used interchangeably in this paper but they refer to the exact same thing.

2 To review basic principles in this area any standard textbook on industrial organization is recommended, for instance Stephen Martin, Industrial Organization in Context (Oxford University Press 2010), hereinafter Martin 2010.

variances between these two abuses are similar; the reasoning behind them follow the same pattern, it is sometimes unclear if an abuse should be classified as predatory pricing or technological tying, and they have a similar foreclosure effect.\(^4\)

To decide on a working model which would do justice to both the legal and economic factors, as well as give a natural transition to game theory, I have revised methods of roughly 50 theses from the fields of law, economics and business administration on master and doctoral levels.\(^5\) In this chapter, the method I will use will be broken down, from a general law and economics point of view to legal and economic points of view explaining my reasoning, which will lead to a verification or a rebuttal of my presented thesis.

What is important to keep in mind is that the research subject is competition policy in general; it is the meaning of the prohibition of abuse of a dominant position by using exclusionary abuses that is investigated. What we are searching for is the law \textit{de lege ferenda}, how it should be, in order to give an efficient and foreseeable outcome. The development of the law in the US and EU have certainly had different basis, and the fact that the EU competition law also has a goal of preserving the internal market is visible in the EU case law, however this paper draws on the theories and important cases from both the US and the EU. Antitrust can have many goals, but the focus in this paper will still be on the efficiency and the foreseeability of the regulation and application mentioned earlier – and to a big degree leave the political and other goals aside. Naturally laws still influences these goals, but they will not be in the scope of the investigation.

Where deemed necessary, critique against the methods will be elaborated and justification will be presented in the paragraphs.

![Diagram](image)

\textit{Figure 1.1. The figure illustrates the relation between the sciences used in this paper, as well as the methods provided and what they contribute with.}

\(^4\) There are of course differences – the most obvious one being that pricing and costs being more apparent in predatory pricing. See the relevant chapters analyzing the case law as well as the definitions of the abuses. See more, Barry Nalebuff, 'Exclusionary bundling' (2005) vol 50 The Antitrust Bulletin 321.

\(^5\) These are not listed as no direct quotes or styles are implemented, they merely worked as inspiration and a platform for modeling my approach.
1.3.1 The economic analysis of the law

The economic analysis of the law is a study of the law using economic principles and methods. These mathematical theories (price theory and game theory), as well as empirically proven methods (statistics and econometrics) are used in the analysis of the effects of the implicit prices that laws attach to behavior. In other words, economics provides a scientific theory to predict the effects of legal sanctions on behavior.

In a historical perspective, even Adam Smith was active in the field of law, discussing the economic effects of mercantilist legislation, but it was not until the 1960s when Ronald Coase and Guido Calabresi, independently, presented their articles that the area truly gained pace.

As in all economic theories, the assumption of individual wealth maximization, and the fact that economic efficiency needs to be maintained, are central issues. There are of course numerous schools of thoughts in economics, but in this paper my focus is on game theory, while using the Chicago school and ordoliberalism as points of reference.

Some scholars view the economic analysis of the law as a branch of (micro-)economics, however, as I have argued above, one can also see the economic analysis of the law as a mere use of certain economic tools to evaluate and assess legislation, making it a stand-alone method. Viewed as a method this is exactly what this paper will do, however for this chapter to actually bring clarity to the approach which will be used it is imperative to also define not only the interaction between law and economics but also the methods used in each step of the process.

1.3.2 Legal method

When assessing the sources of law, one needs to use a suitable method for understanding it. The tools from other disciplines, for instance economics or business administration are not suited for this. Throughout this paper I will use a Scandinavian legal dogmatic method, paying great attention to the source of law doctrine. The legal dogmatic method is a term you can read in

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6 Commonly also referred to as law and economics, see Vladimir Bastidas, 'Rättsekonomi' in Fredric Korling and Mauro Zamboni (eds), Juridisk metodlära (Studentlitteratur 2013) 175.
11 Alison Jones and Brenda Sufrin, EU Competition Law: Text, Cases and Materials (5th edn, Oxford University Press 2014) 21-34.
12 Gölstam (n 8) 32.
14 Ibid 37-38.
15 The broader, somewhat imprecise definition of this term is used, including – not only – Sweden, Denmark and Norway, but also Finland and Iceland (commonly also referred to as the Nordics).
most (if not all) theses ranging from bachelor theses to doctoral theses in law. However, since both the legal dogmatic method and the source of law doctrine carry certain ambiguity, definitions are in place.

1.3.2.1 Source of law doctrine

What counts as sources of law varies not only geographically but also over time.\(^{16}\) In the scope of this paper the sources I will use are first of all case law from the CJEU, the GC\(^{17}\) as well as relevant case law from the US and legislation (mainly article 102 TFEU and Sherman Act Section 2). Thereto I will also analyze legal and economic doctrine, as well as scientific articles, and various theses. To this I will also add soft law sources such as the EU Commission’s Guidelines. Another interesting source, which I will consider is the opinion of the General Advocate of the EU. Granted, this is a non-binding opinion, however there is no reason to per se value this opinion any less than the legal doctrine. National legislation or case law within the MS will however not be touched upon in this paper.

An important part of the source of law doctrine is also which weight you put on each of these sources, when you have several sources claiming different things. In the same way, the source of law doctrine works as a guide when you have several interpretations available; it binds the problem, the sources and the conclusion together.\(^{18}\) This means that the source of law doctrine is not only the sources, but also the principles used to navigate them.\(^{19}\)

1.3.2.2 Legal dogmatic method

The legal dogmatic method is also hard to define,\(^{20}\) but it can be described as not only using the law in its applicable areas, but also considering the system in which the rules exist. It is said that it marks the outer system of the law by developing normative standpoints, which can either justify or criticize different aspects of the applicable law.\(^{21}\)

What I am striving for is a method which includes reasoning not only in the wording of the specific paragraphs, but also puts them in a context, and systematizes them in a coherent manner so that foreseeability can be upheld. This also applies when looking at certain circumstances in a case, where one has to take numerous factors such as the intent of the legislator, the aim of the legislation, and the specific circumstances in mind when discarding or accepting an interpretation. This resonates well with the Scandinavian legal dogmatic method, which was developed from the German historical school.\(^{22}\) This way of reasoning suits the civil law system mainly used in the EU where the legislator without too much trouble can adapt to market changes. This of course leads to the question whether it is suitable when looking at Anglo-Saxon law in general, and American law specifically. When using this method, my intent is to make just

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\(^{16}\) Sandgren (n 13) 36-37.
\(^{17}\) Formerly the CFI.
\(^{18}\) Sandgren (n 13) 35.
\(^{19}\) Ibid 36.
\(^{20}\) Ibid 37-40.
assumptions and conclusions taking relevant consideration to the differences in the two systems, so that the interpretation of the law remains logical and coherent. Since both US and EU cases have been thoroughly discussed on both sides of the Atlantic, including hefty criticism and acclaim, I am striving for an objective and just interpretation.

The Scandinavian legal dogmatic method has however received criticism for being too closed off to the realities of the world. It has been resistant to the possibilities of including other methods, especially when trying to regulate and interpret the free market economy. One solution presented has been to include the economic analysis of the law. 23

1.3.2.3 Comparative method

When reasoning de lege ferenda with two opposing goals in mind; efficiency and foreseeability, it is easy to realize that at some point compromises are needed. Since the legal traditions are different in the US and the EU we will arrive at different conclusions. To find the golden mean, both legal systems need to be consulted, and some degree of comparison will be necessary. This is not in itself a comparative paper on the differences between the US and EU antitrust, however to fulfill the purpose of the paper some level of comparison is vital.

When using a comparative method there is a risk of putting too much emphasis on one or the other legal system. One application of this is when competition policy is enforced in some cases under competition law, and in other cases under intellectual property law. Not knowing the culture of the other country’s legislation might therefore lead to detrimental results when a narrow comparison is made. The hierarchy of the foreign system must be respected. 24 In other words, the same caution used in chapter 1.3.2.2 regarding the method used should be exercised.

1.3.3 Economic method

In order for this paper to be scientific also from an economic point of view, it is more important than for the legal viewpoint to account for the procedure of collecting data. The idea of the thesis was born in my first encounter with microeconomics and industrial organizations. When reading news articles it occurred to me that this topic is of interest not only from a scholarly point of view, but it can have a direct impact on the everyday life of most people who come in contact with a smartphone or the internet in general. Even though this paper may seem abstract, and on a very theoretical level, the law’s implementation can have clear effects on the individual. 25 After contacting my mentor-to-be, I started approaching researchers and professionals in both the US and different MS in the EU to ask for feedback on my topic and to find further relevant material, since not much is written on the game theoretical aspects of the abuse of a dominant position. 26

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26 Most game theoretical literature is either on other fields of law, and when it is on competition policy it is the simpler forms of the prisoner’s dilemma and oligopolies.
Another important point to clarify is that this paper is based solely on secondary data; court cases, articles, books, etc. This means that the data used is collected by others, and what this paper does is to analyze it from a different perspective.

### 1.3.3.1 Traditional or qualitative research perspective

When it comes to which perspective one is applying to any scientific work, it has to suit the aims of the work itself. The traditional research perspective keeps an objective perspective. The opposite is the qualitative perspective, where the researcher has a more subjective point of view. What is of interest in the latter is how the human being perceives and interprets its surrounding, and not, as in (the natural) science where one observes, “measures” and reasons from a given reality. The qualitative perspective is often used when doing case studies, or research with other “subjective” angles, such as interviews. Despite the fact that my personal interest here stems from the game theoretical reasoning in the Microsoft cases in both the US and the EU, I decided to make use of the traditional perspective. This is due to the fact that a case study can have a narrowing impact on the study, as the focus could be too much on the details in the specific case (rather than on the fundamental principles), which would not bring any clarity to how different cases should be handled in the future. I will instead try to reason in a broader scope on the abuse of a dominant position and attempt to provide clarity in regards to predatory pricing and technical tying in general. The traditional research perspective opens up for an empirical analysis that I believe would be more fruitful in the field of competition policy.

### 1.3.3.2 Empirical method

In my analysis I will make an empirical assessment, mapping out the hallmark cases of the last 60 years, to see in which way they actually changed the way competition policy is interpreted. From these conclusions I will make a modern economic analysis according to a game theoretical interpretation. Since the cases and judgments are from different economic mindsets, the results may diverge, however my aim is to find some main themes. Alongside this, current legislation from both the EU and the US will be presented. With these conclusions I will attempt to construct an interpretative model for the prohibition of abuse of a dominant position in regards to predatory pricing and technical tying.

In the empirical assessment it is interesting to note that the method used here goes hand in hand with the method of the legal scholars when looking at how the data in the cases are reviewed. The quantitative method of an empirical study is however still there when we are charting the most important cases (and hereby arguments) through time.

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27 As opposed to primary data which can include interviews, questionnaires, etcetera.
29 Ibid 55.
31 Ibid 27.
32 Sandgren (n 13) 40-41.
1.3.3.3 Quantitative or qualitative method

Another distinction to be made is the one between the qualitative research perspective vis-à-vis the quantitative or qualitative method.\(^{33}\) It is important to keep in mind that what is discussed in this paragraph is whether the research method is qualitative or quantitative. These two are extremities, but a definition is useful to bear in mind. A qualitative method is characterized by the fact that we are not transforming facts to numbers for analysis, but interpreting the social outcome. In the opposite way, a quantitative method is used when transforming facts to numbers, and then comparing them mathematically to come to a conclusion.\(^{34}\) The quantitative method is not the optimal to use here since there are different kinds of social factors to take into account, which is why qualitative reasoning is preferred and will be the main method. It can however be pointed out that a certain degree of quantitative methodology will be used in some of the games, which will mainly work as models to show different aspects of the reasoning, rather than to assign exact values to reality. Traditionally in economics, the qualitative method has been unimportant compared to quantitative methods, however in the past 10-15 years many more "mixed-method projects" have surfaced.\(^{35}\) The drawback of the qualitative method is that it may lack in the normative applicability, and be too descriptive in its nature, but this cannot simply be blamed on the method per se, but on how the research project is specified.\(^{36}\)

1.3.3.4 Game theoretical method

The game theoretical model is the focus of this paper. In an economic viewpoint, (the modern) game theory is a quite new branch of economics, where von Neumann and Morganstern's book from 1944 is considered the standard work.\(^ {37}\) In the subsequent few decades game theory developed to take the form it has today.\(^ {38}\)

In this paper games will be illustrated in their normal form as well as their extensive form as a mean of introducing and explaining how the fundamentals of this theory works. It will also be used to support the general reasoning and to illustrate what an efficient and foreseeable competition policy could look like. Beyond the games themselves, the underlying logic and theory will be applied in all the reasoning upon the reasonableness of the theories and economic schools of thought used earlier, and to discuss whether game theory is a better solution. Also game theory has received a lot of criticism, especially from the Chicago school supporters regarding its lack of normative applicability because they see it as too descriptive. Since the Chicago school has a high standing in law and economics due to its applicability in for instance contract law, it is not easy for another economic school to change the mindset in economic reasoning about the law. However one cannot neglect the important contribution that game

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\(^{33}\) See regarding the distinction between qualitative method and qualitative perspective, Backman (n 28) 33-34.

\(^{34}\) This is a slight simplification, but with the disclaimer made about these two forms being extremities it still stands correct. see Martha A. Starr, 'Qualitative and Mixed-Methods Research in Economics: Surprising Growth, Promising Future' (2014) vol 28 Journal of Economic Surveys 238-264, 239-240.

\(^{35}\) Ibid 238, for examples of qualitative and mixed research see 245-253.

\(^{36}\) Ibid 257.


theory makes to the earlier economic theories, taking strategic factors into account, as well as its dealing with rationality. From a reasoning point of view it is easier to accept some of the game theoretical models, since they are often more anchored in reality, which is a point where the Chicago school sometimes fails to deliver.

One could argue that game theory works well in interpreting court cases and behaviors of firms when the cases are simple, however when the cases become more complex, the criticism increases. By using empirical data (for instance case law) and using game theoretical principles to reason about these complex situations the aim is to find a model living up to the standards of efficiency and foreseeability, to try to outline a normative assessment of game theory within the concept of abuse of a dominant position.

Figure 1.2. The flowchart represents a summary of chapter 1.3, including the methodology used from the start to the end. The empirical method consists mainly by the choice of cases. The legal method is used to analyze the cases and to compare differences and similarities between the US and the EU. The results are then compared with the outcome of a game theoretical interpretation of the cases, to clarify whether the game theoretical method works, and whether my thesis stands correct.
1.4 Outline

The paper is in large divided into 3 main parts: a legal part, an economic part, and a comparative part. The legal part explains the development and the situation *de lege lata*, the current law. The economic part explains game theory, and then implements this theory on the cases discussed in the legal part. The comparative part analyses what the outcome of the implementation was, and draws conclusions from it.

**Chapter 2 aims at giving an overview of the US antitrust situation.**
Chapter 2 surveys the Sherman Act Section 2, and the case law on predatory pricing and tying respectively in the US. Some comparison between predatory pricing and tying is also made.

*Method:* Empirical study of the different cases. Cases are analyzed with a legal dogmatic method, paying attention to the source of law doctrine, as well as a comparative method when relating predatory pricing to tying.

**Chapter 3 aims at giving an overview of the EU antitrust situation.**
Chapter 3 reviews article 102 TFEU, and the case law on predatory pricing and tying respectively within the EU, to show the differences from chapter 2.

*Method:* Empirical study of the different cases. Cases are analyzed with a legal dogmatic method, paying attention to the source of law doctrine.

**Chapter 4 aims at explaining the specifics of game theory as an economic school of thought.**
Chapter 4 explains the principles and concepts of game theory, and shows how it can be used in antitrust law. In its later parts it shows the benefits and drawbacks of game theory in comparison to the earlier economic schools of thought.

*Method:* Objective, descriptive survey of game theory as a method, followed by a comparative study of game theory and the earlier economic schools of thought.

**Chapter 5 aims at showing what a game theoretical interpretation yields.**
Chapter 5 applies the game theoretical method to the cases discussed in chapter 2 and 3 and compares the outcome with the courts’ judgments in regards to predatory pricing and tying respectively. Finally, it illustrates the strengths and the weaknesses with the theory.

*Method:* A game theoretical analysis of the different cases, while still having the fundamental legal principles of the legal dogmatic method and the source of law doctrine in mind. There will also be a comparative element looking at the differences of game theory when applied to the US cases as well as the EU cases to look for differences and similarities.

**Chapter 6 presents the conclusions.**
Chapter 6 presents the conclusions drawn from this paper, and shows the result of the current situation in the US and the EU, with the theory provided in this thesis side-by-side. Finally it presents a final verdict of whether the game theoretical approach actually does improve antitrust.
Method: This chapter adds the overall “economic analysis of the law”-methodology to everything discussed thus far.

Chapter 7 lists the sources used in this paper.

Figure 1.3. The flow chart represents the process of the paper. The white arrows show that the methodology presented in chapter 1 follows each chapter, however the methods do vary in accordance to what is stated in this chapter. The black arrows indicate that each chapter builds on its preceding chapter. You can also note that “Law” and “Economics” are on the same level, since they do not add anything to each other until chapter 5.
2. Antitrust in the US

"Charging monopoly prices 'is an important element of the free-market system' and the 'opportunity to charge monopoly prices—at least for a short period—is what attracts "business acumen" in the first place; it induces risk taking that produces innovation and economic growth.' While that statement reflects the conventional wisdom of our day, it is far cry from the first three decades of the Sherman Act's history when monopolists were called Robber Barons and what to do about them was a loud issue in a half dozen presidential elections."39

The Sherman Act,40 implemented in 1890 is divided into two parts, Section 141 and Section 242, which deal with agreements restraining trade, and monopolization respectively.43 The Sherman Act was in 1914 complemented by the Clayton Act44 and the FTC Act45. The Clayton Act addresses four specific business practices that the Sherman Act does not clearly prohibit, such as mergers.46 The FTC Act created the FTC, an independent government agency whose task was information gathering and disseminating activities to the public.47 The FTC, can just as the DOJ prosecute civil violations of the antitrust laws, however only the DOJ may pursue criminal charges.48

These three acts, the Sherman Act, the Clayton Act, and the FTC Act, together constitute the basic antitrust laws of the US.49

2.1 Sherman Act Section 2

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<td><em>Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding $100,000,000 if a corporation, or, if any other person, $1,000,000, or by imprisonment not exceeding 10 years, or by both said punishments, in the discretion of the court.</em></td>
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Section 2 of the Sherman Act is aimed at single firm conduct, and preventing monopolization, the emergence of monopolies. The prohibition of monopolization in the US antitrust law is targeted at hindering not only abusive conduct of existing firms, but also to prevent firms who are attempting to monopolize. However, do note that the act of monopolization is forbidden, not monopolies per se. The Sherman Act when enacted, had no outspoken aim, which makes the

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40 An act to protect trade and commerce against unlawful restraints and monopolies, 15 US Code, 2 July 1890, hereinafter the Sherman Act.
41 15 US Code § 1 (1890), hereinafter Section 1.
42 15 US Code § 2 (1890), hereinafter Section 2.
43 Martin (n 2) 610.
47 Martin (n 2) 623.
48 Martin (n 2) 629.
49 Martin (n 2) 622.
wording of the short Section 2 text quite open for interpretation. However, one has to pay attention to the last part of the text stating that when applying remedies it is up to the court to decide, which is in line with the common law system in general; the case law gives a better indication of the interpretation than the legislation or any preparatory work.  

What is clear, however, is that the illegal conduct is associated with predatory or anticompetitive actions which have the specific intent to acquire, preserve, or enhance monopoly power, when it is not due to a superior product, business practice, or a historical accident. This means that a monopoly per se is not illegal, but it is generally accepted that an action is anticompetitive when it harms consumers. To be able to prove a violation according to Section 2 today, two criteria need to be fulfilled; intent of conducting these unlawful actions, and monopoly power (as of 1966). In theory, finding out if a firm has monopoly power is rather simple. If the firm is a price taker, but the price it sets is dependent on market demand, it has no monopoly power. If it can set its own prices regardless of the demand on the market, it would set the price so that the profit is maximized. The profit is maximized at a certain, higher, price than the market equilibrium.

2.2 Predatory pricing and the case law in the US

Setting your price low to undercut your rivals, and thereby gaining their customers is what drives the most fundamental form of competition. If you are the most efficient firm, you can do this below all your rivals’ costs, and thereby you will become the only actor left on the market, a monopolist, because all the other firms have exited the market. Suppose now, that you are not the most efficient firm. In this scenario you can lower your prices until your MC = MR. Pricing below that would incur a loss, and while this might work in the short run, it will not work in the long run. If you would sustain a price lower than your costs, you would eventually be forced to exit the market as well. If we now consider a scenario where your rival is just as efficient as your firm, you might set a price lower than your own cost (and thus lower than your rival’s costs). The rival cannot keep up, and this will incur an exit. You will not be able to sustain this lower price in the long run (and you have no reason to), so you will eventually have to raise your price to at least the MC. If there are no rivals willing to enter the market, you will also be able to increase the price to the monopoly price, and thereby recoup your past losses. This phenomenon is called predatory pricing (see figure 2.1). 

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50 Jones and Sufrin (n 11) 20.
Figure 2.1. At $t = 0$ there is only one firm, and it can because of this enjoy monopoly profits which are much higher than the marginal cost. The fact that there is room for supracompetitive prices, will incur other firms to enter the market. However when they do so (at $t = 1$) the incumbent firm lowers its prices below the MC so that the entrant cannot gain any profits, and is forced out of the market. Between the entrance of the entrant ($t = 1$) and its exit ($t = 2$) the incumbent firm incurs losses to itself, with the plan to recoup these losses (after $t = 2$) when it is once again alone.

What the Sherman Act Section 2 says about predation is hard to tell from the wording, since there were no clear definitions of the terms used in the wording itself. The rules and tests used to distinguish predatory pricing from competition on the merits have instead been developed through certain important cases important to the whole scope of Section 2 interpretation. We will now review the different approaches to arrive at the situation today.\textsuperscript{54}

What is pervading through the reviewed cases is that they have in some sense, even if not specifically dealing with the predatory pricing we will reach at the end, have set up certain rules which are imperative to today’s view on predatory pricing.

\textsuperscript{54} Some are also defined in the Clayton Act. For a review, see Richard S Markovits, *Economics and the Interpretation and Application of U.S. and E.U. Antitrust Law* (vol 1, Springer 2014) 502.
2.2.1 Standard Oil and the rule of reason

The Standard Oil case,\textsuperscript{55} from the beginning of the last century is mainly of importance to us due to the rule of reason developed by the court.\textsuperscript{56} It also carries weight due to the fact that it set out that monopolization under Section 2 comprises the same kind of behavior that is forbidden according to Section 1, with the obvious difference that Section 2 deals solely with unilateral conduct.\textsuperscript{57} This is also referred to as the abuse theory,\textsuperscript{58} which was confirmed in the US Steel case.\textsuperscript{59}

General facts of the case

Standard Oil was found by the SC of monopolizing the oil industry, by using its market power in refineries, to leverage itself (upstream) into oil exploration, as well as (downstream) into retail distribution of its product. The SC found that both the intent and effect of the company’s activities was aimed at monopolization, and decided to break it up into smaller companies.

The specifics of the case

By certain problematic practices the company managed to control more than 80\% of the refining capacity in the US.\textsuperscript{60} The issue at hand was whether the way Standard Oil had received its monopoly was illegal per se (per se rule), or if it was illegal only if it was unreasonable (rule of reason).\textsuperscript{61} The Supreme Court interpreted Section 2 with guidance of the aims of the legislator, to avoid unreasonable restraints on competition. The rule of reason developed states that one has to look at (1) the nature of the contract, (2) the circumstances surrounding it, and (3) the intent with which it had been entered into.\textsuperscript{62}

When applying the rule of reason one first looks at the conduct to determine whether it violates Section 2. Secondly, one looks at the intent of the company determining whether there was an intent to monopolize.\textsuperscript{63} It was only with this case that predatory pricing became an antitrust violation.\textsuperscript{64}

\begin{quote}
\textbf{Rule of Reason:} Unreasonable restraints on competition is not determined through a per se rule, but by an analysis of the nature, circumstances, and intent in the case.
\end{quote}

\begin{footnotes}{55}The Standard Oil Company of New Jersey, et al. v. The United States 221 U.S. 1, hereinafter Standard Oil.\end{footnotes}

\begin{footnotes}{56}Hylton 2003 (n 52) 186.\end{footnotes}

\begin{footnotes}{57}See Hylton 2003 (n 52) 187. For further reading on the restraints of trade under Section 1, see Martin (n 2) 653.\end{footnotes}

\begin{footnotes}{58}Hylton 2003 (n 52) 187.\end{footnotes}

\begin{footnotes}{59}United States v. United States Steel Corp., 251 U.S. 417 (1920).\end{footnotes}

\begin{footnotes}{60}See Martin (n 2) 708-711.\end{footnotes}

\begin{footnotes}{61}Hylton 2003 (n 52) 187.\end{footnotes}

\begin{footnotes}{62}Martin (n 2) 711.\end{footnotes}

\begin{footnotes}{63}Hylton 2003 (n 52) 187; in some later cases and in the doctrine this is also referred to as "specific intent".\end{footnotes}

\begin{footnotes}{64}BBR (n 53) 2250-2251.\end{footnotes}
2.2.2 Alcoa

Up until the Alcoa case, the main rule had been the “specific intent” rule when assessing intent. With Alcoa, a new concept, a sort of (welfare) balancing test was introduced by Judge Hand in the Court of Appeals in 1945.

In a sense, Judge Hand was ahead of his time, as many of his arguments have since been developed and refined into well-accepted theories based on game theory and behavioral economics. In the time of the judgment however, and many years thereafter the case was criticized, and while some cases have refined his thinking, many of them overturned his view.

General facts of the case

Alcoa, being the only domestic supplier of primary aluminum, was charged with monopolization in 1937. Alcoa was, due to an earlier patent of electrolytic reduction (see figure 2.2(3)), which expired in 1919 in an advanced position, and had control of the whole aluminum refinement process, see figure 2.2 below.

Alcoa maintained its position due to a number of facts. First, it was protected from foreign competition by high import tariffs. Additionally, it bought low-cost deposits of bauxite (see figure 2.2(1)), and cheap electric power sites, as the process was especially electricity demanding. The last step, fabrication of goods was something they also conducted themselves, however they also did sell a big part of their aluminum ingots to other manufacturers. Alcoa did seem to keep prices down, in order to gain an even bigger market share.

The District Court deemed the actions of Alcoa not to be unlawful, however the CA, acting as the highest court concluded that Alcoa was indeed guilty of monopolization.

The specifics of the case

This case included two important decisions. The first one was how to define the relevant market, since this was essential to determine whether the company had any monopoly power. The second was to show that the company had obtained its position with intent to exclude competitors.

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65 United States v. Aluminum Co. of America, 148 F.2d 416 (2d Cir. 1945), hereinafter Alcoa.
66 The Court of Appeals acted as a court of last resort, by request from the Congress, since many Supreme Court judges disqualified themselves from the case due to previous involvement.
67 Martin (n 2) 715.
69 ibid 301-302.
70 Alcoa (n 65)
(1) The market definition

Judge Hand considered three possible market share definitions:

1. \[
\frac{\text{Alcoa's sales}}{\text{Total primary+Secondary+Imports}} = 33\% 
\]

2. \[
\frac{\text{Alcoa's sales + Internal use}}{\text{Total primary+Secondary+Imports}} = 64\% 
\]

3. \[
\frac{\text{Alcoa's sales + Internal use}}{\text{Total primary+Imports}} = 90\% 
\]

The first definition (33\%) – which Judge Hand held not constituting a monopoly – was precluded since its own fabrication was excluded, which was not realistic.

The second definition (64\%) – which Judge Hand held could constitute a monopoly – was adjusted to contain the aluminum it used itself, since these products were also competing on the market.

The third definition (90\%) – which Judge Hand held would constitute a monopoly – was adjusted to exclude the secondary market of aluminum scraps.

His reasoning, and choice of the third definition, arriving at the conclusion that Alcoa did have a monopoly position, was based on the fact that Alcoa at one point did exercise control over the scrap market, as it had dominance in the whole country, and would set its prices and quantities produced, taking this factor into account. By so far we have concluded that Alcoa did indeed have a monopoly position.

(2) Intent to exclude

Judge Hand started by stating that the fact that Alcoa did have a monopoly, did not mean that it had been monopolizing the market. It could have received its position to a number of different reasons, where superior skill, foresight and industry specific circumstances might have been a few.\footnote{ibid 302-303.} What was unique with the Alcoa case was that it redrew the image of monopolization by stating that building capacity ahead of demand could be sufficient to indicate intent to monopolize by a dominant firm.\footnote{ibid 303.} In other words: Alcoa expanded its capacity to deter entry from competitors, which is something of an anachronism; these thoughts were developed in the 1970s and 1980s when game theory was being established.\footnote{Drew Fudenberg and Jeane Tirole, ‘The Fat-Cat Effect, The Puppy-Dog Ploy, and the Lean and Hungry Look’ (1984) vol 74 American Economic Review 361; Avinash Dixit, The Role of Investment in Entry-Deterrence (1980) vol 90 The Economic Journal 95.} The tactics used in earlier cases with aggressive and predatory practices were not seen here, but it could still constitute illegal monopolization.
Judge Hand deemed the behavior unlawful, not by showing a direct object projecting intent to monopolize, but by considering more factors. He concluded that Alcoa did not reach its monopoly position by a historical accident or technological advantages, but by its business practices that were deemed unlawful.\textsuperscript{75} He found support in the noneconomic goals of the Sherman Act, referring to the Surplus Property Act of 1944, and the small Business Mobilization Act.\textsuperscript{76}

It was these specific considerations which changed the definition of intent from having to show a specific intent to monopolize (specific intent test), to balancing different factors and finding majority of factors pointing more towards an abuse than not (welfare balancing test).

2.2.3 Areeda-Turner paper

Up until 1975 when Areeda and Turner presented their seminal paper on the assessment of what composes exclusionary practices in relation to predatory pricing the Judge Hand’s decision stood rather firm.\textsuperscript{77} Areeda and Turner focused on the short-run profit-maximizing behavior for pricing, and tried to simplify the assessment with a simpler rule, which is best illustrated by figure 2.3.

\begin{figure}[h]
\centering
\includegraphics[width=0.8\textwidth]{figure23.png}
\caption{Figure 2.3.}
\end{figure}

In the A region, the price is higher than the short-run MC, and higher than the short-run AC. In the B region price is higher than the MC, less than AC and greater than AVC. Areeda and Turner state that prices in the A or B regions should be considered non-predatory. Prices in the C region on the other hand should be deemed predatory, as there in default is no reason to keep

\textsuperscript{75} Hylton 2003 (n 52) 190.
\textsuperscript{76} Martin (n 2) 716.
your price below your costs. Since MC can be hard to judge from the outside of a company, Areeda and Turner suggest AVC as a proxy for MC.\textsuperscript{78}

The reasoning is that in the A region there is no risk that equally efficient rivals will be excluded and therefore this is a safe zone. In the B region there is a risk that equally efficient firms might be eliminated, but this is an unavoidable risk. The risk of a type 2 error is smaller than a type 1 error. The same can be said about region C.\textsuperscript{79}

By introducing this test, they are in fact going back to a specific intent test, where the numbers work as proxies to determine what to classify as predatory behavior. After the publication of the article, several cases in the US steered the development towards this view.

2.2.3.1 Barry Wright/Grinnell\textsuperscript{80}

The Grinnell case set out the rules of predatory pricing that we still use today, which was partially explained in chapter 2.1. Furthermore the problem of type 1 and type 2 errors mentioned above is best described in this case.\textsuperscript{81}

General facts of the case
The case revolved around the ITT Grinnell Corporation that created nuclear plant pipe systems. For a long time it received its parts from Pacific Scientific Company. To be less dependent on Pacific, Grinnell contracted Barry Wright to create these parts, however the company did not manage to deliver the parts on schedule. Pacific then offered discounted parts, upon which Barry Wright sued for predation.\textsuperscript{82} Since Grinnell’s discounting was still above AC, the Court of Appeals found the conduct to be legal.\textsuperscript{83}

The specifics of the case
The court first assessed that Pacific did have sufficient monopoly power to fulfill the first criterion of the Grinnell test.\textsuperscript{84} The second criterion was to assess whether it had created or kept said monopoly power through other merits than growth as a consequence of superior product, business acumen, or historical accident.\textsuperscript{85} This means that apart from (1) monopoly power you also need (2) an intent to monopolize, why the Grinnell test has also been called the “monopoly power plus intent test of monopolization”.\textsuperscript{86}

\textsuperscript{78} Hylton 2003 (n 52) 221.
\textsuperscript{79} Hylton 2003 (n 52) 220-221. See also, James H Stock, Mark Watson, \textit{Introduction to Econometrics} (3rd rev edn, Global edn, Pearson Education 2014) 124, for clear economic descriptions of the two types of errors.
\textsuperscript{80} Barry Wright Corporation v. Itt Grinnell Corporation, et al., 724 F.2d 227 (1st Cir. 1983)
\textsuperscript{81} Hylton 2003 (n 52) 214.
\textsuperscript{82} Hylton 2003 (n 52) 215.
\textsuperscript{84} Do note that the Barry Wright v. Grinnell case from 1984 is referring to the older US v. Grinnell case from 1966 in this respect.
The plaintiff urged the court to apply an intent rule used by the Ninth Circuit where a company could be held liable to predatory pricing if the plaintiff could provide sufficient evidence that the competitor had a predatory intent. The First Circuit court however withheld that prices above AC could not be seen as predatory even if intent was shown. This means that regardless of the evidence of intent provided the competitor could not be held liable, as long as the price was above this cost limit. Judge Breyer provided three arguments to why this was the case. First, the risk of type 2 errors (false convictions) at this price interval is common, as it is hard to distinguish between competition on the merits and predation. Next, it would send the wrong message – with the Ninth Circuit rule in play lawyers would discourage companies from cutting prices. Lastly, the risk of errors would bring frivolous lawsuits encouraging rent seeking, which would impede competition. Judge Breyer did however point out that even the Ninth Circuit intent rule would lead to the same verdict. The argumentation provided by the judge seemed to strive towards contributing to a long-term doctrine with an easy-to-apply rule of how to handle similar cases in the future.

2.2.3.2 Matsushita

The Matsushita and the Brooke Group cases have together given rise to the so-called Brooke Group test (which in essence is a specific intent test), which emphasizes the need to show harm that will affect consumers, rather than just competitors. The Brooke Group case draws extensively from the Matsushita case, which is why we will start with examining the latter.

In 1986 the Supreme Court expressed their view on type 2 errors for the first time in the Matsushita case, which has been seen as the most important predatory pricing case from the Supreme Court. Something worth noting is that Matsushita was a Section 1 case, dealing with collusive actions and a possible cartel, but it had nothing to do with unilateral conduct whatsoever. Despite this it managed to find itself into the Section 2 jurisprudence.

General facts of the case

Matsushita claimed that ten Japanese television manufacturers alongside two distributors of Japanese television sets in the US had conspired for twenty years to hold up prices in Japan in order to use the surplus to finance a predatory scheme on the US market, in order to drive the American firms out of the market. The claims were that the companies would thereafter act as a cartel on the American market, just like they did on the Japanese market. The SC found that predation had not taken place.

87 Hylton 2003 (n 52) 214-215.
89 The reason is that if the requirements of the Brooke Group test are satisfied, then one can say that the objective evidence implies that the defendant’s intent could only have been predatory. Keith N Hylton, 'The Law and Economics of Monopolization Standards' in Keith N Hylton (ed), Antitrust Law and Economics (vol 4 Encyclopedia of Law and Economics, 2nd edn, Edward Elgar Publishing 2010) 86.
91 Hylton 2003 (n 52) 216.
The specifics of the case

The Supreme Court was skeptical to the predation allegations since so many companies would have been forced to suffer losses under an incredibly long time (they had – allegedly – already conspired for twenty years, and predation had still not occurred), and furthermore they must have had a reasonable expectation to recoup these losses in the future.\(^{94}\) The court used an objective reasonableness test for predation claims (which basically is a specific intent test). The necessary conditions for a predation scheme to be successful are: (1) the cartel must have some prospect of achieving a monopoly, (2) monopoly pricing must not result in quick (re-)entry, and (3) the firms must be able to maintain a monopoly long enough to recoup the losses and turn it into profit. The claims failed on many grounds, as entry seemed to be easy, it did not seem like the (alleged) plan was working, the market shares remained the same, and the fact that it was a cartel (among 10 manufacturers) made the situation highly unstable.\(^{95}\) This aside, there was nothing supporting that the prices were actually predatory, and the court referred to the Areeda-Turner test claiming that the plaintiffs did not show that any form of below-cost pricing was applied.\(^{96}\)

2.2.3.3 Brooke Group\(^ {97}\)

In 1980, Liggett & Myers, a part of the Brooke Group, introduced a line of low-price generic cigarettes, since there was a decline in the cigarette market. A competitor, Brown & Williamson countered with their own generic cigarettes. This lead to a price war, which ultimately ended with Liggett filing a lawsuit against Brown & Williamson claiming that their discount scheme was discriminatory and was aimed at killing the growth of generic cigarettes in order to protect its branded cigarettes. The SC found that predation had not taken place due to recoupment not being probable.\(^ {98}\)

The specifics of the case

For 18 months, Brown & Williamson held prices below AVC, which resulted in a loss of millions of dollars. At the end of this period, Liggett backed out of the competition by increasing its prices of the low-price cigarettes, after which Brown & Williamson and the other companies adjusted their prices respectively.\(^ {99}\)

To back their claims Liggett had several documents thoroughly explaining how Brown & Williamson would put this plan in motion (to not only injure Liggett but also to slow the whole generic cigarette market) from several high level executives at Brown & Williamson.\(^ {100}\) Liggett was further claiming that Brown & Williamson intended to use their profits from their branded cigarettes to cover the losses from the generic market. When the case reached the highest instance

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\(^{94}\) BBR (n 53) 2250–51 and 2253.

\(^{95}\) Hylton 2003 (n 52) 216.

\(^{96}\) Martin (n 2) 720-721; interestingly the court did not specify whether AC or AVC was intended, see 721.


\(^{98}\) Martin (n 2) 721-723.

\(^{99}\) Brooke Group at 231.

the Supreme Court held that in order for this to be a case of predatory pricing, apart from the reasonableness test in Matsushita, it was required that the prices were below cost (Areeda-Turner test as used in both Matsushita and Grinnell), that there was a realistic possibility of recoupment (“dangerous probability”), and they added a third requirement, that predation and recoupment occurred in the same market. Since the generic cigarette market and the branded cigarette market were not considered to be the same market, there was no possibility for recoupment (in the same market).101

2.3 Tying and the case law in the US

Apart from directly adjusting prices there are also other ways to compete, and other ways for dominant firms to use their monopoly power to try to foreclose rivals, or to deter entry into the market. These non-price monopolization practices can have three different forms; strategic investments, tying, and inter-operability. This chapter will focus on a specific form of tying, namely technological tying however when assessing cases it is good to also have an understanding of the relating practices.102

Purpose of this chapter

The purpose of chapter 2.3 is, apart from defining tying, to discuss the purposes of tying, with the literature as a basis. Game theory (strategic theory) has made some remarks on the reasoning of today, which is fairly undisputed – at least under certain circumstances.103 In order to develop game theory further later on, we need to first assess what today is accepted, to be able to grasp why a development of strategic theory is a natural succession of the exclusionary abuses discussed.

The chapter also starts making comparisons between predatory pricing and technological tying, to straighten out the meaning of the similarities that I argue exist, based on the literature. This will however be further developed and explained in chapter 5 and chapter 6. Naturally, the tests of predatory pricing and technological tying presented will differ slightly, but the intent, the firm’s mindset, and the economic reasoning is the same as will be reviewed in chapter 6.

Strategic investments

In this first section we will look at how strategic investments can be used to deter entry or foreclose competitors.104 It is hard to distinguish if a price reduction is because of competition on the merits, or due to anticompetitive behavior. As a general rule of thumb, you do not want to discourage price reduction, as it benefits consumers. The exact same thing applies to investments in production capacity, number of services provided, research and development, advertising, product quality, new brands or new models, etcetera.105 The mechanics behind anticompetitive behavior in regards to investments are similar to those of predatory pricing; you take a loss today

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101 Martin (n 2) 722-723.
102 There are also other types of non-price monopolization practices, for instance exclusive dealing, refusal to supply. See, Massimo Motta, Competition Policy: Theory and Practice (Cambridge University Press 2004) 454, hereinafter Motta.
103 Motta (n 102) 454-491.
104 A concrete example of how strategic investments, inter-operability and technological tying are used in an unlawful way will be given in chapter 2.3.1.
105 Motta (n 102) 454.
(by investing more than is profitable in the short run), counting on recouping the losses, with interest, tomorrow.\textsuperscript{106} The goal is to scare the entrant into thinking that it could not compete with a firm running on so high economies of scale or scope, and therefore avoid the industry in question. My own interpretation and definition of over-investment is quite strict; it is \textit{per default} an investment that yields no positive surplus. However, a \textit{per se} assumption that over-investment is anticompetitive is not feasible for two reasons. The first being that the lower cost might actually lower costs for the monopolist,\textsuperscript{107} and the second being that it is very hard – just like in the case of predatory pricing to assess which investments are overinvestments, and which are “optimal” investments. The precedent of charging firms with anticompetitive behavior due to overinvestments would also make lawyers advise their clients to not invest too much, and paradoxically chill innovation.\textsuperscript{108}

So far we have seen many similarities between strategic investments and predatory pricing; unnecessary costs are incurred on one-self, however there are also distinct differences. First, there are several benchmarks (discussed in chapter 2.2 and later in chapter 3.2) suggested for establishing predatory pricing, but no such benchmark exists for strategic investments. Secondly, price setting can be reversed, whereas investments cannot (at least not the kind of investments we are interested in here). This implies that the monopolist in question will not only be better off (from an efficiency standpoint), but it could also mean that consumers will benefit from this. All things considered, strategic (over-)investment is a lesser bad compared to predatory pricing from a consumer surplus perspective.\textsuperscript{109}

\textbf{Inter-operability}

Let us first assume that a monopolist sells both a main product A, and its complementary product B, which is on a contested market. By denying compatibility of the competitors on the market for B, the monopolist is effectively foreclosing the competition since the competitors’ complementary products will not be compatible with the main product.\textsuperscript{110}

In a network industry, inter-operability becomes particularly important. As a starting point we can assume that no monopolist would want to share its market by granting its rivals compatibility, as it would be self-defeating. In some cases, suppose that there are several smaller rivals, and by giving them all compatibility you can attract a wider market of customers. You are in this case giving up a dominant position over a small market to a less dominant position on a bigger one. An ex poste intervention might be seen as an easy fix to the problem to impenetrable markets to increase the competition, however this as well could chill innovation, as the dominant position is the carrot for companies to compete, and the incumbent monopolist might have sunk time and money into establishing itself, money that it should have a right to recoup.\textsuperscript{111} There are of course exceptions but we are currently only reviewing the different assessments of strategic behavior.

\textsuperscript{106} For an example on this see Richard J Gilbert and Michael H Riordan, ‘Product Improvement and Technological Tying in a Winner-Take-All Market’ (2007) vol LV The Journal of Industrial Economics 113, hereinafter Gilbert and Riordan.
\textsuperscript{107} Which would be an irrational decision by the firm, however if the decision cannot be reversed, it is from that point a better outcome for the consumers, as they potentially get lower prices.
\textsuperscript{108} Motta (n 102) 454-455.
\textsuperscript{109} ibid 455-456.
\textsuperscript{110} ibid 483.
\textsuperscript{111} ibid 483-484.
Tying
Tying is defined as the act of selling a product A, with the condition that the buyer will also buy the accessory product B from the seller, and not from a competitor. This can be exemplified with a seller of a printer (tying product) requiring that the buyer also buy ink and paper (tied products) from the seller, and not from a competitor. Naturally, to be able to impose terms like these on a buyer you need market power, the leverage with which you impel the buyer to buy your tied goods. As set out in the first chapter, we will not deal with product tying in this paper, but we will instead direct our attention to technological tying, as this is relevant in the new economy, and it has the biggest similarities to predatory pricing.

In the US tying can be challenged under both Section 1 (contracts in restraint of trade) and Section 2 (monopolization), but also under the Clayton Act (prohibition of exclusivity arrangements that harms competition) and the FTC Act (unfair competition methods).

Technological tying
In short technological tying is a more intimate way of tying than by contract. As product tying historically had legal restrictions, one could imagine certain firms to forcefully integrate two products together into one, to avoid the rules on product tying. However, courts are aware of the incentive to use this strategy, and the rule today is that personal illegality does not apply to these cases. To avoid this, plaintiffs need to show that the defendant integrated the two products together for the sole purpose of distorting competition rather than to produce surplus to consumers. The legal standard was first expressed in the Leasco case where it was stated that the integration was solely “for the purpose of tying the products, rather than to achieve some TECHNOLOGICALLY BENEFICIAL RESULT.” This puts the bar high for the plaintiffs in their burden of proof, and is basically a specific intent test.

2.3.1 Microsoft Internet Explorer case
The Microsoft case is arguably the most discussed case in the history of antitrust. Just as Standard Oil had a decisive impact on the course of antitrust in the beginning of the previous century, the Microsoft case has in this century stirred up issues belonging to the new economy, and the new technological realities of our time. While this chapter deals with tying, it is nevertheless

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112 Hylton 2003 (n 52) 279.
114 U.S. Dep’t of Justice, Competition and Monopoly: Single-Firm Conduct Under Section 2 of the Sherman Act (2008) 78. It is important to note that the policy contents of this document is no longer the policy of the US as it was repudiated shortly after its release by the succeeding government, as they chose a more active enforcement, see http://www.justice.gov/opa/pr/justice-department-withdraws-report-antitrust-monopoly-law and http://www.justice.gov/atr/speech/vigorous-antitrust-enforcement-challenging-era, both accessed 2 June 2015.
115 Hylton 2003 (n 52) 301-302.
116 Response of Carolina, Inc. v. Leasco Response, Inc. 537 F.2d 1307 (5th Cir. 1976) at 1330.
117 Hylton 2003 (n 52) 302.
118 United States of America, Appellee v. Microsoft Corporation, Appellant, 253 F.3d 34 (D.C. Cir. 2001)
119 It is important to clarify that it is not actually just one case, but several, both in the US and in the EU, and in the literature they are often numbered. Some of the cases deal with procedural issues, but in this paper we are discussing the “Internet Explorer case” (in the US – this chapter) and the “Windows Media Player case” (in the EU – chapter 3.3.1). For a complete timeline of the US cases, see Martin p. 756-757.
important to highlight also other types of anticompetitive behavior conducted in the cases, as the court makes an overall assessment.

Technical background: middleware and APIs
Before delving into the case details a brief technical definition is needed of middleware and APIs. An OS is merely a platform for the applications that run on it. To promote the development of third party programs, the OS has certain API, which makes the writing of program code much easier, faster, and cheaper. Instead of inventing the wheel all over again, programmers can refer to some parts of code that is already written in the OS that performs the desired action. These are the API. An example is the API for drawing a box on the screen. This can be used in drawing programs, but also in word processors. Instead of the developers of each program having to write the code manually they can simply refer to the “draw box function” built into the OS with much less code. Every OS has thousands of APIs, and they differ from OS to OS. Obviously, you want developers to commit to your OS, and therefore you do not want a code that can easily be transferred (ported) to another OS. However, from a developer point of view, common code would help you spread your applications through a vast range of OSs. This is where middleware comes into the picture. Middleware simply are programs that are written on one OS, with their own APIs, which are not controlled by the OS (see figure 2.4 for a graphical illustration). This is why Netscape that was running on several OSs, was a powerful competitor to Microsoft. It allowed the use of Java, which is a programming language with its own libraries of APIs, common throughout all OSs. If a majority of applications would run “within” Netscape via Java, Microsoft’s dominant position would diminish, as it did not matter which OS a user had. And this strive for control, and user base, is the core of the Microsoft case.

Figure 2.4. The red blocks represent two platforms that utilize different types of API; the blue connectors, which connects to the platform via the white openings. Our middleware, in the case Netscape Navigator opens up the possibility to run Java on Windows, which would further spread the usefulness and utility of Java. Since Java runs on other platforms as well, such as Mac or Linux devices, Microsoft loses power as users and programmers want a platform that is as large as possible. (As we will see shortly Microsoft managed to block Java and Netscape out by introducing a competitor to Netscape Navigator; the Internet Explorer, that did not allow the same interoperability.)

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120 Motta (n 102) 513.
General facts of the case

In May 1998 the DOJ and 20 state Attorney Generals sued Microsoft for violations of Section 2 (monopolization) and Section 1 (tying and exclusionary conduct). The allegations dealt with Microsoft’s business practices related to its browser, IE, which competed with Netscape Navigator, initially the leading browser.\(^{121}\) The case was in the end settled, and the plaintiff, the state, was considered to be the winner. However, the fact that the remedies were not nearly as far-reaching as the state initially pursued, questions how much of a win this actually was.

The specifics of the case

In 2000 when the District Court issued its conclusion of law, it found Microsoft liable of three violations of antitrust law:

1. maintaining a monopoly of operating systems for Intel-compatible PCs (Section 2);
2. attempting to monopolize the market for internet browsers (Section 2); and
3. tying IE to the Windows OS (Section 1).\(^ {122}\)

As we discussed in chapter 2.1, there are two requirements to prove that a firm is guilty of monopolization; (1) proof of monopoly power, and (2) proof that this monopoly power has been acquired or maintained through anticompetitive means.\(^ {123}\) To establish the presence of monopoly power the District Court stated that Microsoft was the leading supplier of the world market for OSs for Intel-compatible PCs with 95% or 80% market share, depending on if you also include Apple’s PCs.\(^ {124}\) The definition of the market as the Intel-compatible PC market was also the one accepted by the CA. To assess the market power, apart from the market share, the CA stated that the entry barriers were significant due to the network effects in play.\(^ {125}\)

Anticompetitive conduct according to the CA

When the CA assessed that Microsoft had monopoly power, it also had to show that this monopoly power was acquired by anti-competitive means. Now, if the monopolist does show a precompetitive justification for an action, it becomes the plaintiff’s task to demonstrate that the anti-competitive act outweighs the precompetitive reasoning. The CA also pointed out that it was the conduct itself that constituted what is anticompetitive, not the intent behind it – the only time intent becomes important is when it supports the effects of the conduct.\(^ {126}\)

The illegal conduct

There was a range of areas where Microsoft used dubious methods. The District Court presented a long list, however some of them were reversed by the CA. The groups of practices, that were affirmed by the CA were apart from the tying of IE to the OS itself, various licensing restrictions

121 id 511.
123 Motta (n 102) 512.
124 Martin (n 2) 754; even though “PC” is the term nowadays used for Windows or Linux based computers (historically: computers with Intel microprocessors), it is nevertheless the term to use also for Macintosh computers (historically: non-Intel microprocessors, but since 2006 also Mac computers use Intel microprocessors). See, <www.apple.com/pr/library/2005/06/06Apple-to-Use-Intel-Microprocessors-Beginning-in-2006.html> accessed 26 May 2015.
125 Motta (n 102) 514.
126 id 515.
to OEMs, anticompetitive agreements with IAPs, ISVs, OSs, as well as the act of undermining the cross-compatibility of Java.\textsuperscript{127}

**Specifically regarding tying**

Since technological tying in this case had certain elements of innovation and a per se regulation as the District Court suggested would chill innovation unjustifiably, the CA concluded that the efficiency gains \textit{could} justify tying, however this was remanded to the District Court for a new assessment.\textsuperscript{128}

It is important to point out that the CA did not find that the plaintiff had proven that Microsoft had attempted to monopolize the internet browser market, and on that ground have violated Section 2.\textsuperscript{129}

**Verdict and remedies**

In the end, the case was settled in November 2001, just after the Bush II Administration had entered office. The view was restrictive, without too severe remedies for Microsoft. Microsoft had to change its business practices; for instance in relation to contracting OEMs, disclosure of certain APIs to the public, and agree to being monitored by an independent compliance officer. However, the terms of the settlement were in general considered a slap on the wrist, especially considering the aim of the District Court on splitting Microsoft into two companies due to their market power and their abusive behavior.\textsuperscript{130}

\textsuperscript{127} For a table of abuses by the District Court and the CA, see Page and Lopatka (n 122) 36 table 1. For a more descriptive review see Motta (n 102) 515-519.

\textsuperscript{128} Motta (n 102) 520-521.

\textsuperscript{129} Martin (n 2) 763.

\textsuperscript{130} id 762-764.
3. Antitrust in the EU

Antitrust in the EU is mainly regulated through the TFEU. Article 101 regulates conduct between undertakings which are aimed at preventing, restricting or distorting competition that may affect trade between MS. Article 102, which will be dealt with shortly, prohibits undertakings holding a dominant position in the internal market from abusing their position. Unlike article 101 it contains no exception or exemption. Articles 103-109 also contain competition rules, however these are either procedural rules, or deal with specific issues, such as state aids. Other TFEU provisions might also be important to the competition rules, but for the main point of this paper, these are the general, and most important provisions. The EU rules regarding mergers are not actually in the TFEU itself, but are controlled via the Merger Regulations, 139/2004.

The EC also issues Communications, and Notices, and even though they are not black letter law, they are still important to the understanding and application of EU competition law as they do work as soft law sources.

An important point to be made when it comes to EU competition law is that the articles 101 and 102 TFEU have direct applicability meaning that the provisions are part of the law of each MS, and that these should be enforced as such by national competition authorities and national courts.

3.1 Article 102 TFEU

**Article 102 TFEU**

Any abuse by one or more undertakings of a dominant position within the internal market or in a substantial part of it shall be prohibited as incompatible with the internal market in so far as it may affect trade between Member States.

Such abuse may, in particular, consist in:

(a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;

(b) limiting production, markets or technical development to the prejudice of consumers;

(c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;

(d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

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131 Jones and Sufrin (n 11) 114-117.
132 id (n 11) 117.
134 Sufrin, 118.
135 Motta (n 102) 31.
Article 102 TFEU deals with abuse of a dominant position, and is aimed at the same kind of single firm conduct as Sherman Act Section 2, as discussed in chapter 3.1, however the terms are different. Instead of monopolization and monopoly power as in Section 2 of the Sherman Act, the TFEU talks about abuse of a dominant position and market power.

In the article there is a list of abuses, which *may* come into play. This indicates that this is not an exhaustive list. The article also implies five elements that must be established before the prohibition of the article is set in use. It must be (1) one or more undertakings; (2) with a dominant position; (3) held in the internal market of the EU; (4) exploiting an abuse; (5) that has an effect in the internal trade. Out of these, the provisions (1), (3), and (5) are normally easy to assess. Whereas the provisions (2) and (4) are the harder ones to determine, which is why we need to define these two concepts.

**Dominance**, defined in one of the first article 102 cases, Hoffmann-LaRoche implies “the power to behave to an appreciable extent independently of its competitors, its customers and ultimately of the consumers”. It might be hard to assess what degree of (market) power is needed to be considered as dominant, but United Brands clarified that 40% of the relevant market is enough. To define *abuse of dominance* we turn back to Hoffman-La Roche which states that it is a behavior “which, through recourse to methods different from those which condition normal competition in products or services on the basis of the transactions of commercial operators, has the effect of hindering the maintenance of the degree of competition still existing in the market or the growth of that competition”. When the CJEU speaks of these abuses it refers to what is referred to as exclusionary practices, or exclusionary abuses.

There are some differences between Section 2 and article 102 that are important to keep in mind. First, article 102 deals only with undertakings that already have a dominant position, not with undertakings that try to achieve one – for these undertakings article 102 is not applicable. Another major difference is that a dominant undertaking, according to the article is prohibited from not only “exclusionary abuses” but also “exploitative abuses”, meaning that it is not allowed to charge unfair prices or limiting production to the prejudice of consumers. As a last clarification it is important to notice what was discussed regarding dominance in the EU. Dominance in article 102 is a lower threshold than monopolization under the Sherman Act. As we just saw, 40% of the market share is enough to constitute a dominant position. This can be compared to chapter 3.2.1.1 Alcoa, where the court stated that 33% did not constitute a monopoly, 64% *could* constitute a monopoly and that 90% definitely did constitute a monopoly. Granted, also according to EU law 40% market share does not mean that you automatically control the market; other factors, such as the strength and number of competitors play a role. It merely means that you have a great influence on the market. Here it is important to remember the significant distinction made in chapter 2.1 where a company with a dominant position in the

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136 Jones and Sufrin (n 11) 271.
137 Case C-85/76 Hoffmann-La Roche v Commission [1979] ECR 461, para 520.
139 Case C-85/76 Hoffmann-La Roche v Commission [1979] ECR 461, para 541.
140 Jones and Sufrin (n 11) 270.
141 ibid.
US (somewhere between 64-90%) also could be charged for intent to monopolize under Section 2, whereas attempt to monopolize is not unlawful in the US, however to balance it out the requirement for dominance in the EU is, as we just saw, much lower.

### 3.2 Predatory pricing and the case law in the EU

The definition of predatory pricing is based on the same principles in both the US and the EU. The only differences are that (1) intent is used differently in the EU, and (2) there is a requirement for recoupment, to show that it is possible to recoup losses later on, in the US law. This requirement does not exist in the EU competition law.

Apart from the principles there are rather big differences, but these are simply found in the case law in the application of predatory pricing, as the economic approaches have been different. The EU case law on predatory pricing will now be examined.

#### 3.2.1 AKZO

Up until 1991 when the CJEU ruled on the AKZO case there was no real precedent on what in the EU was classified as predatory pricing. By then, the rule according to US law was quite clear after the tests and models had been thoroughly discussed by scholars, and the preference for the Chicago approach was also highlighted in the recent Matsushita case. Since the US were leading in the economic analysis of the law, no further research was needed in figuring out how to determine an act of predatory pricing, however the CJEU had to be very careful in choosing a method that would be in line with the EU competition policy’s history, culture, and aims when deciding on which test and which model to apply.

**General facts of the case**

The CJEU held, in line with the EC, that AKZO intended to eliminate its competitor, ECS, by abusing its dominant position in the polymer industry. AKZO was found of selective price cuts in the flour additives market, and pleaded to the CJEU to apply the Areeda-Turner rule, as the prices were below ATC, however the court stated that despite prices being below ATC (but above AVC) AKZO’s intent to foreclose its rival made it a case of predatory pricing.

**The specifics of the case**

AKZO Chemie and its subsidiaries formed the chemical division of the multinational (multimarket, multiproduct) firm AKZO NV. One of said subsidiaries, AKZO UK, was in turn in charge of the chemical business of AKZO Chemie in the United Kingdom. AKZO UK produced not only organic peroxides for the polymer industry (“plastics industry”), but it also

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143 Guidance Paper (n 113), para 63.
144 See the AKZO case in the upcoming chapter 3.2.1.
145 As set out in Brooke Group, see chapter 2.2.3.3.
146 Confirmed by the CJEU in AKZO and Wanadoo, see chapter 3.2.1 and 3.2.3 respectively.
148 See chapter 2.2.3.2.
manufactured benzoyl peroxide (BP) compounds that were used as bleaching agents. In the United Kingdom (and Ireland) this was used in commercial baking of bread. An important fact here is that in the EEC the use of this bleaching agent for flour was only permitted in the United Kingdom and Ireland, which made the flour market considerably smaller than the plastics market.

Apart from AKZO UK, which had a market share of 52%, there were two other agents in the flour market in the United Kingdom; ECS (35%) and Diaflex (13%). It is important to notice that Diaflex bought its raw material from AKZO. Engineering and Chemical Supplies Ltd (ECS), was a small producer of organic benzoyl peroxide in the United Kingdom, focusing mainly on the production of flour additives. In 1979 ECS began producing benzoyl peroxide for the plastics industry for the purpose of selling these in the UK. Later the same year ECS expanded their business and started shipping the peroxides to one of AKZO’s major customers in the plastics industry in Germany, at a price of 15-20% below AKZO’s price. AKZO UK reacted swiftly with a series of threats stating that unless ECS withdrew from the plastics market, AKZO UK would retaliate with both overall price reductions and selective cuts aimed at ECS’s customers in the flour market, as it would cause ECS the most harm. AKZO UK explicitly said that they were willing to go down below cost if necessary with the more profitable side of its business supporting the price reduction. AKZO also looked over the possibility of buying out ECS as to neutralize the competition. From a legal point these threats bear weight since they can show a predatory intent. A settlement was however reached where AKZO agreed to pay for ECS’s legal costs and not to reduce its prices in the UK or elsewhere for either plastics or flour additives.

The market of mills, to which AKZO, ECS and Diaflex sold their flour additives, were divided as follows:

- RHM, Spillers and Allied Mills: 85%
- “Large independents”: 10%
- “Small independents”: 5%

RHM, Spillers and Allied Mills were roughly the same sizes; let us assume that they held 28% of the market share each. The customers (the mills) were supplied as follows:

- RHM: by AKZO and Diaflex;
- Spillers: by AKZO and Diaflex – after 1982: only AKZO;
- Allied Mills: by ECS and AKZO;
- Independent mills: by ECS (2/3) and AKZO (1/3) – after 1982: the reverse;

ECS’s prices were roughly 10% below AKZO UK’s prices, but despite this AKZO UK managed to keep its market share. ECS brought forward that its production costs were lower than AKZO UK’s costs and specified that it obtained reasonable profit margins before AKZO started their undercutting.

AKZO later raised its prices for flour additives to its UK customers by 10%, as it had done for several years. After each increase ECS normally followed, however in this specific case they did not. This led to an even bigger price difference between AKZO UK and ECS. At this point AKZO UK’s biggest customers; RHM and Spillers tried to negotiate a better deal with ECS. When this happened AKZO UK agreed to adjust its price to the same level as ECS’s, not to lose
any market shares. Furthermore, AKZO UK also in turn approached the other mills of Allied Mills to offer them a new price to increase its market share.

The Commission
The Commission started by stating that the relevant market consisted of organic peroxides in the EEC as a whole.\textsuperscript{150} Due to the great market share of AKZO, the technology advantage, and the barriers of entry AKZO was considered to be in a dominant position. Furthermore the Commission deemed this to be predation due to unreasonably low prices to ECS’s customers. AKZO was charging 60% higher prices to their own established customers, adding flour additives to its line of products so it could offer them in a package with benzoyl peroxide to ECS customers,\textsuperscript{151} maintaining UK flour additive prices at an artificially low level for a prolonged period. They obtained details of offers from major customers and underbid those offers on condition of an exclusive supply arrangement.\textsuperscript{152} AKZO, on the other hand urged the EC to apply the Areeda-Turner rule, under which their behavior would not have been seen as predatory.

The Court of Justice of the European Union
The CJEU agreed with many of the point made by the EC, and also elaborated on some issues. To start with, they stated that the large market share is evidence of a dominant position. When it comes to the predatory pricing the CJEU agreed on the behavior stated by the Commission, and here it did actually use the Areeda-Turner test, after modifying it with some strategic considerations. While they agreed with the EC regarding prices under AVC being predatory they did make a modification to cases where the price was between AVC and ATC. The court stated that if there was an intent to distort competition by trying to drive an agent out of the market, this price could be predatory.

The court continued with stating that the costs that AKZO had booked as fixed costs, namely labor, was indeed done according to accounting principles.\textsuperscript{153}

\textsuperscript{151} As we can note, some type of bundling was also involved here, but we will not analyze this aspect further.
\textsuperscript{152} Martin (n 2) 747-749.
As mentioned in chapter 2.2.3, the Areeda-Turner rule suggests MC to be the determining factor of whether something is predatory (D, E and F in figure 3.1), but due to the difficulty to do this approximation justice in practice, they propose using AVC (C and D in figure 3.1) as a proxy. What the AKZO case does introduce, is the notion of strategic consideration between ATC and AVC (B and E in figure 3.1). When we are in this area there might be justifiable reasons for not pricing higher, however if there is any predatory intent, prices in this area could still be detrimental to competition and therefore unlawful.

**Concisely, AKZO gave us the following two-part test:**

1. If \( \text{PRICE} < \text{AVC} \) \( \rightarrow \) illegal per default
2. If \( \text{AVC} < \text{PRICE} < \text{ATC} \) \( \rightarrow \) illegal if predatory intent

### 3.2.2 Tetra Pak II\(^{154}\)

Tetra Pak is a very educative case within the EU system. However, it is a very complex case, dealing with multiple issues: definition of the relevant market;\(^{155}\) tying in regards to aftermarkets;\(^{156}\) restrictive contracts;\(^{157}\) as well as predatory pricing.\(^{158}\) In order not to deviate from course, we will focus on the last part, as Tetra Pak II, was the second of three cases in Europe, defining how predatory pricing should be defined.

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\(^{155}\) Jones and Sufrin (n 11) 319-321, 331-334, 338.

\(^{156}\) ibid 489-492.


General facts of the case
Tetra Pak’s rival Elopak Italia filed a complaint to the EC claiming that Tetra Pak was trying to foreclose its rivals in the cartons industry by, among other practices, predatory pricing. The CJEU found Tetra Pak guilty of predatory pricing, confirmed the AKZO rule and stated that recoupment was not a requirement within the EU.

The specifics of the case
Tetra Pak produced cartons, both aseptic and non-aseptic, as well as machines for the processing both aseptic and non-aseptic cartons. Tetra Pak was accused of abusing its dominance on the aseptic markets, where it held at least a 90% market share in the mid-1980s, to gain market shares on the non-aseptic markets.

There were substantial entry barriers on this market due to the complex technology used, intellectual property rights, and the distribution practices used by Tetra Pak throughout the EU. For instance it only leased its machines in certain member states, whereas it both sold and leased them in others. It also had other business practices, such as leasing terms with penalty provisions which it had a major power over. Due to this, Elopak Italia brought to the EC that Tetra Pak was abusing its dominant position in three ways:

1. Predatory pricing of cartons in the non-aseptic market;
2. Tying of the cartons and the machines; and
3. Restrictive contracts in the supply of machines.

The Commission
The EC agreed on all three charges due to the fact that the practices had been ongoing for at least 15 years and that Tetra Pak must have known that these practices were unlawful. The EC fined Tetra Pak, which made the latter appeal to the GC. The GC had the same stance as the EC in the major respects, but they also clarified on the pricing abuse. The court stated that in some cases Tetra Pak had priced below AVC, and in some cases they had priced between ATC and AVC with intent to eliminate a competitor. This was done using the same method that the AKZO judgment had set out. At this point, Tetra Pak made use of the economic defense arguing that predatory pricing is only plausible if losses can be recouped after the competitor’s exit. The EC had not found any possible chance for recoupment; therefore it could not be guilty of predation.

The Court of Justice of the European Union
When Tetra Pak appealed the GC’s decision to the CJEU, the court maintained the use of the AKZO test:

“In AKZO this Court did indeed sanction the existence of two different methods of analysis for determining whether an undertaking has practised predatory pricing. First, prices below average variable costs must always be considered

160 ibid para 3.
161 Martin (n 2) 750-751.
162 Martin (n 2) 751.
163 See chapter 3.2.1.
164 Jones and Sufrin (n 11) 414.
abusive. In such a case, there is no conceivable economic purpose other than the elimination of a competitor, since each item produced and sold entails a loss for the undertaking. Secondly, prices below average total costs but above average variable costs are only to be considered abusive if an intention to eliminate can be shown.” 165

When Tetra Pak argued that since there was no proof of possible recoupment, this could not qualify as predatory pricing, the court replied as follows:

“Furthermore, it would not be appropriate, in the circumstances of the present case, to require in addition proof that Tetra Pak had a realistic chance of recouping its losses. It must be possible to penalize predatory pricing whenever there is a risk that competitors will be eliminated. The Court of First Instance found, at paragraphs 151 and 191 of its judgment, that there was such a risk in this case. The aim pursued, which is to maintain undistorted competition, rules out waiting until such a strategy leads to the actual elimination of competitors.” 166

It is important to notice that the court said that it does not see the need to show that recoupment is possible in this specific case. It did not state that all cases need to be judged with disregard to recoupment, but the circumstances in this case did not motivate any further inquiry on the matter. The circumstances which were of importance here were first, that Tetra Pak had a quasi-monopoly, secondly, that the alleged predation was on a market distinct from the dominated one (which shows a way for Tetra Pak to fund – or subsidize – its predation) and thirdly, that it was clear that Tetra Pak had an intent to eliminate competitors. 167

**In short, Tetra Pak II gave us the following confirmations:**

1. The AKZO test stands both regarding the below AVC-test, as well as the AVC-ATC-test with intent.
2. Recoupment is not a necessity in EU predatory pricing cases, at least under certain circumstances.

### 3.2.3 Wanadoo 168

By 2009, the AKZO test had been widely accepted, as it was cemented in Tetra Pak II, however the issue of recoupment was not yet a principle – although the notion of it had been introduced into EU law through Tetra Pak II. 169 It was in the case against France Télécom – whose judgment came merely two months after the EC released its Guidance Paper – that this principle was explicitly stated by the CJEU. 170

**General facts of the case**

The EC found that Wanadoo had charged predatory prices on their ADSL subscriptions; varying – in periods – from below AVC, to the span between AVC and ATC. The main points discussed in the CJEU were whether a meeting competition defense could be used, and whether there was a

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167 Jones and Sufrin (n 11) 415.
169 See chapter 3.2.2 Tetra Pak II.
170 This is merely an observation. It does not mean that the CJEU will align with the Guidance Paper – in fact; it might even be in its interest not to let the EC pave the way for the legal development and let the member states and the democratically elected EP draw up the competition rules, with judges in the CJEU, nominated by the member states themselves assessing the compliance.
need to demonstrate plausible recoupment, or not. The CJEU took a systematic approach, with the inner market in mind, stating that dominant firms are free to act on the market in a way that does not distort it. The CJEU therefore found Wanadoo guilty of predatory pricing.

The specifics of the case
As the EC acknowledges access to internet as a key to not only developing the economy, but also to develop the information society it has since 1999 taken a clear interest in stopping undertakings from abusing the access to broadband.\textsuperscript{171}

The Commission
The EC found that Wanadoo Interactive,\textsuperscript{172} had infringed article 102 by charging predatory prices for its ADSL subscriptions.\textsuperscript{173} The EC used the AKZO test and found that from the end of 1999 to August 2001 Wanadoo set their prices below AVC. From August 2001 to October 2002 their prices were equivalent to AVC, and therefore substantially lower than ATC. As of March 2001 a mass marketing scheme of Wanadoo’s ADSL services started, which is why the EC decided to assess that the abuse started from this point in time.\textsuperscript{174} As a result of this Wanadoo sacrificed substantial profits up to the end of 2002. The EC looked thoroughly at the intent, and found that this sacrifice coincided with a company plan to pre-empt the strategic market for high speed Internet access to get ahead of its competitors in this new market.\textsuperscript{175} The market share of France Télécom (including Wanadoo) was almost 100% of the ADSL services.\textsuperscript{176}

The EC rejected a legal need to show that recoupment was possible,\textsuperscript{177} but did nevertheless show that a recovery of the losses was a possibility.\textsuperscript{178} Another reason for not requiring recoupment was that the EC showed that in some cases, recoupment is not the aim of predatory pricing.\textsuperscript{179} Economists have shown that for instance public enterprises (such as Wanadoo) is a typical exception.\textsuperscript{180} The EC also pointed out that in other cases it might aim at another form of recoupment that does not measure in cost-price settings, such as increasing the firm’s value by increasing the customer/user base and thereby the value of its goodwill. This might reflect in for instance the share prices of a company.\textsuperscript{181}

\begin{itemize}
\item \textsuperscript{172} Wanadoo Interactive (COMP/38.233) Commission Decision of 16 July 2003, paras 111, 112.
\item \textsuperscript{173} ibid 35.
\item \textsuperscript{174} ibid 35.
\item \textsuperscript{175} Ballesteros and Szarka (n 171), 35.
\item \textsuperscript{176} Ballesteros and Szarka (n 171), 35.
\item \textsuperscript{177} ibid paras 332-335.
\item \textsuperscript{178} ibid para 334.
\item \textsuperscript{179} ibid para 334.
\item \textsuperscript{180} ibid para. 334, fn 406. For another example see Case C-295/12 P Telefónica and Telefónica de España v Commission (10 July 2014).
\item \textsuperscript{181} Wanadoo Interactive (COMP/38.233) Commission Decision of 16 July 2003, para 334, fn 408.
\end{itemize}
The General Court

Wanadoo appealed the EC decision on two grounds; first, the calculation of the rate of recovery to fixed costs, and secondly that the EC did not apply the test of predation properly.

Regarding the rate of recovery of their fixed costs, Wanadoo argued that advertisements was a fixed sunk cost, since it was a part of their long term plan to raise awareness of their products. The GC, in line with the EC, rejected this claim stating that advertisements in new markets revolve around information campaigns directed at an immediate impact on consumer behavior, intended to result in new customers. The GC based this on the EC’s assessment of a strong correlation between advertising and new subscription rates, however they agreed that this might not be a universal pattern, and deviations such as general communication expenditures aiming to strengthen the trademark in general could also exist. The GC did not interfere in the economic analysis by the EC for evaluating costs. The EC had used a method of depreciation of the equipment (for instance modems) needed for the service in their assessment of the costs, and it was said that it is not the goal of the firm to produce an instantaneous profit, but rather to seek returns in a longer period of time.

Regarding the test for predatory pricing, the GC upheld the AKZO test. The GC also rejected Wanadoo’s defense stating that their internal communication was spontaneous and informal, and that their talks of “pre-empting” the market was “locker room talk”. Wanadoo had also claimed that several statements were taken out of context by the EC, but since the plaintiff did not provide any specifics, or arguments, the GC did not reverse this point. The GC instead held that many of these statements, combined lead to a notion of intent to eliminate competition.

The problems with subjective intent are manifold, as has been pointed out in the cases we have seen. US courts have a tendency of being critical to the subjective intent in general, as indicated in both the US Microsoft case, in the Grinnell case, by both Judge Bryer stating that subjective intent should not receive much weight in predatory pricing cases, as well as by Judge Easterbrook. Hylton himself has pointed the same fact out several times. As mentioned this conservative view is representative by several US legal scholars, which also coincides with the Chicago school of thought, but is also noticeable among some EU scholars, who at least to a large extent tend to agree with the same school of thought.
Regarding the meeting competition defense the GC seemed to agree with the EC’s argument that there was not an unconditional right to align prices to match the competitors in all cases. As a dominant actor, there are certain limitations on what is allowed and what is not. In these limitations one can see when predatory pricing would be allowed, however by holding enough market power these exemptions might not apply.\(^\text{193}\)

**AG Mazák’s opinion**

AG Mazák criticized the GC due to the lack of reasoning on why recoupment was not in fact a criterion in the assessment of predatory pricing, as his opinion was the opposite, in line with the US approach. This was not only due to the economic reasoning used in the US, but AG Mazák believed, after considering the EU case law for predatory pricing, that the GC and the EC had misinterpreted (just like AG Fennelly believed in an earlier case) the law in regards to the requirement of recoupment.\(^\text{194}\) Finally, he therefore urged the CJEU to refer the questions of proof of the possibility of recoupment and the “meeting competition” argument back to the GC for re-examination.\(^\text{195}\)

**The Court of Justice of the European Union**

Wanadoo did appeal the GC decision to the CJEU where the main points were regarding the “meeting competition” defense and the recoupment criterion.

The CJEU did not follow AG Mazák’s line of reasoning and gave a relatively short judgment, considering the lengthy efforts of the EC and the GC. It confirmed what the GC had already stated regarding both the AKZO test and matching the competitor’s prices.\(^\text{196}\) Wanadoo had no absolute right to align the prices to the market, unless it was at the same time covering its costs.\(^\text{197}\) It added to this by stating that the fact that an undertaking is dominant does not deprive it the rights it has to protect its commercial interests (making a profit), and that it could take actions to defend itself on the market, however this was still limited in cases where the undertaking’s behavior was in fact to strengthen its own position in an abusive way.\(^\text{198}\)

In regards to recoupment the CJEU took a systematic approach by first stating that the interpretation of article 102 should be done in the light of the aims of the EU, which is to ensure the internal market is not distorted.\(^\text{199}\) The court stated that it follows from article 102 that the use of a dominant position to eliminate a competitor in order to strengthen its own position is actually an abuse, if it is not done by competition on the merits.\(^\text{200}\) This was all in accordance with the case law. Stating that, the need to show that the possibility of recoupment is a part of the case law, is however, to read too much into the rules regarding predatory pricing. The court


\[^{197}\] ibid paras 43, 45.

\[^{198}\] ibid para 45.

\[^{199}\] ibid para 103.

\[^{200}\] ibid para 106.
reiterated that the possibility of recouping losses may be a relevant factor when trying to prove intent when a price is set below ATC, but above AVC.\textsuperscript{201}

**In conclusion, Wanadoo stated:**

- (1) the non-requirement for recoupment in EU predatory pricing cases as given in Tetra Pak II;
- (2) that some leeway exists in how to assess variable costs and fixed costs in different markets, and
- (3) that alignment of prices to meet the market demand is not an acceptable defense.

### 3.3 Tying and the case law in the EU

Tying in the EU is, just like in the US an exclusionary abuse, but it has been clarified further from both the legislator in article 102 itself, as well as in communication from the EC.\textsuperscript{202} Tying is defined as the act of selling a product A, with the condition that the buyer will also buy the accessory product B from the seller, and not from a competitor. This can be exemplified with a seller of a printer (tying product) requiring that the buyer also buy ink and paper (tied products) from the seller, and not from a competitor. Naturally, to be able to impose terms like these on a buyer you need market power; the leverage with which you impel the buyer to buy your tied goods.\textsuperscript{203} As set out in the first chapter, we will not deal with contractual tying in this paper, but we will instead direct our attention to technological tying, as this is relevant in the new economy, and it has the biggest similarities to predatory pricing.

Technological tying, also referred to as pure bundling, or technical bundling can be defined as the opposite of contractual tying. It is not an option in any way, but the tied product is integrated in the tying product, either physically (GPS in a car) or in a technical way (a program within an OS).\textsuperscript{204}

#### 3.3.1 Microsoft Windows Media Player case

Up until the Microsoft case there was a quite evident precedence of per se illegality of tying in the EU.\textsuperscript{205} Whether this applied to all kinds of tying was unclear, but with the Microsoft decision the EU competition policy took another turn, at least concerning technological tying.\textsuperscript{206} It is also important to keep in mind that this complex case was dealing with several issues, however our focus here will be on the suspicion of technological tying of the two programs; the OS and WMP.

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\textsuperscript{202} Guidance Paper (n 113) para 48.

\textsuperscript{203} This definition is from the American literature, see Hylton 2003 (n 52) 279. Compare with the Guidance Paper (n 113) paras 47-51 and paras 52-58.

\textsuperscript{204} Jones and Sufrin (n 11) 485-486.


\textsuperscript{206} See chapter 2.3 and chapter 3.3.
General facts of the case

The European Microsoft case, similar to the Microsoft case in the US, was brought up by the EC, and was later appealed to the GC. The EC found that Microsoft was abusing its dominant position with 90% market share in the OS market by selling its Windows OS together with its media player, WMP. The fact that Microsoft had a dominant position was undisputed. The GC found Microsoft guilty of monopolization.

The specifics of the case

In its decision the EC brought forward a new test for examining whether a tying practice would be deemed lawful or not. The test contained four requirements that need to be fulfilled for tying to be unlawful:

1. the goods should be separate products;
2. the undertaking is dominant in the tying product market;
3. the undertaking does not give the consumer a choice to obtain the goods separately; and
4. tying forecloses competition.

With point (4) the EC did not assume that foreclosure of competitors would per se take place. Instead it stated that the fact that WMP is tied to the OS requires a more in-depth analysis, bringing something more similar to a rule of reason rather than a per se illegality rule.

The EC’s analysis set out three major points; first, that tying WMP to the OS gave Microsoft an unfair advantage against other competitor’s media players, as no other distribution methods could come close to this universal distribution. Secondly, this also meant that content providers and software developers used Microsoft’s own formats to a bigger extent, to the detriment of competitors who might use more publicly acclaimed formats. This was shown through an extensive review of the market conditions by the EC. Lastly, this could due to network effects in the end lead to the market favoring WMP, as it was supported by the majority of all PCs. At that stage, intervention would be in vain, as the damage would already have been done.

After this analysis the EC found Microsoft’s conduct to be a case of (abusive) technological tying, and therefore fined the company €500 000 000, and forced it to offer OEMs a version of Windows where they could choose to install the OS, either with or without WMP.

The decision was, as expected received with mixed acclaim, as the case raised the question whether dominant undertakings must restrain their innovation as soon as competitors appear.

207 Discussed in chapter 2.3.1.
209 ibid para 794.
210 ibid para 841.
211 ibid paras 843-878.
212 Microsoft used their own file formats WMA and WMV, whereas the other media player companies also had their own specific formats. Besides these examples, there were industry standards such as MP3 and MP4 that were partially supported by all players. The company specific standards can with the use of anticompetitive methods be used to foreclose competitors. For a review of the formats, see Microsoft (Case COMP/C-3/37.792) Commission Decision 2007/53/EC [2007] OJ L32/23, paras 113-114.
213 ibid paras 879-944.
214 ibid para 946.
215 ibid paras 1078-1080.
216 ibid para 1011.
Opinion from the US DOJ on the Microsoft case in the EU

Assistant Attorney General for Antitrust of the DOJ, R. Hewitt Pate issued a statement on the EC decision, establishing that imposing code-removal is ill-advised and that this might chill innovation. Furthermore the Attorney General stated that one should bear caution in the scope of single-firm conduct, where other parts of antitrust law, such as price-fixing deserves more attention, and consequently higher fines.217 This, of course, bears no binding power within the EU, and the statement itself was in a sense a diplomatic slip, and a relatively ill-advised way to try to affect the developments in another jurisdiction. Especially since it was an official press release from a branch of the US government.

As professor Andy Gavil of Howard University stated during a speech at the Berkman Center at Harvard University in 2008; it might even cement the EC decision, making it hard for the EU to back down from the statement.218 What it did succeed in, however, was to highlight the different approaches of the Chicago school and the ordoliberal school in a clear way.

The General Court

In June 2004 Microsoft appealed the EC decision to the GC, filing for annulment of the EC decision, and annulment or a substantial reduction of the fine.219 The GC initially stated that its position was merely judicial, having limited expertise on the technical and economic factors brought forward by the EC and Microsoft.220 The GC thus adopted the new, more effect-based test suggested by the EC, which overturned the earlier per se illegality of tying, and instead required a rule of reason analysis, weighing the precompetitive and anticompetitive circumstances.221

The defense

Microsoft’s defense included a series of statements.222 Microsoft claimed that;

(1) it is not two distinct products, but one integrated one;
(2) the case did not fall under article 102(d);
(3) there was no coercion (restriction of customer choice); and
(4) there was no foreclosure of competition.

The rejection of the defense

The GC rejected all these arguments.223 It firstly stated that it was indeed two separate products for a range of reasons, among others functionality, commercial practices of Microsoft, the user’s freedom of choice of provider as well as lack of incentive to search out other media players.224

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218 Andrew I Gavil, ‘Minding the Gap: How Microsoft Contributed to the DOJ’s Eight Year Effort to Reform Section 2 and Amplified the Gap Between U.S. and E.U. Policies Regarding Dominant Firms’ (Speech, 10:00-12:00 minute mark, Berkman Center for Internet and Society, Harvard Law School, 13 September 2008) <www.youtube.com/watch?v=lx1RAq_K_hI> accessed 8 July 2015.
220 ibid paras 85-89.
221 ibid para 868.
222 ibid para 960.
223 For a more detailed review of the grounds of the rejections, see Jones and Sufrin (n 11) 496-506.
Secondly, the GC argued that article 102 is not exhaustive, and that the EC’s claims fell well within the scope of the article. Secondly, the GC argued that article 102 is not exhaustive, and that the EC’s claims fell well within the scope of the article. Thirdly, Microsoft did not give the user a choice when buying the OS, and that the element of coercion therewith was fulfilled. The fact that the user did not pay anything additional for WMP did not make it free per se, but this was nevertheless an irrelevant factor. On this point the GC also stated that even though the user could use another media player, it had little incentive to do so. Lastly, the point of foreclosure brought some economic considerations. Microsoft had contested the foreclosure alleged by the EC, arguing that the EC presented “new, speculative arguments, with no basis in law, in order to establish the existence of a foreclosure effect”. The GC put forward a formalistic analysis, which albeit drew heavily from economic reasoning, and thereafter stated that it did not have to investigate additional strategic considerations further, however it still did so for the sake of completeness.

The formalistic reasoning mentioned is based in large on the structure of competition; discussing how the network effects lead to altering the market balance of competition in Microsoft’s favor. On the same topic, the GC stated that it was the tying that gave Microsoft the unparalleled advantage of distribution throughout the world. This is not in any way invalidated due to the fact that OEMs and others do add third-party media players in packages for customers. The altering of market balance mentioned by the GC was a sign of a leveraging theory; something that the Chicago school deemed lawful, but the EU clearly had issues with. Finally, when discussing the incentives to search out other media players, the GC also made claims in line with both information asymmetry and transactional costs stating that the WMP being shipped with the OS hinted that they in fact work well together, and that the user needed to take no additional effort to set it up.

Efficiency defense
The GC also set another precedent in the Microsoft case by allowing a so-called efficiency defense, or business conduct justifications. This followed from the move from the per se illegality to the rule of reason approach, where the anticompetitive elements in a case could be vindicated by pro-competitive justification. Microsoft did however not manage to show this in the case at hand.

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225 ibid paras 845-847.
226 ibid paras 961, 968-971.
227 ibid para 839.
228 ibid para 1059.
229 ibid para 1034.
230 ibid para 1055.
233 To date this has never prevailed in courts. See, Case T-201/04 Microsoft v Commission [2007] ECR II-3601, para 1167.
Verdict and remedies
Since Microsoft simply reiterated the facts and arguments in their first plea, and the GC did not find them valid, they did not alter the remedies suggested by the EC.\textsuperscript{234} The GC lastly repeated that the EC only wanted to give consumers the ability to purchase the OS without WMP.\textsuperscript{235}

4. Game theory

The sheer mention of “game theory” makes most lawyers think of complicated mathematics, and new-age economists. When it comes down to the application, game theory is much simpler.

The purpose of this chapter
The purpose of this chapter is simple. It is to introduce how economic strategic thinking works, and show a model of thinking; not only in what is important to notice, but also how to address behavior and frame it in a systematic way. Game theory can give the structure and foreseeability that lawyers need, while still being accurate and efficient in the economic field.

The purpose is not to give the reader models and matrices to memorize. The formal game theory shown is solely there to create the theoretical foundation for the applied game theoretical way of thinking strategically.

Some of the games will be easy to distinguish in real life situations, but the reader should also recognize the different choices one is constantly put in front of, and realize why one chooses one option over another. Slightly simplified I dare to state that, when the reader learns to identify the best option in a given situation, he has learned economic strategic thinking.

What is game theory?
Game theory is a method of studying strategic decision-making between rational agents in a cooperative or non-cooperative setting. A suggested alternative name to game theory is interactive decision-theory, which might be more representative of what it actually means. It has also been explained as concerning the behavior of decision makers whose decisions affect each other.

These definitions give a very precise description of what game theory is. However, as many disciplines it uses terms in a very particular manner, which need to be defined for the delineations to make sense to someone who has not extensively studied game theory. The use of game theory help us understand why one agent, A decides to act in a certain situation, and why another agent, B would be better off to act, or not to act. It can also help us understand which among several actions would be most beneficial for a particular agent.

Game theory, originating in mathematics, can help us understand a wide range of situations as auctions, bargaining, threats and promises, elections, biology, military strategies,

238 Von Neumann and Morgenstern (n 37)
240 DSR (n 239) ch 17.
241 ibid ch 9.4.
242 ibid ch 15.
243 ibid ch 12.
244 ibid ch 14.
and last but not least, businesses and antitrust. Because of all of this, game theory has developed into an interdisciplinary field, with its application becoming a valuable tool in economics, politics, business and international relations.

If we are assuming that a market is in perfect competition, there is no need for game theory. Firms are price takers and do not need to “think” at all, and most importantly they do not need to worry about the actions of the other firms. If we assume that we have a monopolized market, the monopolist is a price setter, and there is no competition; it simply works along the demand curve (or the marginal revenue curve). It is for the situations that happen between these two extremities; in imperfect competition that game theory is a useful tool.

Concerning business and antitrust, game theory has been used for a long time to assess situations of collusion and cartels, however my view is that game theory has an incredible – unprecedented – potential also in unilateral conduct situations, as even a monopolist fall in under the definitions given above. This is what chapter 5 will outline, but before we can make use of the application, we have to delve into the principles, techniques, and reasoning behind, and within game theory.

### 4.1 General principles

#### 4.1.1 Games, players, strategies, payoffs and rationality

A game can be understood as a situation, where agents (players), use different strategies to achieve their objective. The situation we are interested in, the (strategic) game, is defined by a situation where two (or more) players can make a choice (an action) where the outcome is dependent on the action also by the other. The opposite would be a decision, where an action is not dependent on the other player. A set of actions, for each move in different situations, together form a strategy.

A strategy can (and often does) contain actions that are not taken. An example of this would be going to the store to buy a certain widget A, preferably in blue, otherwise in red. If they do not have this widget at all, you plan to buy widget B, which is of inferior quality, but it would still be better than nothing. This whole plan is a strategy, and not only loose decisions, since they are dependent on the other player (the store). If they do not have widget A, you will buy widget B, however your strategy still contains a color choice in the event that they do have widget A. The outcome of this situation would be that you get a widget (or that you do not get a widget – both might be out of stock).

In game theory, outcomes are called payoffs, and are often measured in numerical utility for the players. Following the previous example, we would assume that the blue widget A is valued

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245 Martin (n 2) 10.
246 Jones and Sufrin (n 11) 660-663.
247 Cooter and Ulen (n 7) 33.
248 DSR (n 239) 18-20.
249 DSR (n 239) 27-29.
250 Von Neumann and Morgenstern (n 37) 8-16.
251 DSR (n 239) 28-29.
higher than the red widget A, which in turn is valued higher than the widget B. It follows the rules of the so-called rational choice theory, which tells us that an agent needs to be able to assess the values of all possible choices, and that the agent needs to be consistent in the utilities applied to the choices. In chapter 4.2 we will assess the example given in this section numerically.

### 4.1.2 Equilibria, best responses and dominant strategies

Now that we have established what the goal is (the payoff), how to reach it (by using a strategy), and which estimations to make (rationality), we need to see where this takes us. In the state where these things are taken into account we end up in an equilibrium; a state of balance. An equilibrium is reached when each player is using the strategy that is the best response to the strategies of others. This means that when all players play their best response strategy we end up in an equilibrium. In some games a player has a dominant strategy, which means that their best strategy is the same, no matter what the other player does – in other games, these responses are inter-dependent. This interpretation of equilibrium, called Nash equilibrium was first developed by Nobel laureate John Nash, as a game where every player uses a strategy that is their best response, given the other player’s strategy. This will be exemplified in chapter 4.3.

### 4.1.3 Playing more than once, cooperation in games, and opting out of the game

Games can be either repeated, or one-shot games. A simple example of a repeated game is when two people make business with each other. Everything cannot be contractually negotiated, so there is a big deal of trust between the two players. This trust does not come out of nowhere, but it is normally built over time. The fact that they have (successfully) been doing business, and have trusted each other in the past, sets incentives to do the same in the future. It is normally in their mutual best interest to do the same. But let us consider the case when two people who have never done business before negotiate a deal. The only thing one can say for certain is that the risk, or incentive for one to deviate from the negotiations is far bigger, as they do not have the same history, and they do not know if they will “need” to build trust with someone they might never even see again. As we will see, the fact that the game between two players might happen again can change whether players do strive towards the NE in games, or if they deviate from it.

Furthermore, games can be either cooperative or non-cooperative. The cooperative game simply suggests that both players have an incentive to work together, however chance, or perhaps laws might obstruct this incentive. A non-cooperative game indicates that there are winners and losers involved among the players. When one player gets a better outcome, it is at the expense of some other. It is the latter we will focus on in this paper.

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253 This is a slight simplification as a stable equilibrium does not always exist in the pure strategy, as will be discussed in chapter 4.3.2.

254 DSR (n 239) 32-34.

255 ibid 95-98.

256 ibid 94-98.

257 ibid 377-378.
As a final point regarding games, it is important to keep in mind that you do not play all games. It is as evident as saying that you do not invest in every new venture that appears, as every prospect you encounter in your business can be said to be a game. Since we live in a world of scarce resources, the reasoning around this comes down to one fundamental economic consideration; whether the opportunity cost of is higher or lower than what the “game” provides.258

4.2 Concepts and techniques

Games can be either sequential-move games,259 or simultaneous-move games,260 or they can be a mix of both.261

In a sequential-move game there is a strict turn order, which the players can also observe. The key for the players is to figure out how the other player will react to their respective moves. Sequential-move games are best illustrated by game trees. Game trees are also called the extensive form of a game.

A game tree consists of an initial node (the root, or the starting node), which indicates where the game starts – and normally also which of the players start – and several decision nodes. The last node of a branch is also called a terminal node. In the widget example in chapter 4.1 there was only one player, which makes for a simple illustration.262

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258 Initially, I intended to include sunk costs in the discussion here, which from a traditional economic point of view is a non-issue – but behavioral economics have challenged this premise. We will however see what sunk costs do to a rational agent in the discussion of wars of attritions and predatory pricing in chapter 4.3.2. For more regarding the role of sunk costs in microeconomics, see: R Preston McAfee, Hugo M Mialon and Sue H Mialon, ‘Do Sunk Costs Matter?’ (2007) <http://ssrn.com/abstract=1000988> accessed 27 May 2015.

259 DSR (n 239) ch 3.

260 ibid ch 4.

261 ibid ch 6.

262 The utility values assigned in the examples are arbitrary, but still following the transitivity condition in chapter 4.1, meaning that $A > B$ and $B > C$ gives $A > C$.

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Figure 4.1.

Figure 4.2. Notice that the store in this case does not have a possibility to act, and is therefore not depicted in the figure, however its payoff remains 1 in any case.
In figure 4.1 we can see that the utility of the player differs depending on which widget is attained. The best-case scenario would be attaining widget A if it is available (where a blue one is better than the red one), if not the player will have to settle for widget B. We assume here that widget B is always in stock. In figure 4.2 we also included the utility of the store, which does not have a choice of deciding anything in this example, but obviously the store is better off when selling something, compared to when it is not. We are here assuming that the payoff (the profit) to the store is the same, regardless of which quality widget it sells. This means that if the player buys a blue widget A the received utility is 3, and the store’s utility is 1. This is denoted by the payoff (3, 1).

To apply all the principles and concepts from chapter 4.1 and chapter 4.2 to one example, we will look at a fictitious case in industrial economics, containing two firms wanting to enter a new market. Let us assume that the market is only big enough for one firm. If both firms enter, they will not generate enough profit to be able to cover their costs, and both would lose €10 million. If one firm enters, and the other stays out, the one in the market will earn €50 million. If both stay out they will not generate any additional income.

We will start with a sequential-move game and then analyze the game as a simultaneous-move game afterwards. This can be illustrated by the following extensive form game:

![Figure 4.3. Firm 1 (F1) and Firm 2 (F2) contemplating whether to enter or stay out of a market in a game of perfect information. Amounts in million euros.](image-url)

In this example Firm 1 starts, and Firm 2 can see what Firm 1 has done; there is perfect information. To figure out what the result of the game will be you start from the back, and do a so-called roll-back analysis. You start with the last decision node, and determine which decision the agent will take, and move your way back to the starting node. This is also how you find the subgame-perfect equilibrium. While there may be several NE in a game, there is only one SPE, which is the NE throughout the whole game. To reach a SPE, you need to play NE in each subgame of the game.

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263 Also known as backwards induction. See, DSR (n 239) 56.
264 Subgame-perfect equilibrium, also sometimes referred to as subgame-perfect Nash equilibrium. See, DSR (n 239) 197-200.
As Firm 1 starts, it has only two strategies:\textsuperscript{265}
\begin{enumerate}
\item Enter
\item Stay out
\end{enumerate}

Firm 2 on the other hand has four strategies:\textsuperscript{266}
\begin{enumerate}
\item Enter, if Firm 1 enters.
\item Enter if Firm 1 does not enter.
\item Stay out if Firm 1 enters.
\item Stay out if Firm 1 does not enter.
\end{enumerate}

As we see, there are two strategies leading to NEs: (2) Enter if Firm 1 does not enter; and (3) Stay out if Firm 1 enters. The other strategies (1) and (4) will never be used in a rational setting. This means that the outcomes are either \((50M, 0)\) or \((0, 50M)\). Firm 1 will then choose to enter, as it is more beneficial; \((50M, 0)\). Therefore we see that strategy (3) of firm 2 is not only a NE, but a SPE.

The important aspect of a simultaneous-move game is that the players do not know what the other actor is doing. This is simplified by assuming that they make their decision at the exact same time.

We will now assume that the two firms in the last example make their decisions at the same time to represent a simultaneous-move game:

![Game Diagram](image)

\textit{Figure 4.4. Firm 1 (F1) and Firm 2 (F2) contemplating whether to enter or stay out of a market in a game of imperfect information. Amounts in million euros.}

The ring around firm 2’s two nodes indicates that Firm 2 does not know where it is; Firm 1 may have entered, or he may have not. The two nodes together form an information set. This illustrates a game of imperfect information, as there is some information missing to the players, as opposed to a game of perfect information, where every singleton node in the game make up its own information set.

\textsuperscript{265} Mathematically you can deduce this by saying that Firm 1 has 2 decisions at one node giving us: \(2^1 = 2\) strategies.
\textsuperscript{266} In the same way Firm 2 has 2 decisions at 2 nodes: \(2^2 = 4\) strategies.
What we with certainty can decide here is that we have two NEs. (50, 0) and (0, 50). However, with the principles we have reviewed so far, we cannot find a SPE to this game, as uncertainty plays a role here, which is not defined. Strategies in similar situations will be discussed in chapter 4.4.267

Games can be depicted in either the extensive form (in a game tree) or in the normal form (matrix form). The example just reviewed with uncertainty can be easier to grasp through the normal form as shown here:

![Game Matrix](image)

In the normal form it might be easier to deduce that we in fact have two NEs. If we are in the bottom left cell, or in the top right cell, no player can improve its situation by changing their own strategy, whereas if you are in the top left, or the bottom right cells you do have a better option to use.

As we will see in chapter 4.3.2, games can also be a combination of sequential-move and simultaneous-move games.

### 4.3 Games

As we now have familiarized ourselves with the basic theory of games, we will now turn to some simple examples, and follow up with a more advanced one, and try to connect these to antitrust economics.

#### 4.3.1 Standard games

It has already been mentioned that games can be either cooperative or non-cooperative.268 What is central is that players want to maximize their payoffs, however different obstacles may be in the way.

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267 See chapter 4.1.
268 See chapter 4.1.
4.3.1.1 Cooperative games

In these kinds of games the players want to communicate but it is not possible.

Prisoners’ dilemma
An example of a cooperative game is the prisoners’ dilemma, which is probably the most famous example of a game theoretical problem. Two people, A and B, have been arrested under suspicion of a crime. The suspects are separated and interrogated. The police do not have enough evidence to convict either one of them of a felony (10 years) without a confession, however they can convict them both of a milder offense (2 years). If one suspect decides to confess and testify against the other, the suspect will get a reduced sentence (1 year), while the other suspect gets 10 years. However, if they both confess, they will each get 5 years in prison. This specific game is shown in figure 4.6.

The prisoners’ dilemma is as stated one of the most famous gambits of game theory, however an elementary component is many times overlooked. The game shows us that rational players will not in every instance cooperate, even though it might be in their mutual interest. This game can illustrate various situations. The name is just a mere representation of games where \( Z > Y > X > W \) in a game such as the game in figure 4.8. An application of this type of game could be two firms in a price war where both would benefit by agreeing on a price.

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269 DSR (n 239) 99-100.
Battle of the sexes

Another type of coordination game is the so-called battle of the sexes game. The game illustrates a husband (H) and a wife (W) who are contemplating on how to spend their date night. They both want to do something together, but they do have certain preferences, illustrated by their payoffs in figure 4.7. The husband would prefer to watch a boxing game, whereas the wife would prefer to go to the ballet. The problem here is that we have two NE, and without further information (communication) there is no certain way to know the outcome. In this game it is best to match the other player’s decision but we have no way of figuring out what the other will do.

What we need in this game is either a focal point, or convergence of expectations, because if both players try to maximize their own payoff (“tough player”), they will both end up in a worse situation than if cooperation of some sort would have been accomplished. Convergence of expectations would for instance mean that the husband, apart from being willing to sacrifice his payoff in favor of the wife’s payoff, also presume that the wife knows this. “The point is not whether a choice is obvious or logical, but whether it is obvious to the other that it is obvious to you that it is obvious to the other...”, as expressed in the literature. One can also imagine that a focal point exists between the players. Maybe the couple alternate between boxing and ballet every date night, and since they went to the ballet the week before, communication between the couple in regards to the venue of the night is not needed. The payoffs are not changed in these cases since they have their clear preferences. Also this game can be translated into other cases where coordination between firms could lead to a preferable outcome. This does not only entail collusion, but one can imagine a scenario where one firm producing smartphones and another firm producing tablets would want to choose the same charger connection for their devices. The firms might not know what the other one will use, but they know that since the market standard is micro-USB the chances are the highest that this will be chosen, and therefore use this themselves.

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270 DSR (n 239) 114-115.
271 The game was developed in the 1950s where certain sexist stereotypes existed, and gender roles were more rigidly defined, as opposed to today’s more developed society.
272 DSR (n 239) 115.
273 DSR (n 239) 10.
274 I would therefore not consider it a focal point where both of them know that the wife is sensitive to the sheer sight of blood. In this case their payoffs should already be altered by this fact and thereby “already be taken into account”.
4.3.1.2 Non-cooperative games

As opposed to the cooperative games, as the name indicates, the players do not want to cooperate in these games.

![Figure 4.9 Chicken.](image)

**Chicken**

The opposite game to battle of the sexes would be the game of chicken. In this game it is in both the player’s (annotated A and B) interests to choose the opposite of what the other player chooses. In this game the consequences of one kind of coordination failure is far greater than the other coordination failure, as indicated by the payoffs in figure 4.9. The name comes from a game that was allegedly played by teenagers. Two players start their cars on opposite ends of a street and start driving towards each other. The player that swerves to avoid a collision loses, whereas the one driving straight is declared the winner. If both swerve they both lose, but the mutual shame is not as bad as if only one swerve. If both drive straight none of them are declared “chicken”, instead rather “tough”, but obviously they will be severely injured, at the very least.

The game has two NE just like the battle of the sexes game, but the same coordination difficulties exist. This game can be seen in various settings. Some game theorists have viewed the nuclear arms race between the US and the former USSR as a game of chicken, whereas most others however have viewed it as an assurance game or a prisoners’ dilemma. This kind of game has many connections to the war of attrition game that we will look at in chapter 4.3.2, which is central in predatory pricing, and helps understanding the reasoning behind technological tying. A recent example of the game of chicken was visible in the negotiations between the EU and Greece during the spring of 2015. Both parties have a lot to lose – not only directly by the potential collapse of Greece, but also when considering loans for the EU that might not be repaid, and the possible extra costs of trade in the future if Greece would be forced to leave the EU. But if this is

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275 The game is also widely referred to as the Hawk-Dove game, see DSR (n 239) 488.
276 DSR (n 239) 116-117.
277 DSR (n 239) 116 fn 14.
278 The assurance game is a modification of the battle of the sexes game, but with the same payoff to both players, instead of mirrored payoffs. Also commonly referred to as stag hunt game where the players can reach a higher payoff if cooperating in catching a stag instead of one rabbit each when not cooperating. See, DSR (n 239) 113-114, fn 12.
seen as a too improbable outcome, the two will continue to set high demands until some party backs down.280

Trying to assess the rationality in the game might, at first be expected to depend on what you apply the game on. If it is between life and death you might think that a player would act differently as opposed to a game of how much money to invest. A rational player would however strive for the NE as it maximizes the player’s utility regardless of what the game would mean. However, if your life actually is at stake in the bottom right cell of figure 4.9 you might always play swerve, or avoid playing the game altogether.281 Game theory take this a step further by stating that these models indeed are viable, as a mixed-strategy – meaning you choose your strategy after a probability assumption – takes the probability of the other player into consideration.282

4.3.2 Advanced games

As we saw in chapter 1 and 2 there was skepticism to whether predatory pricing was actually a valid concern, or if it was irrational in itself. By using the reasoning and the models above we can show that it indeed is fully logical and rational to price below costs under some circumstances.

War of attrition

In game theory one does not talk about “predatory pricing” which is an area on which you can apply game theoretical models. Instead game theory prototypes around brinkmanship283, and wars of attrition284 to model the scenario that antitrust economists and lawyers refer to as predatory pricing. A price war can be seen as a war of attrition, as it hurts every firm on the market, including the aggressor. The reason is of course to reach customers ahead of your competitors. If the prices are lowered below the costs of production there is a case of predatory pricing. This will lead to the exit of (at least) one firm, as costs are not covered.285

Before we start analyzing what actually happens between firms in a price war, it is useful to look at different strategies that have been discussed throughout this paper so far in regards to entry deterrence.

281 Although avoiding playing the game of chicken can be seen as having played and lost the game, as Nobel laureate Thomas Schelling explained it. See, Thomas Schelling, Arms and Influence (Yale University Press 1966) 118.
282 The concept of mixed strategy equilibrium will be applied in chapter 4.3.2. See more, DSR (n 239) ch 7.
283 Creating a gradually increasing risk which increases the probability of a bad mutual outcome unless the other player gives in. For an in-depth description and application, see DSR (n 239) ch 14.
284 David Besanko and others, Economics of Strategy (International Student Version, 5th edn, John Wiley & Sons 2010) 320, hereinafter Besanko and others.
285 id, 320.
Table 4.1

<table>
<thead>
<tr>
<th>Entry barrier</th>
<th>Most effective when...</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sunk costs</strong></td>
<td>Incumbent has incurred them and entrant has not.</td>
<td>Costs must truly be sunk. If the incumbent can sell its fixed assets, then so, too, could an entrant. This implies that failure is not very costly, and entry is harder to deter.</td>
</tr>
<tr>
<td><strong>Production barriers</strong></td>
<td>Economies of scale or scope, superior access to critical inputs or superior location, process or product patents, or government subsidies exist.</td>
<td>Must be asymmetric (see sunk costs). Technological innovation can cause an abrupt change to the well-being of an incumbent. Patents are not all equally defensible, and the cost of defending a patent can be prohibitive.</td>
</tr>
<tr>
<td><strong>Reputation</strong></td>
<td>Incumbents have long-standing relationships with suppliers and customers.</td>
<td>Reputation reflects hard-to-measure factors, such as quality or reliability, that entrants may not be able to promise.</td>
</tr>
<tr>
<td><strong>Predatory pricing</strong></td>
<td>Firm has reputation for toughness or competes in multiple markets.</td>
<td>Incumbent firm may lose more than entrant; deep pockets and conviction that there are many potential entrants are a must. May arouse antitrust scrutiny.</td>
</tr>
<tr>
<td><strong>Holding excess capacity</strong></td>
<td>Marginal costs are low, and flooding the market causes large price reductions.</td>
<td>Capacity investments must be sunk. Demand must not be growing.</td>
</tr>
</tbody>
</table>

Looking at these five strategies only one of them, namely predatory pricing, is (generally) illegal, but these strategies often come up in clusters, as we will see shortly.

**War of Attrition – predatory pricing**
In our example of a price war, we will look at two firms, Firm A and Firm B. This price war is not about regular competition, but when a firm actually does price below its costs. The goal here is to show that perfectly rational firms can incur losses to themselves, and even that they should do that, as it is their best response in some situations as it is a NE strategy to do so in the short-run. We will do this by strictly looking at the rationality in the costs and expected payoffs – without bringing in any reputation argumentation, that pride is important, or the fact that irrationality can be rational – but through a pure rational choice theory.

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286 This table is a reproduction of Besanko and others (n 284) 322, table 11.2.
287 Here, reputation refers to how other firms perceive the firm; the goal might be to give the impression that it would not hide from wars, to show a record of tough business conduct for future business settings with other firms (or more likely; the same firm in a future encounter).
The situation might arise because the market can only handle one firm,\textsuperscript{289} or because the firm wants the monopoly profits for itself.

Rules
The conditions of the game are as follows; the firms have two choices, either they will go to war (W) or leave the market, defect (D). The game ends when a firm defects. When one firm defects, the other firm gets the whole market to itself, so he gains (M). In every period of the game each player has a (sunk) cost (c, which is subtracted from each player). This can be seen as the below-cost pricing performed. If both quit, obviously no firm gets the reward (M, the market).\textsuperscript{290}

An important notion is that we are assuming that the reward is bigger than the cost; \( M > c \).

Looking at this from a real life perspective, it is important to remember that costs cannot be paid in eternity. At some point a firm will run out of funds, and at some point the banks and other institutions will no longer provide loans, and as will be shown, the longer time that passes, the higher is the probability that the war will end.

We will first look at a two-period game (figure 4.10), and then extend this to an n-period game to show that the logic is still applicable.

\textsuperscript{288} A CEO might be too proud or have a big enough ego, that this part overshadows the “rational” thinking of a company leader.

\textsuperscript{289} For instance due to too high fixed costs, not big enough profit margin (demand might not be big enough for several firms).

\textsuperscript{290} This is essentially a game of chicken as explained in 4.3.1.2.
Two-period game
Adapting to the rules given above, we end up with the following game tree:

Figure 4.10. If both players go to war in the first period, the game will continue in period 2. In this two-period game we are assuming that the game will end and no firm gets the prize if the game is not resolved after two periods; meaning if both firms go to war twice.

Each period is denoted with a number. The upper case letters indicate moves of Firm A, the lower case letters indicate moves of Firm B. To reiterate what was stated above; the game ends when one player defects, because then the other player gets the payoff M, the whole market to itself, and since we stated that \( M > c \), this player has made a profit (and will keep making profits).

Pure strategy equilibria
We will first look at the pure strategy equilibria by analyzing period 1 (P1) and period 2 (P2) below.

In P1 we can solve three outcomes without any trouble:

1. If both defect we get \((D(1), d(1))\) which leads to the payoff \((0, 0)\).
2. If A goes into war and B defects we get \((W(1), d(1))\) yielding the payoff \((M, 0)\).
3. If A defects and B goes into war we get \((D(1), w(1))\) yielding the payoff \((0, M)\).
4. If both go to war we cannot say what will happen unless we analyze P2.

---

291 Notice that this is the same type of game as in 4.3.1.2, although this time we have modeled it as an extensive form game.
In P2 we get the following:

1. If both defect, we get \((D(2), d(2))\). Their payoffs need to be modified by the cost incurred in P1, yielding the payoff \((-c, -c)\).
2. If A defects, and B goes into war we get \((D(2), w(2))\) yielding the payoff \((-c, -c + M)\).
   In this scenario B won the market (despite the cost incurred) and thus the game.
3. If A goes into war and B defects we get \((W(2), d(2))\) yielding the payoff \((-c + M, -c)\).
   In this scenario A won the market (despite the cost incurred) and thereby the game.
4. If both go to war we get \((W(2), w(2))\). Since we are at the end of the game we can already include the cost of the current game, yielding the payoff \((-c - c, -c - c)\) or \((-2c, -2c)\).

Having the following payoffs after the two periods;
1. \((-c, -c)\)
2. \((-c, -c + M)\)
3. \((-c + M, -c)\)
4. \((-2c, -2c)\)

we can make two observations:
1. there is a cost \((-c)\) in each payoff, originating from P1, which is a sunk cost. Since this is strategically irrelevant we can simply move out the \((-c)\) in all P2 games.\(^{292}\)
2. from the game tree above we have two pure strategy SPEs, namely the strategies \((W(2), d(2))\) and \((D(2), w(2))\) which yield the payoffs \((M, 0)\) and \((0, M)\) respectively.\(^{293}\)

Looking at the game thus far we understand that the pure strategy SPE are when:

Firm A has the strategy \((W(1), W(2))\) and Firm 2 has the strategy \((d(1), d(2))\), or
Firm A has the strategy \((D(1), D(2))\) and Firm 2 has the strategy \((w(1), w(2))\).\(^{294}\)

Pure strategy SPEs in P2 yield: \((M, 0)\) and \((0, M)\). This means that we still do not know what happens in P1 if both players choose to go war, we can end up in either \((M, 0)\) and \((0, M)\), which is not the stable NE we set out to find. What we have found out so far is that the best response to defecting is going to war, and the best response to going to war is defecting. To find the stable NE we need to look for the mixed-strategy SPE.

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\(^{292}\) We are merely moving it outside of the game for a specific period to enhance the visibility. This \(-c\) in the next (period) game becomes a sunk cost. This is why we in the subsequent game can disregard it.

\(^{293}\) We have already here moved out the \(-c\) from the original \((-c + M, -c)\) to obtain \((M, 0)\) as it does not impact the decisions taken in P2 games.

\(^{294}\) Notice that the strategy for P2 is also included, even though this strategy will not be used if the game is finished in P1, as explained in chapter 4.1.1.
Mixed-strategy equilibria
Let us revisit the two stages of the game:

**Period 1**

**Period 2**

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Figure 4.11. *The same game tree as in figure 4.10.*

We will now analyze the P2 game, and this time model it in its normal form game as it will make the upcoming steps easier to follow:

**Period 2 – matrix form**

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Figure 4.12.

\[^295\] Do notice that the \(-c\) also in this visualization is moved out of the matrix to make the overview easier.
To find the mixed-strategy equilibrium for one firm, we need to use the other firm’s payoffs to make it indifferent between its two strategies (war or defect). By doing so we are making it plausible that it is playing its mixed-strategy game.

We will now use Firm B’s mixed strategy to make Firm A indifferent between choosing to go to war or to defect, to make it plausible that Firm A is in fact playing mixed-strategy equilibrium. Firm B plays $w(2)$ with the probability $(q)$. Consequently Firm B then plays $d(2)$ with probability $(1 - q)$. We will choose the value of $(q)$ to make Firm A indifferent between going to war or defecting.

(I) If Firm A chooses to go to war; then its payoff would be $-C * (q) + M * (1 - q)$

(II) If Firm A chooses to defect, then its payoff would be $0 * (q) + 0 * (1 - q) = 0$

If Firm A is mixing, then it is in Firm B’s interest to use its mixed-strategy in such a way to make Firm A indifferent between (I) and (II). To make Firm A indifferent we must set (I) = (II) which gives us:

$$-c * (q) + M * (1 - q) = 0$$

$$-cq + M - Mp = 0$$

$$M = q(c + M)$$

$$\frac{M}{c + M} = q$$

$$q = \frac{M}{c + M}$$

This means that the probability of Firm A going to war is $\frac{M}{c + M}$.

---

296 Since the game is symmetric, doing the calculation for Firm B would yield the same probability.
To find out the probability for Firm A defecting we simply insert $q = \frac{M}{c+M}$ into (I), and solve for (1-q):

$$-c * \frac{M}{c+M} + M(1-q) = 0$$

$$M(1-q) = c * \frac{M}{c+M}$$

$$M(1-q) = \frac{cM}{c+M}$$

$$(1-q) = \frac{cM}{c+M} \cdot \frac{M}{1}$$

$$(1-q) = \frac{cM}{c+M} * \frac{1}{M}$$

$$(1-q) = \frac{cM}{cM + M^2}$$

$$(1-q) = \frac{c}{c+M}$$

**The probability of Firm A defecting is $\frac{c}{c+M}$.**

**Mixed-strategy NE for going to war in this P2 happens with probability $\frac{M}{c+M}$.**

With this mixed-strategy NE can now find out the payoffs for going to war and defecting by inserting this probability in (I) and (II) above:

(I) **Fight:** $-c * \frac{M}{c+M} + M * \frac{c}{c+M}$

(II) **Defect:** $0 * \frac{M}{c+M} + 0 * \frac{c}{c+M} = 0$

We have earlier stated that the payoff for going to war, and for defecting is the same, and since we can see in (II) above that the payoff for defecting is 0, we can also conclude that the payoff for fighting is 0.

**To sum up, when playing this mixed-strategy NE in P2 their payoff will be 0.**

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297 Since the game is symmetric, doing the calculation for Firm B would yield the same probability also in this case.

298 If you are not convinced, solve (I) to see that this too, will equal 0.
Period 1

We now simply insert this into P1:

Figure 4.13.

In this figure we see that P1 is the same as in figure 4.10 and figure 4.11, and P2 is also the same, apart from the case of \((W(2), w(2))\) where the continuation payoff have been altered. They will still incur the cost of \(c\), and they will still have continuation payoffs. But now the payoffs are not \((M, 0)\) or \((0, M)\) but they are simply \((0, 0)\).

When we insert these continuation payoffs into the matrix we get what we see in figure 4.13, which is the same as the matrix in figure 4.12.

The mixed-strategy SPE in P1 has:
Firm A mixing with the probability \(\frac{M}{c+M}\) in P1, and in P2, and
Firm B mixing with the probability \(\frac{M}{c+M}\) in P1, and in P2.

We can annotate the probability for “mixed \(q\)”, \(\frac{M}{c+M}\) as \(q^*\).

Mixed-strategy SPE is that the fight will happen with the probabilities for Firm A and B respectively as: \([(q^*, q^*), (q^*, q^*)]\).

When doing so, both firms have the expected payoff 0.

Conclusions two-period game

What does this actually mean in this two-period game? Does it mean that price wars are always rational and that it is something to strive for? No, but it rather shows, that even when rational firms are competing in a market, there is in fact cases where rational firms do engage in price wars, and that it is completely rational. They do this in the mixed-strategy SPE. They do not always engage in these wars, but they do so with the probability \(q^*\) as defined above. This is the
break point of giving just as much incentive to engage in a price war, as to defect from the
market. Playing this equilibrium in each period there is a chance that the game will end, however
with the probability $q^*$ the game will move on to the next period.

Infinity game
Take notice that we have now looked at the two-period game. But to show that this holds up in
longer periods, we will now look at an $n$-period game.

The infinite game would look something like this:

Figure 4.14.

At the period $n$, the tree looks like any other period we have looked at.

Period $n$

Figure 4.15.
What we have concluded earlier is that we have some sunk costs accumulated before this period—but microeconomics also tells us to disregard these as the strategy is not affected by past costs. And what we know about the periods thereafter is that we will have some continuation payoffs, but the relations of the payoffs at this stage are still the same; we have:

1. \((D(n), d(n))\) giving the payoff \((0, 0)\)
2. \((D(n), w(n))\) giving the payoff \((0, M)\)
3. \((W(n), d(n))\) giving the payoff \((M, 0)\); and
4. \((W(n), w(n))\) giving the payoff
   \((-c + \text{[continuation payoffs]}, -c + \text{[continuation payoffs]})\).

**If firms play the mixed-strategy SPE the continuation value (the payoff) will be 0.**

Since the continuation values are the same, we can treat the \(n\)th game just the same as the first round of the game, disregarding the sunk costs, and knowing that our future continuation values will be 0 in any case, leaving (4) with the payoff \((-c, -c)\).

With these assumptions we have shown how the game will play out in infinity.

**When will the price war end?**

What is more, we can assume that probability of the game ending increases as the game moves on due to these two factors, by going back to the first periods:

The probability that there will be a fight in one period between two firms is \((q^*) (q^*) = (q^*)^2\). That means that the probability of a fight in both periods is \(((q^*)^2)^2 = (q^*)^4\). The more the game goes on, the smaller the probability of a fight will become.

The probabilities we have calculated are based on the payoffs. As the payoffs increase (M gets bigger), the probability for a fight increases as well. Consequently the probability of a fight goes down when the cost of fighting increases (bigger c).

This leads to a downward sloping curve looking at the probability of yet another period of war (a longer war) in relation to the time passing by (see figure 4.16). Bringing back our theoretical model to the real world, we can just imagine how costly the price war will be in the \(n\)th period of the game (infinitely costly). However, the more costly it gets, the higher is the probability of the price war ending.
Final remarks
Notice the two disclaimers in the beginning. First, we have not intermingled cases of pride, irrationality, or reputational aspects that may add additional value to participating in a price war. Secondly, this applies as long as the market is worth more than the costs to participate \( (M > c) \). One could also argue that a certain time frame (or other kind of limitation) would make sense, as you cannot count on the future continuation payoff to be endless.

4.4 Strategic moves

We have now looked at how one can reach a desirable outcome of a game by playing their optimal game, their NE game, by deducing it for example by a rollback analysis. This is, as we have seen in chapter 4.2 not the only way to reach the desired payoff. We saw there how also the order of a move, or rather, of a player can influence the outcome.

Strategic moves have a lot to do with the information conveyed by one player to the other. In many real life situations, such as business negotiations you can, and would gain from, manipulating the rules of a game to your advantage. This is what is normally called a strategic move. This changes the rules of the game, and can be imagined by creating a two-stage game, where a pre-game is added before the original game. The second stage of the game is then the original game. The first stage would be the “game changer”. This stage is supposed to in some way alter the way the second game plays out, and can be classified into two major groups:

(1) commitments,
(2) threats and promises.

The pre-game is intended to either change the order of the moves or the payoffs of the second game. One precondition to strategic moves to work is that the other player believes that you will do what you declared in the first stage of the game, the credibility of your strategic move is central. Only credible strategic moves will have the desired effect.

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299 This would add on to the value of the continuation payoffs if taken into account.
300 An example to when it is not possible would be collusion, when the legislator has criminalized an act and thereby decided the rules of a game.
301 DSR (n 239) 342.
302 Besanko and others (n 284) 241.
4.4.1 Commitments

The first category, the commitments are unconditional strategic moves. Player A indicates that a move will be performed regardless of the response of player B. As we just discussed credibility, it is important to point out that the move has to be both irreversible and observable to have the right effect. An example of this would be that a player in the game of chicken, illustrated in chapter 4.3.1.2 would unscrew the steering wheel and throw it out the window (irreversible) when the other player is watching (observable). In business terms this can be translated to an example where a producing company buys enough raw material to produce a higher number of units and announces the higher number of units to be released for the upcoming sale start.

The difference between a game of chicken, with and without commitment can be shown as figure 4.17 and 4.18 below.

![Figure 4.17. Without commitment (same as figure 4.9).](image)

![Figure 4.18. With commitment.](image)

4.4.2 Threats and promises

The other types of strategic moves are threats and promises. These kinds of moves are so-called response rules. This means that what a player will actually do is conditioned to a specific move of the other player. The aim is to alter what the other player will do. Player A will be a second-mover (in the main game), but is already in a pre-game declaring what move will be performed in the second stage game.

Threats and promises are two sides of the same coin. Either it is thought of as “unless you do ‘X’ I will do ‘Y’ which is detrimental to you”, or it is thought of as “if you do ‘X’ I will do ‘Z’ which is beneficial to you”. Also here it is important to convey your move in a credible way. The first

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303 DSR (n 239) 344.
304 We are here assuming that the company cannot back out of the commitment, for example due to the (probable) reason that it would lose face, which could be even worse (more expensive) than sticking to the promised amount.
305 DSR (n 239) 352.
player is said to be deterring or compelling the second player respectively.\textsuperscript{306} These kinds of moves are common in international conflicts of varying kinds; both in wars and in commerce.\textsuperscript{307} Two examples from the business world could be that a dominant player agrees to license a patent it holds to companies that agree to stick to a certain platform, or that it refuses inter-operability to players using a competing platform. Since these are different kind of moves, there is obviously nothing hindering a player from combining threats and promises (or any other kind of strategic move), making a more complex game.\textsuperscript{308}

### 4.4.3 Building credibility

As highlighted above, all strategic moves build on the other player believing that the first player will actually do as declared. Empty threats are easy to make, but building up credibility is one way to signal that you will follow through with what you set out to do.

There are two main paths of building credibility:

1. reducing own future freedom, and
2. changing own future payoff in a way that makes your strategy a believable outcome.\textsuperscript{309}

#### Reducing own freedom of action

This has in the literature been exemplified by mechanical doomsday devices, and programmed fail-safes.\textsuperscript{310} This can still be a probable strategy in the way commitments were described in chapter 4.4.1 either by a legislative procedure for tariffs,\textsuperscript{311} or when imagining public policies among companies that they may have set out for this specific purpose.\textsuperscript{312}

Burning bridges\textsuperscript{313} is a classic example from the ancient times when bridges (or ships) were literally burned down to prevent retreat in order to motivate soldiers to fight harder.\textsuperscript{314} Today this can be translated in the business world to any kind of retreat-hampering acts, such as ending licensing of important patents, terminating agreements with suppliers in favor of your own substitutes, or the use of a third-party OS in favor of your in-house developed OS.\textsuperscript{315}

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\textsuperscript{306} DSR (n 239) 345.

\textsuperscript{307} DSR (n 239) ch 14 and DSR (n 239) 353-357 respectively.

\textsuperscript{308} DSR (n 239) 359-360.

\textsuperscript{309} DSR (n 239) 362.

\textsuperscript{310} DSR (n 239) 362-363.

\textsuperscript{311} DSR (n 239) 363.

\textsuperscript{312} This can be seen as a change in future payoffs, however the automated process makes it a good example also under this heading.

\textsuperscript{313} This dates back to the earliest treatise of war, when game theory was far from developed, Sun Tzu, *The Art of War* (Samuel B Griffith tr, Oxford University Press 1963) 110.

\textsuperscript{314} A more recent example of this can be seen during World War II when Japanese kamikaze pilots were only given enough fuel to make them empty their load, and to afterwards crash their planes into US naval ships for additional damage. DSR (n 239) 363.

\textsuperscript{315} An interesting example of this is Samsung’s investment in Tizen OS for phones, which they develop despite using Google’s Android in their mobile devices. Recently Samsung have however used Tizen OS in their newer TVs. By not implementing it in the mobile phone market they are not burning any bridges at the moment, however it is probable that Google is fearing that Samsung might abandon Android at a point when Tizen OS is developed enough. See Gordon Kelly, ‘The Master Plan: Why Samsung Is Ditching Android’ (6 February 2014) <www.forbes.com/sites/gordonkelly/2014/06/02/the-master-plan-why-samsung-is-ditching-android> accessed 15 June 2015; Vlad Savov, ‘Samsung is building a Tizen iceberg for Google’s Titanic’ (14 January 2015)
Cutting off communication has also been proposed in the literature, however in this day and age it can only be a semi-credible since it does not actually cut off communication, however it can severely delay communication.\textsuperscript{316}

**Changing own future payoff**  
By acquiring a reputation of carrying out threats and standing by promises the market will see your moves as more credible in the future.\textsuperscript{317} The connection to predatory pricing is imminent. An example of when a great credibility can be earned (to – what was by many seen as a too steep price) is the case between BSB and Sky.\textsuperscript{318} A price war occurred between two firms, and ended with a price so steep, that even from a developed predatory pricing assessment it was agreed that it made no rational sense whatsoever. There was no chance at all that any of these companies would ever be able to recoup the costs incurred, even if they would monopolize the market. Even though this might just have been two foolish lines of reasoning, competitors who are dealing with any of the decision-makers behind these companies will at the very least have this case in mind in future encounters.

The case concerning BSB and Sky brings us to our second point under this title: irrationality. Even when your competitor believes that you are a rational actor, you can distort their assessment by acting irrationally. By acting irrationally in some games (or in some markets), your competitors might believe that you will also do the same in other situations. This might even deter entry to a market, as the risk of entering might punish itself quite early.\textsuperscript{319}

By using strategies and various kinds of business conduct with the aim of confusing your competitor – through making their read of your strategy harder – you can gain an unmatched advantage. This is of course a balancing of distorting perceptions and costs; there is a limit also to rational irrationality, and even though a huge loss can be motivated to perplex your competitors, you always have to consider the opportunity cost.

**4.5 How game theory is differentiated from other schools of economics**

The main difference between game theory and traditional price theories is that game theory includes certain specific assumptions that are not considered in price theory. We are dealing with decision-making where we can determine three factors; individualism, which can be translated to best responses; rationality, and mutual interdependence. Now, rationality is in a sense also a part of price theory, however it is utilized differently, and it is more nuanced in game theory. Apart

\textsuperscript{316}DSR (n 239) 364.  
\textsuperscript{317}DSR (n 239) 364.  
\textsuperscript{319}Although supracompetitive prices (and profits) might still motivate competitors to at least try to enter.
from rationality, these are unique factors for game theory and other behavioral assessments of economics, and something that regular price theory does not take into account.

4.5.1 Drawbacks of game theory

The first thing to admit is that all economic theories are models, which means that they will never be completely applicable on all cases at all times. No theory is perfect, but when it comes to game theory it has received a lot of unjustified criticism. Some criticism however is undeniably accurate.

To begin on a fundamental public, and scholarly level, one perception of game theory is that game theory is only about the prisoners’ dilemma, which is immediately connected to various TV shows. The prisoners’ dilemma is a pedagogically good way to display how a game matrix works, however this cooperative game does not make game theoretical assessments in law uprightness, but in the context it rather reduces the academic viability of the science itself. Other points being made is that game theory is too descriptive, not explaining what to do, or how to act, but rather just stating the obvious. It has been stated that it is not easy to apply game theory on predatory pricing cases, and that it is not easy to find a “bright line rule”. Some scholars argue that it is hard to grasp game theory overall in its application, and that it can give rise to too many equilibria to be useful. This issue has been further developed when assessing the fact that judges need to, first of all understand the economic theory, and then be able to apply it on cases in a satisfactory manner. The critics have claimed that a “story based” assessment of cases is inefficient, slow, and expensive, where an easy to apply standard (test) would suffice. This does in a sense bring the discussion back to the classical standard vis-à-vis rule discussed in chapter 2. One of the biggest criticisms has stated that it is not only too descriptive, but it is in fact speculative, since it is not empirically proven. Of course there are also misplaced criticism across the literature (especially in earlier days, in the cradle of game theory), one example of which stated that irrationality needs to be a part of the model for predation to be an equilibrium outcome. As was displayed in chapter 4.3.2, irrationality need not be involved for predation to be an equilibrium outcome among agents.

4.5.2 Benefits of game theory

It is unfortunate that game theory is as misunderstood as it seems to be. The first obvious aspect we can conclude from this chapter is that game theory takes strategic consideration into account. When something changes on one end of a balanced scale, the other end is affected in some way. It might be seen as a hassle, but it is indeed a benefit as you can fine-tune your choices according
to what the situation needs. When other price-based economic theories did not suffice, especially after the Areeda-Turner paper at the end of the 1970s and the beginning of the 1980s, an uprising among economists occurred, where economists found the need to find something more adaptive. Today, 30 years later even more situations have emerged when the earlier price based analysis becomes more irrelevant, as prices are not as easy to define.  

While some economic theories just make a disclaimer of rational choice theory before they explain their beliefs, game theory actually works on the rational choice of players throughout its assessment, and gives a mathematically sound explanation of why something is logical and rational. While the criticism often lifts the fact that a “small change in the facts of a case” can change the equilibrium they are in a manner criticizing the rational choice theory. If something changes enough to make a choice a bad choice (economically speaking a non-rational choice), then it is per se what they are promoting as well. The insignificant changes as have been prompted by some is something for the mathematicians to argue about, because a true economist, and a lawyer does not argue on the outcome of a case in society in terms of (1-p) and (p), but rather the actual real life outcome, the facts of a case and whether it is the socially most desirable result.

In this respect game theory is more anchored in reality than for instance the Chicago school’s assumptions that there are two types of situations; perfect competition or monopoly. This is why game theory is not too hard to grasp, it surely uses mathematics in its models, but in its application it focuses on the “why” of a case; why did the company lower the price?, or why did it include that software for free?

This “why” is also what the courts need to take notice of. In other areas of law, it comes naturally for courts and judges to discuss the facts of a case, but in antitrust we have ended up in a landscape – at least post-1975 – where numbers have been seen as economics, and nothing else. But we have now reached a new age; the new economy. Facts can to the same extent be economics; as long as their basis follows the economic thinking presented here. Strategies and business administration is integrated to form the legal delimitations of societies, and this might give a complicated picture, and it might be a generation gap between the “old economists” and “new economists”, however it is important to keep the eye on what is important; namely the argumentation of why something should be allowed and why something should not. Just like judges have been doing in all areas of law for centuries.

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327 Granted, 30 years ago there were a few examples of markets with low AVC, such as the airline industry, however these low-AVC examples vastly expanded when intellectual property became a bigger part of society. Despite new ways of determining costs, like LRAIC, AAC and IC the problems still remain.
5. The game theoretical analysis of the law

Everything reviewed thus far has in a way been building up to this chapter. We have reviewed the history of antitrust, to see which societal influences have shaped antitrust on both sides of the Atlantic. We have seen how – on both sides – the interpretation of the law has oscillated between different approaches throughout time. We have seen what a strategic approach according to game theory actually entails.

5.1 Specific intent v rule of reason & strategic v standard approach

To conclude this paper, we will look at the cases that have had the biggest impacts in both the US and the EU. This subchapter has a quite complex title, but at the same time it represents the history of the antitrust during the last decade.

Before game theory was developed, the discussion in monopolization cases revolved around whether there should be a simple standard; a yardstick that one could use to quickly see whether the behavior was outside, or within the scope of the law. What became the rule of reason, or more specifically the balancing approach was another method, which worked more like a scale where you could precisely measure piece by piece to estimate the impact of every part of the whole case.

The same kind of reasoning emerged again in the 1970s and 1980s with the strategic approach in game theory representing the – now even more – refined tool, imagine a digital scale, to assess the lawfulness of an alleged abuse. On the opposite side we had the same type of easy-assessable price-based standard that the Chicagoans had advocated for years, although in the EU with a certain modification with the AKZO rule.

Judges and academics have essentially discussed the problem for at least 125 years. The question, which I deem to be answered affirmatively, is whether we can use the latest developments in strategic decision theory and business conduct to guide us through this, at first glance, complex area.

5.2 Predatory pricing and tying

In the US, the Brooke Group case was seen as the tie-breaker between the Areeda-Turner standard (and specific intent) approach, and the nail in the coffin for the in Alcoa decision stated strategic (and rule of reason) approach concerning predatory pricing.

In the same way, in the EU, it was in the AKZO case that the EU rule for predation was established, why these two cases have many similarities. The difference however, is that the

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328 Welfare balancing approach as discussed in chapter 2.2.2.
329 As explained earlier, this is in itself a strategic consideration, meaning that the EU has been more adaptive to the newer theories than the US. See chapter 3.2.1.
AKZO decision had a slightly more prevalent element of strategic consideration with the intent requirement, but this aspect was not developed to its full potential.\footnote{See further chapter 3.2.1.}

In modern times, these two decisions set out the rules in the two jurisdictions with regards to predatory pricing, with somewhat varied, however still quite rigid assessments. Since predatory pricing cases are relatively scarce, and tying cases become more common, we will look at two cases also from this exclusionary abuse. Interestingly enough, the cases are both in regards to Microsoft’s abuses, but in two (very) different categories of programs. As explained in chapter 2.3 and chapter 3.3, I consider the theory of predation to be applicable also on cases of technological tying since one can simply assume the prices being cut to zero.\footnote{One could argue that the EU Microsoft case regarding WMP in fact is a pure case of predatory pricing. As we saw in chapter 3.3.1, the CJEU forced Microsoft to offer two versions of Windows should they not wish to remove the Windows Media Player. Both versions of Windows were priced at the same amount, and therefore per default it must be seen as predatory pricing when an alleged valuable part of the product was removed, but the price remained the same.} Different exclusionary abuses may require different assessments, however predatory pricing and tying are close enough to be treated the same way.

\section*{5.3 How game theory applies the law on the discussed cases}

In the following the four cases will be dealt with separately, and the game theory we saw in chapter 5 will be used on the cases in the respective chapters. This chapter will highlight the parts where game theory and strategic reasoning in fact can be applied, regardless of what the outcome of the case would be.\footnote{For a more complete review of the background and the facts of each case, see chapter 2 and chapter 3. For additional information outside of this paper, consult the references in the respective chapters.}

\subsection*{5.3.1 Brooke Group (US)}

The Brooke Group decision was a case of high-held academic structure. It laid out an easy-to-follow, however stern method that undoubtedly delighted the American judges. First of all Brooke Group prescribed the reasonableness test from Matsushita, including (1) prospect of achieving monopoly, (2) monopoly pricing not resulting in quick entry, and (3) ability to maintain monopoly to recoup losses. Further on it required that the prices were set below cost, and that the predation occurred on the same market.

\textbf{The Brooke Group test}

(1) Reasonableness test

(2) Below cost pricing (for example shown by the Areeda-Turner rule)

(3) Same market

First, one can see the test of below-cost pricing as a threshold test, which would give judges and authorities a chance to quickly assess whether a case is worth pursuing or not. The reasonableness test is what is interesting to us in many respects. The test introduced by Brooke Group required
additional proof or recoupment.333 It meant that it was no longer a case of a simple yes or no after assessing the cost, but it was actually necessary to prove that recoupment was possible. Still, quite easy to apply, the Brooke decision now included one strategic consideration. This kind of reasoning is just what game theory is about. Quite surprisingly, this decision that in many respects is considered to be a clear-cut Chicago school case with a specific intent application, has elements that the post-Chicago schools approve of. Many of the neo-liberal economists would generally argue that the reason why the Chicago school is better is because it does not bring any uncertainties regarding false positives and false negatives, which this case might also avoid. However, the easy to apply rule – the other great benefit of the Chicago school economics – just became somewhat trickier with a balancing act where the courts have to estimate how the future would pan out, and project if recoupment could indeed occur. It is important to note that the SC did in fact step away from the Chicago view by refusing to reject the possibility of recoupment, even in an oligopolistic context. However, the SC did not go as far as to say that the post-Chicago school claims were right in regards to recoupment being plausible.334 By doing so, the SC did turn away from the principles set out in modern IO, and the economics explained in chapter 4.335

The recoupment test more specifically requires that the plaintiff can either (a) show supracompetitive prices, or (b) show the likelihood of such prices,336 which brings the question of projecting future outcomes mentioned above. The SC continued to explain that the price measure were not enough, but required additional factors, such as market structure facilitating predatory pricing, and as such an example excess capacity is presented.337 The reason to why a company would invest, or announce that it would invest in such overcapacity can be seen as signaling to the market, to deter any entrant from entering the incumbent’s market. This can be one of the considerations game theory is presenting to analyze abuses of either oligopolistic or single firm conduct.

In the case there were two factors that the SC pressed on; that predatory pricing rarely occurs, and the skepticism of predatory pricing in collusion among competitors.338 That predatory pricing actually does occur, and that it can be fully logical and rational was discussed and shown in chapter 4. The fact that Brown & Williamson was actually a relatively small company on an oligopolistic market (see figure 5.1) and that they did not have any real market power was a circumstance that made the case somewhat more difficult.

333 According to the Chicago scholars, the slight chance of predatory pricing being rational was if recoupment was possible. By creating another hurdle for the plaintiff, they hope to limit the number of claims of this exclusionary practice. See Baker (n 97) 589.
334 Baker (n 97) 602-603.
338 BBR (n 53) 2257.
A game theoretical approach to Brooke Group does bring up the factors of the case, but puts them in a context that was not dealt with in the in the judgment of the SC. First of all, looking at the market as a whole, we see that it was very concentrated among a few firms. Pricing seemed to be set in a way that was not too competitive, but when the price change did happen, the other five firms did tend to adjust their own prices. It is hard to maintain collusion, maybe even particularly hard to maintain tacit collusion. In the Matsushita case there were twenty firms that allegedly colluded. The only thing we can say for certain in Brooke Group is that it is probably more likely that collusion would happen here, as it is easier to control the smaller group.

What we know for a fact is that Brown & Williamson did price below their costs for 18 months, and that they did suffer losses of $15 million during that period. This action resulted in a loss of $49.6 million for Liggett.

For this to be (at least probable) predation we have to turn to the market again. Liggett, with 5% market share introduced generic cigarettes that were cheaper than the branded ones to increase its market share. A natural response by Brown & Williamson was to also introduce generic cigarettes. Obviously, Liggett had more to gain as it was among the smaller firms (and would thereby gain market shares from more companies), compared to Brown & Williamson who, despite being a relatively small player, had more than double Liggett’s market share. According to the evidence put forward by Liggett, Brown & Williamson had an elaborate plan that was well known within their organization to not only injure Liggett, but to slow the whole generic market. If Brown and Williamson could force Liggett’s prices up in the generic market, it would itself not lose out on profits in the branded market. Despite this being subjective proof, it is important to distinguish between two types of statements; those simply made to boost morale in a company; “to kill competition”, and those statements that have a more refined form, especially if the statements are expressed in an elaborate plan. This would at least constitute some

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340 See chapter 2.2.3.2.
342 See chapter 2.2.3.3.
343 Baker (n 97) 596.
realistic form of intent, which together with other factors could constitute proof of predatory pricing.\textsuperscript{344}

The recoupment requirement in US antitrust sets us up for a range of other considerations. For a claim of predatory pricing to be valid, the possibility of recoupment must be probable. Naturally price both ex ante and ex poste can be used to see whether recoupment would be probable, but this is just one traditional approach.\textsuperscript{345} The court did not consider the gains from deterring prices either in future time periods, or in other markets when assessing recoupment possibilities.\textsuperscript{346}

First, the below-cost pricing caused one market, the generic cigarette market, to in essence disappear. If the below-cost price cut would not have been allowed, there would be a total welfare gain, as more consumers would get goods at a price they would be willing to pay. This in itself is a loss that should bear weight in a strategic setting, as the only winners would be the companies involved in this scheme. The act also deters other firms, especially the two smaller ones from entering this generic market.

The generic market was not seen as the same market as the branded cigarette market, but they do in fact influence each other. The aim of Liggett’s entrance in the generic market was to provide an option for smokers, which does imply interchangeability on the consumer’s side, which is also attested by the rapid gain in popularity of the generic cigarettes.\textsuperscript{347} Here the fact that Brown & Williamson had a plan to do just this, bears weight, as their intent is matched with actual market realities.

Secondly, the reputation effects that Brown & Williamson gains by their price war in the generic market gives them credibility of being a tough actor – some might say irrational. This aura of toughness that was gained by their losses also deters entry in the branded cigarette market, as long as Brown & Williamson are there, and maintain their reputation.

We will briefly return to the case of recoupment. In Brooke Group, the SC did not accept that recoupment would take place in the branded market, to make up for losses incurred in the generic market.\textsuperscript{348} The predatory pricing scheme Liggett presented stating that the other market segment would be the area of recoupment was not accepted. One view of the situation was that there was no realistic possibility of recoupment and that recoupment did not occur in the same market.\textsuperscript{349} Game theory however suggests that recoupment in fact can take place in another market.\textsuperscript{350} When looking at the facts presented by Liggett, the only reason for the predation in the generic market to exist in the first place was to harm the competitors in the branded market, and not to lose market shares. It is however important that the plaintiff explicitly presents this view of multimarket recoupment, and not presents it – or lets it slip – as deep-pocket predation or financial market predation, since the court apparently did not accept the latter, due to the fact that it was considered to be two different markets.\textsuperscript{351}

\textsuperscript{344} BBR (n 53) 2266-2267.
\textsuperscript{345} See chapter 2.2.3.3.
\textsuperscript{346} See chapter 2.2.3.3.
\textsuperscript{349} Martin (n 2) 722-723.
\textsuperscript{350} Baker (n 97) 589-592.
\textsuperscript{351} Baker (n 97) 595 and BBR (n 53) 2285-2286.
As an additional note, some scholars also suggest that the evidentiary standard for proof of probable recoupment should be lowered when there is a predatory scheme supported by evidence of market structure and conduct.  

Considering these facts, a game-theoretical assessment of the Brooke Group case would find that predatory pricing was indeed applied, and that it was unlawful.

If Brown & Williamson’s plan would succeed, this would not only hurt Liggett who would be destroyed, there would now only be five companies left on the market, meaning that the market would be even more concentrated. Destroying the generic cigarette market specifically, also means that there is not only less choice for consumers but that, most likely, prices de facto will be higher as the cheap alternatives are the ones to disappear for the consumers. Alas, there is an actual harm to consumers, and not only to competitors. Furthermore, in the later stage Brown & Williamson will also have built up their reputation as a ruthless competitor, and this will in itself deter entry further; at least the cigarette industry as a whole will be considered to be a more risk-filled market.

### 5.3.2 AKZO (EU)

For this subchapter it is useful to keep the following timeline of actions and reactions between AKZO and ECS in mind:

1. ECS entered one of AKZO’s markets.
2. AKZO threatened to punish ECS, by preying on the market that would damage ECS the most, if ECS did not exit the market.
3. A settlement was reached – AKZO promised not to prey.
4. AKZO raised its prices.
5. ECS did not raise its prices.
6. AKZO lowered prices to match ECS’s prices.
7. ECS alleged that this was predation.

Changing the view from what happened in the actual case to a game theoretical analysis several new things appear, and we have to adjust both the way we interpret things, as well as re-think every decision made.

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352 BBR (n 53) 2270.
ECS first entered the plastic market in the United Kingdom, after which it approached one of AKZO's customers in the plastics market in Germany. It now entered a different market than the flour additives market which it was initially specialized in. AKZO reacted by a series of threats. Legally, we established in chapter 3.2.1. that these threats were used by the EC to establish predatory intent. Economically, from a game theoretical perspective, we have to first of all establish whether the threats were credible or not. The EC did not consider this aspect, even though AKZO claimed that the meetings where the threats were presented were a mere “communicative exercise”. This was developed further in the Advocate General’s opinion. A senior sales manager of AKZO UK stated that he did not consider the threats made by AKZO to be real, but that they were an indication of the fact that good relationships between the two companies were at stake. The fact that the Commission did not even consider this opens up for an extensive interpretation; if threats by default mean intent, this can actually backfire, leading to less law-abiding actors on a market. While dominant firms have the resources to maintain hoards of lawyers going through memos, e-mails, and setting up policy guidelines for what to say, it will make detection of abusive behavior of these already strong firms harder. Firms with limited resources cannot spare the time or manpower on these issues (they might not even be aware of these issues), and might therefore end up in a less favorable position. Considering the economic strain this will have it is also in general bad for efficiency if firms have to take precautions for slip-ups to an extreme degree; something that will in the end only result in a higher price for the consumers. This is not to say that threats cannot be used for establishing intent, but it is certainly something that has to be weighed by the courts.

Moreover, the threats were made after the two entries on the plastics market. In an SPE, threats like the ones AKZO made are not credible when we have perfect information. When we do not have perfect information, we can end up in Selten’s chain store paradox, or in a war of attrition simply put. If we look at the information in this case we can see that the long history of friendly collaboration between the firms in the UK market for flour additives; all through the 1970s AKZO increased the price of additives with 10% per year, and ECS always followed these increases. With this in mind we can work under the assumption that we know what will happen, and that AKZO has no reason to deviate from its past behavior.

Whether it was a credible threat or not (figure 5.2 shows fictitious probabilities as an illustration), a settlement was reached out of court, and AKZO agreed to pay ECS’s legal costs and agreed to not reduce its price for benzoyl peroxide anywhere (figure 5.3).

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353 Before delving into this topic it is important to remember that threats can mean different things in law compared to economics. Threat generally has a negative correlation (particularly in law) as it connotes coercion, however in economics threats can also annotate a negotiation position or a value which is your lowest or highest agreeable position. (In AKZO it was disputed which intent the company had with its threats.) For the general interpretation of threats in economics, see, Cooter and Ulen (n 7) 60-62.


355 Phlips (n 354) 249.


357 Phlips (n 354) 249.
After this settlement a few interesting things happened. At this point, AKZO was not allowed to lower its prices, or as Phlips puts it “in game-theoretic jargon AKZO made a binding commitment to eliminate predation from its action set”, and by this indicating that it was willing to collaborate.\textsuperscript{358}

Price war
Since they had good collaboration so forth, AKZO probably believed that this would continue even after this commitment, hence it raised its prices with 10%, but this time ECS did not follow.

The price gap became so big – and ECS might have wanted exactly this, so that it could try to increase its market share – that AKZO started to get worried. One might say, as the EC did, that the upcoming price cut was AKZO performing predation. What happened in reality was that AKZO had been the price leader for a long time (and the best thing to do for the runner up is to follow the price leader), and suddenly something happened that made ECS want to deviate from this plan. After ECS deviated and decided to set its own price, the best thing AKZO could do was to become the follower, by lowering its price to some extent. AKZO did not seem to have understood that ECS was now the price leader, or even that its best tactic would be to follow suit, or maybe it was simply more aggressive than that. What AKZO did was to match ECS’s price.\textsuperscript{359} In practice this is not predatory pricing but a clear case of Stackelberg warfare, or simply, healthy price competition.\textsuperscript{360} The reasoning is however based on the circumstance that ECS had a sufficient cost advantage to be the price leader. The size of the company is however irrelevant.\textsuperscript{361} As mentioned in chapter 3.2.1, ECS’s production costs were lower than AKZO’s, and when AKZO matched their price, this was called out as predation by both the EC and the CJEU. Looking at it from an economic point of view the only thing AKZO could do was to match the competitor’s price.

\textsuperscript{358} Phlips (n 354) 249.
\textsuperscript{359} Phlips (n 354) 252-255.
\textsuperscript{360} Stackelberg warfare is not a fight about pricing, but a fight about being the market leader. See more, Phlips (n 354) 244-247.
\textsuperscript{361} Phlips (n 354) 252-253.
Predatory pricing

For it to be a case of predatory pricing we need an attack from the alleged predator, meaning a lowering of its prices upon entry in one of its markets.\textsuperscript{362} We know that AKZO did not do this when ECS entered, but simply made empty threats at this point. Maybe AKZO felt forced by the settlement imposed on it, but in any case it did facilitate the existence of ECS. By doing so there is no correlation between the entry of ECS and the alleged predatory pricing by AKZO. This is also something that AG Lenz correctly pointed out.\textsuperscript{363} AG Lenz stated that:

“I have no doubts whatsoever about the finding of the applicant’s intention in 1979, to exert pressure on ECS and to drive it from the plastics market. However, it is more difficult to assess the intention that is said to have inspired the events that occurred from autumn 1980 onwards. In the end, \textit{the strategy developed at the end of 1979 was not implemented}, if only because the intervention of the High Court prevented it. It is \textit{at least doubtful whether the intention} [of predatory pricing] existing in 1979 still continued to exist in 1980 or whether there is some other explanation for these events.”\textsuperscript{364}

“Thus although it is unclear whether the applicant’s original intention subsisted in 1980 or 1982, one fact seems to me to be of particular importance, namely that the applicant’s behaviour can also be explained in the absence of the intention imputed to it by the Commission. After AKZO’s hands had been tied to a certain extent by the proceedings in the High Court, ECS made offers to AKZO’s traditional customers (albeit at their request) at prices considerably below those of AKZO. \textit{It need not be decided whether ECS thereby intended to intensify competition on prices or to start a price war. From the applicant’s point of view this behaviour could have been interpreted as giving it the right to initiate an active pricing policy (‘to compete with them as violently as possible’).}”\textsuperscript{365}

“This reasoning by the AG is perfectly in line with the strategic assessment accounted for thus far.\textsuperscript{366} In other words, if AKZO did in fact prey on ECS there needs to be a proven link between ECS entry and the alleged predation of AKZO one to three years later. At the very least there was no intent, which in turn would make the predation accusations void. It would be truly difficult to argue that an entry was forced, during a price war in this duopoly at this point. First of all, nothing showed that there was an actual threat to competition in general or to ECS specifically, and secondly, AKZO did not intend to foreclose the competitor at this point. If the price war would have continued this \textit{might} have become an issue, when AKZO would price low enough (meaning below AVC), but at this point it was not.

With the information in the case, we can conclude that this would not have been enough evidence of predatory pricing and that this would be a basis to free AKZO of the predation charges, as this was just a case of active competition.\textsuperscript{368}

\textsuperscript{362} Phlips (n 354) 252.
\textsuperscript{364} ibid para 204.
\textsuperscript{365} ibid para 215.
\textsuperscript{366} ibid para 216.
\textsuperscript{367} However, according to the economic and legal policy of that time, the CJEU did not even comment on this crucial strategic deliberation.
\textsuperscript{368} AG Lenz furthermore argued that AKZO’s dominant position was not proven. See, Case C-62/86 AKZO v Commission [1991] ECR-I3359, Opinion of AG Lenz, paras 62-124.
Harm to competition or competitors

In order for the predation to have any effect, there must be some harm inflicted to either competitors or consumers. If there is no harm, there is consequently no need to forbid an action. When ECS did not increase its prices, the gap as we reviewed became too big and AKZO risked losing customers, whereby they matched the prices of ECS. Normann estimated the costs of ECS to be about 10% below AKZO’s costs.\textsuperscript{369} With this assumption in mind AKZO’s pricing cannot have been too damaging – keep in mind that AKZO was still above AVC.\textsuperscript{370} Normann made two additional points; first that ECS was the more efficient firm (which was attested by ECS itself), and secondly that both companies at this time had a suffered declined sales to cover their fixed costs. This was due to the general decline in demand of white bread (and thereby flour). ECS however had also infiltrated a new market, the plastics industry, which gave it an additional revenue stream that it did not have earlier, which is one potential way to cover some of its fixed costs, at the disadvantage of AKZO.\textsuperscript{371} Ironically, this could question whether ECS itself was cross-subsidizing, at least during a limited period of time.

To assess the potential harm done, we have to review the costs of ECS. The EC did not see a need to do so, however this is something that both Phlips, and AG Lenz had strong views on and deemed important.\textsuperscript{372} Without this information, it is impossible to conclude whether the prices were economically justifiable.\textsuperscript{373} In order to show this, Phlips concluded a table (table 5.1) of three scenarios that he compared with the alleged predatory price of £517.9, which AKZO offered between 1980 and 1983 to Allied Mills.\textsuperscript{374}

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
\textbf{Year} & \textbf{1981 (£)} & \textbf{1982 (£)} & \textbf{1983 (£)} \\
\hline
\textbf{Scenario 1} & 502.1 & 520.3 & 467.3 \\
\textbf{Scenario 2} & 557.9 & 578.1 & 519.2 \\
\textbf{Scenario 3} & 583.9 & 603.4 & 539.7 \\
\hline
\end{tabular}
\caption{ECS’s estimated ATC.}
\end{table}

In the first scenario, ECS is assumed to have a cost advantage of 10%, in the second scenario both are assumed to be equally efficient, and in the third scenario – just for reference – ECS is assumed to have a cost disadvantage to AKZO of 10%. In the first, and hardly in the second scenario it cannot be claimed that ECS would suffer damage from AKZO’s pricing. Regardless of the exact costs of ECS, the analysis is crucial in an economic assessment of predation, as this is what actually decides whether a case of predatory pricing would be harmful or not. ECS were in this case the most efficient firm, and price leaders at points, so a game theoretical assessment cannot be complete when looking at the costs of one agent, but not the other. Naturally there would be difficulties in assessing the true nature of the outcome of the case even if the costs were investigated, since a slight overstatement of costs could have affected the outcome.\textsuperscript{375}

\begin{thebibliography}{99}
\bibitem{369} Phlips (n 354) 254.
\bibitem{371} Phlips (n 354) 253-255.
\bibitem{372} Phlips (n 354) 253; Case C-62/86 AKZO v Commission [1991] ECR-I3359, Opinion of AG Lenz, paras 34-36.
\bibitem{374} Phlips (n 354) 254-255.
\bibitem{375} Phlips (n 354) 254-255.
\end{thebibliography}
Intent between AVC and ATC

With the use of the new intent condition, introduced in AKZO, the CJEU was on a good way to implement a full strategic approach in the case law, however they stopped one step too early. There are indeed situations where costs below ATC can be justified, as promotion offers etcetera, and the intent-rule introduced here could facilitate that kind of situation, however it still had the lower limit of AVC. This rule, while adding one more step in the fact-finding, does open up for a survey of the circumstances of a case, and in other words it opens up for a strategic assessment of the alleged predator. However, the fact of the matter is that the overall assessment is not as complete as one might imagine – or want – for a strategic approach. Looking wider within the cost-assessment, in this case by also surveying the costs of the entrant, could give some insight in the market, to see if a price is actually below what can be expected.

Concluding, we can see that a game theoretical view of the case leads us to see that the predatory intent cannot be shown. Threats were assessed in a per se manner, and not in their context. When looking at all facts of the case; the factors between ECS’s entry in the new market and the price reduction were not linked, and this again would be needed to show intent. Furthermore the cost of the entrant was overlooked, which is a crucial part in deciding whether there will be an anti-competitive or pro-competitive outcome. The line between aggressive pricing and predatory pricing might be thin, but it needs to be respected.

5.3.3 Microsoft – tying products across the Atlantic

Network effects as a general issue

There are two main traits of cumulative effects that constitute the success of Microsoft as a corporation. The first one being indirect network effects, which indicates that a bigger user base attracts a bigger number of application developers. The markets in which this applies are also referred to as two-sided markets. The second being learning effects. As the system grows, the company gets a better understanding of the market, just as the users learn how to use the OS or the program. This familiarity increases the user’s appraisal of the program in question, which makes it harder for the user to switch to something different. This can be seen as a sunk cost for the user.376

These factors combined create a “value package” that will last for at least one generation of the product’s life cycle. This makes the market tip to the emergence of one system, which in turn makes firms invest resources in winning a whole market, instead of competing for one part of it.377 Consequently, if you do not capture the market, you have therefore lost the part of the market that you fought for.

It is sometimes said, often by scholars advocating rigid price theory, that one should not be worried of competition for markets as they only keep their power over one generation, however

376 Some count three traits, also adding direct network effects, the multiplying effect of the user base, such as the telephone, or the Internet. However, when looking at the software industry I only count two as I find the naming perplexing; the third category is, in a strict assessment, covered by the cumulative effects in two-sided markets, where the addition of more users attracts more application developers. See, Roberto Pardolesi and Andrea Renda, ‘The European Commission’s Case Against Microsoft: Kill Bill?’ (2004) vol 27 World Competition Law and Economics Review 513, 525-527, hereinafter Pardolesi and Renda. 377 Pardolesi and Renda (n 376) 527.
many scholars do still acknowledge that this value package that companies fight for can be exploited to also penetrate the next standard, and strong firms can therefore lock in also future generations. How long these generations span is a hard question to answer, however, that Microsoft has managed to retain its position for more than 20 years, points to the fact that the market lock-in is a reality, especially since prominent voices tend to claim that Microsoft is not even that innovative – and how else would a non-innovative company stay in the game for so long?

Innovation as a central issue
Considering both the Microsoft cases they have one thing in common, the tying part. The differences are in the details that we will assess one by one, but looking at tying in general we can draw some common conclusions. Tying is a very complex kind of abuse. Due to its non-price nature, it is very difficult to categorize it with clear thresholds, like the Areeda-Turner rule did with predatory pricing. In one sense, tying does bring down the price to zero, making it a per se violation like the ones of predatory pricing, but at the same time tying can bring a new layer of benefits, which makes the circumstances more opaque.

A natural conclusion of technological tying is that it is in fact good. Comparing the cell phones from the middle of the 1990s with the substitutes of today we can see evident examples of tying where cameras, calendars, music players, remote controls, and even functions earlier requiring computers are integrated – to the benefit of consumers. Despite this, you can easily understand the rage of both Netscape Navigator and Real Networks when Microsoft chose to give out its IE and WMP respectively for free, and include it on a platform that had an unprecedented reach. On the other hand, one has to take the economic incentives of innovation into account. In doing so, parties opposing the IE integration alleged that it locked customers into a single monolithic program and stifled innovation in the industry, and parties opposing the WMP integration claimed that it gave Microsoft an unfair advantage. In response, Microsoft argued that the real threat to innovation would be government intervention to stop bundling. The topic is disputed, however the central point is the role of innovation, even though it is unclear what best drives it. Despite what earlier economic theories have thought, it is clear that technological tying can be to the detriment of consumers by driving better products and services out of the market.

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378 id 532-534.
381 id 84.
382 id 97-98.
Strategic consideration of tying

The strategic considerations reviewed earlier in chapter 2.3, chapter 3.3; and chapter 4 in general (chapter 4.4 specifically) constitute the foundation of this section. While those sections laid the theoretical foundations, this section will explain the conclusions and draw from research based on the theories.\(^\text{383}\)

Gilbert and Riordan made an illustrative example of the outcomes of two games; a product improvement game, and a general technological tying game.\(^\text{384}\) The article discussed the incentives for a competitor to allocate resources for improving a product (for example a program), when it is in competition with a vertically integrated firm, who apart from a competing product also has access to an essential component (for example an OS) that both need. It analyzed the responses in situations with and without a possibility of technological tying of the vertically integrated firm’s products, and what the welfare implications would be. Even though they pointed out that their models might not represent the Microsoft cases,\(^\text{385}\) I believe that it illuminated the important notions one has to make in an assessment of the lawfulness of a tying arrangement. They did show that technological tying can under certain circumstances be anti-competitive (negative welfare implications), in certain circumstances be pro-competitive (positive welfare implications), and in some circumstances irrelevant (the equilibria already being an SPE).\(^\text{386}\) Comparable research has also been conducted by others reaching similar conclusions.\(^\text{387}\)

Microsoft can avoid competition from its rival by foreclosing them. It can do so by disrupting the ability of its rival to offer a competitive system, or make it more expensive for consumers to assemble a system that includes products from the rival, be it IE or WMP. This means that Microsoft can both foreclose competition in the PC market where it is dominant, and still increase its reach by providing its product on other markets, such as the OS X and Linux markets.

One conclusion to draw from Gilbert and Riordan is that how an alleged monopolist, or a vertically integrated firm, prices its products may signal whether a monopolist is trying to attract more firms, or foreclose them. For instance; if Microsoft sets a high price for its OS, it has an incentive not to tie its OS, as it already receives its desired profit. However, if Microsoft sets a low price for its OS, technological tying can be a good way to penetrate other markets.\(^\text{388}\) It is noteworthy that Microsoft in fact is considered to set low prices for its OS.\(^\text{389}\)

\(^{383}\) This part simply reviews the conclusions of Gilbert and Riordan (n 106). The mathematically inclined is strongly suggested to review their article in full. For a simplified textbook example of the proof, see Motta (n 102) 469-490.

\(^{384}\) Gilbert and Riordan (n 106) 125-129.

\(^{385}\) id 115.

\(^{386}\) id 136-137.


\(^{388}\) Gilbert and Riordan (n 106) 136-137.

5.3.3.1 Microsoft Internet Explorer case (US)

The US case did indeed concern the tying of IE to the OS, however the issues brought up were more relating to exclusionary contracts, and preventing OEMs, vendors, IAPs and end-users from altering the middleware and the setup of the OS. Furthermore the remedies applied were strictly behavioral and contractual.

The strategic moves in the case

From a strategic point of view, the discussion of the tying aspect itself has a great value. This is the pinnacle around which the case is shaped, however, as we saw in chapter 3.3.1, this is what the EU case revolved around. We will therefore have the possibility to return to these considerations further in chapter 5.3.3.2. We will therefore mainly focus on the other issues brought up in the US case in this subchapter, and the game theoretical considerations here will focus on the different strategic moves reviewed in chapter 4.4.

Integration of two products

The first question we have to ask ourselves is if the OS and IE are indeed two products or if they constitute one integrated product. In an early stage of Windows there was no browser. The product did work, and fulfilled the needs of users even so. Nevertheless, needs do change, and products evolve, so this per se cannot be a justification of them being different products. However we saw that these products were integrated after criticism of tying was directed towards Microsoft, in order to create the illusion of integration. With this in mind, the products should be considered separate, despite the technological integration (meaning the commingling).

When two products are tied together, there must be some objective justification. The reason why IE was integrated into the OS was from Microsoft’s point of view product improvement. It would also send the wrong signals that could stifle innovation to the market if this alleged type of product improvement was not allowed. The question coming to mind is whether this stifles innovation to the extent that other companies would due to legal grounds be afraid of introducing an apparent beneficial functionality, for instance antivirus software to its platform. This seems highly unlikely, if this innovation does not have an anti-competitive intent from the start. On the other end of the scale we had the risks of foreclosure and increased entry barriers for rivals. When looking at these factors it is clear to see that they are opposing arguments.

To take this further we have to look at how these products were integrated. The code of IE was written into various DLL files belonging to the OS, and due to this, the user could simply not remove IE. This justification does not reflect the efficiency in its true sense, but seems like an elaborate strategy to coerce the user of having a Microsoft product installed. The program could

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391 Pardolesi and Renda (n 376) 519.

392 Dynamic link library files (DLL files) are libraries of functions that the OS and other programs can refer to in their operations. They are a compartmentalization of programs, which makes the administration of applications easier. For instance an accounting program can be sold with different functionality to different prices if its modules are divided into separate files. Furthermore it makes updates easier as less code needs to be modified. See more, ‘What is a DLL?’ (Microsoft) <https://support.microsoft.com/en-us/kb/815065> accessed 6 July 2015.
just as well be separated into specific DLL files for the browser with minimal additional effort (if any), which would give the user the choice of choosing a browser, and eliminate the coercion.

Reviewing the possible justifications one could argue that the OS becomes a better product with the integration, adding value to the user by for instance allowing more efficient search options and file browsing. Furthermore it simplifies the user’s experience by eliminating the learning curve. It is however hard to argue that the UI of for instance Netscape Navigator is considerably different from that of Internet Explorer.

Underlying strategy and intent
When looking at this situation, the intent of Microsoft needs to be assessed as well. It took a product that had a potential profit margin, the browser, and turned it into a free product. It then included it in Windows, effectively forcing it on the almost all PC users due to Windows’ dominance. Doing so can economically only be explained by the argumentation presented by the plaintiffs; that Microsoft intended to foreclose its competitor, because of the threat that Java, as middleware, posed to the OS’s unrivalled market.

The discussion of intent also has different layers. The question is which value should be assigned to subjective intent, meaning e-mails, internal memoranda, etcetera, as opposed to objective intent, where the conduct itself is central. There is some reasonableness of taking objective intent more seriously than subjective intent, as the conduct is definitive. However intent to monopolize in itself is unlawful, so therefore it can be useful to consider also subjective aspects if it is expressed in an elaborate enough manner. This is also sensitive as it can pose a risk to smaller firms with limited resources. Especially after this case expressions such as “killing the competition” or “crushing the competitors” will be toned down by any legal counsel at a firm, but start-ups and smaller businesses with no corporate and legal strategists might oversee these issues. Nevertheless, when a plan is elaborately described or expressed it has to be taken into account, as it can support the overall reasoning.

The average user
When assessing how people think, what is considered to be rationality, and what users can expect, it is not only different economic theories that diverge, but time and the societal development of technology also is a factor. In the end of the 1990s computers were still relatively new to the average consumer. To assume that every consumer knew what it meant to “commit” to a PC (which generally contained Windows), and that they knew which options were available in terms of applications in the pre-broadband era when information technology was not sufficiently developed differs immensely from the situation of today. The awareness of intra-system competition in all aspects of the software market was far from general knowledge. This makes the user especially vulnerable, and should also be taken into account when assessing how a technological tie affects the market efficiencies.

393 The topic of threats and similar considerations were discussed in chapter 4.4 as well as in chapter 5.3.2 in connection with the AKZO case.
394 Note that this only applies in the US.
395 This can be illustrated by a simple example. In the past the sheer installation of programs or OSs could take hours, and sometimes required some more advanced tweaking and knowledge of MS-DOS commands. Today users download applications for their smartphones with a press in matter of seconds, and update their smartphone OS just as easily.
Rule of reason approach

Returning to the application of the game theoretical considerations in interpreting the law, we have earlier seen that the rule of reason approach gives a good arena for discussion. To make sure to actually use this approach, and not only claim that this is done, an actual weighing of arguments needs to take place. We need to use a welfare-balancing test to consider all argumentation; anti-competitive as well as pro-competitive, to arrive at a conclusion establishing what the efficient outcome would be. We need to test whether the plaintiff’s claims actually prove harm to consumers, and whether the defendant’s claims actually do make sense in an economic meaning. The last part is particularly important as the efficiency defense, or the business justifications if you may, can overturn the efficiencies to something positive for social welfare, despite some harm to consumers. Nevertheless, when looking at the defense it is important to have an ex ante mindset, in order not to let fabricated afterthought constitute intent.

First of all it is clear that Microsoft did have market power, and that the user did not have an option to opt-out of IE. Counter-arguments disputing the coercion cannot be accepted since there is no way to actually get away from using it – no matter what you do it will be on your system. Microsoft simply claimed that this was product improvement on a dynamic market with extra features added. While it is true that it does bring extra benefits to the user, this brings the question whether the integration of DLL actually had an efficiency defense, however Microsoft failed to deliver any credible argumentation. So the only probable reason was to limit the choice of the users. Therefore any attempt to display that this would stifle innovation fell alongside this, as Microsoft did not manage to show how innovation would be hindered.

The notion that it was two products was strengthened since IE was offered also as a stand-alone product, not only within the Windows OS, but also in other OSs, where Microsoft could further extend its reach. This leads to the question whether there is any sound economic explanation to why IE was free, when there was a clear possibility to sell it for profit. Microsoft apparently did not care about the browser market per se, if it did, it would have competed on other terms here, however as a part of a long-term strategy it aimed at foreclosing Netscape, to secure its OS position. This resembles predatory pricing in itself, as I initially claimed in regards to the likeness between tying and predatory pricing. Schmalensee, the economic expert witness of Microsoft, argued that the fact that it was not free was not anti-competitive per se, but Microsoft tried to strengthen its OS with this product, to make it more competitive. Fisher, the economic expert witness of the DOJ, claimed that the pricing strategy was indeed a part of a long-term scheme and that it constituted predatory pricing since Microsoft had invested $100 million a year at least between 1995-1999 to develop IE. These considerations, together constitute a solid base of some illegal activities, if not tying then predatory pricing with the same common goal, to secure Microsoft’s main market; its Windows OS.

396 Their attempt to say that Windows would be destabilized and not function properly crashed in a video demonstration which had certain flaws, making it look like it was fabricated evidence. See, Stan Crock, 'Buggy Video and More, Microsoft Is Going Backward' (Business Week Online, 3 Feb 1999) <www.businessweek.com/microsoft/updates/up90203a.htm> accessed 6 July 2015.


399 ibid.
In addition to the tying allegations Microsoft had as mentioned earlier used exclusionary contracts with IAPs, ISPs, OEMs (including the microprocessor manufacturer Intel) and retail vendors to promote Windows and Microsoft’s other applications, to the detriment of its competitors. Due to the market power of Microsoft none of these had a chance of refusing the demands. On these issues Microsoft did not have any articulated defense, but merely waived off the allegations as unfounded, and that Microsoft had great products that the market liked, and its market powers were exaggerated. The fact of the case is that the allegations were based on the Sherman Act’s Section 1 and Section 2.

Assessing all these factors, it becomes evident that there was indeed a harm to consumers in the sense that Microsoft blocked the distribution channels that Netscape could have used, the harm being that a competitor was foreclosed, and the sole purpose of Microsoft’s strategy points at this foreclosure, with no other justification of other possibilities.

Remedies

The discussions around exclusionary abuses and foreclosure are moot unless a discussion is also takes place regarding the entry barriers and (re-)entry. The remedies should be aimed at lowering the entry barriers, so that competition is not hindered (or at least less hindered) by the huge advantage of network effects that were evident during this case.

The exclusionary contracts need to be deemed illegal, and supervised, standard contracts do seem like a good place to start, to avoid deviation from agreed terms, and to make sure that no party is discriminated.

To stop the development of exclusion, Microsoft should, disclose information on their APIs so that third party software developers could build competitive software without being discriminated, with an impartial observer surveying the compliance for the initial years after the decision.

Untying IE from the OS would probably not be proportionate as an OS without a browser in fact is crippled (despite the fact that this was the late 1990s and internet downloading was just in its cradle), alongside the acceptable (albeit weak) business justifications presented by Microsoft. However, to get around the coercion element Microsoft needs to offer an option to install another browser upon OS configuration. This could for instance be a choice between the browsers with the top five market shares. Microsoft could here present a “recommended” installation with IE, and if they in fact are as efficient and innovative as they claim, the company should be in the clear. As much as this brings responsibilities for the monopolist, it is a good way to mimic perfect competition, or at least to avoid discrimination and foul play. This could be via a strict, or generous system. The generous one referring to a model where IE is suggested next to its four biggest competitors. The criticism towards this can be that IE would still be favored in the sense that it will be promoted regardless of its position on the market. The strict system refers to a model where the top five browsers are offered, regardless of whether IE is one of them or not.


401 See chapter 2.3.1.
Global strategy

Even though this was a case brought up in the US, against an American firm, Microsoft is in fact a global company. This means that Microsoft is also active in other jurisdictions. To try to anticipate the developments and the reception of the judgment, the parties (both the DOJ or Microsoft) could have communicated with other enforcement agencies in the world. Clearly, the DOJ did dedicate some time to press releases aimed at other jurisdictions afterwards.\(^{402}\) Realizing that it is easy to judge with the wisdom of hindsight, I will still state that if they had done so preemptively in a cooperative way instead of in a competitive manner, future cases on related issues might have been avoided. Many of the inconsistencies, as we will see in the upcoming chapter, are not simply due to the fact that the economic traditions are different between the jurisdictions, but also because the courts focused on different aspects of the same case. Through this they made different mistakes, instead of learning from each other’s approaches.

5.3.3.2 Microsoft Windows Media Player case (EU)

What made the Microsoft case in the EU so popular – or rather, un-popular – was not so much its final outcome, but rather a mix of political and procedural issues.

What differed the EU case in the legal aspects was the focus on the tying itself. It was this abuse that was in the center of attention, and how Microsoft pre-installed and commingled the code, alongside the reactions and choices of end-users.\(^{403}\) On the remedy side it was not only about behavioral remedies, but the GC actually forced Microsoft to re-write the source code and literally untie WMP from the OS.\(^{404}\)

Looking at the political aspects of the IE case, initially, during Clinton’s democrat administration the DOJ and FTC started harshly, however when the time came for the verdict, in the succeeding republican Bush administration, the tone was more corporate-friendly, which lead to the settlement.\(^{405}\) In the EU the situation was the opposite; the enforcement agencies were promoting harsher sanctions with Competition Commissioner Monti in the forefront with a reputation of being a ruthless enforcer, striking fear in the business world.\(^{406}\)

Finally, the critique was also aimed at the way the GC dealt with the case. As we saw in chapter 3.3.1, the GC did not go into details on several issues, but rather referred to the EC’s assessment. What was noteworthy was also that the GC did not investigate the foreclosure issue thoroughly enough, and the issue of tying was not assessed through an elaborate (enough) rule of reason analysis.\(^{407}\) In the case the GC mentioned that it did consider Microsoft’s arguments that the exclusionary abuses could be justified (however it rejected these arguments). This discussion should however have been thoroughly developed.\(^{408}\)

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\(^{402}\) See chapter 3.3.1.

\(^{403}\) Pardolesi and Renda (n 376) 517-518.

\(^{404}\) Pardolesi and Renda (n 376) 520.

\(^{405}\) Jennings (n 390) 82.


\(^{407}\) Pardolesi and Renda (n 376) 557-558.

\(^{408}\) In the EU this is referred to as objective justification reasons, which in essence correspond to an efficiency defense in the way I have used the expression, however a proper theoretical base was not defined at the time of the Microsoft case. For the GC discussion on the MS case which nevertheless does contain this type of reasoning, see, Case T-
The specific game theory of the EU case

In the EU case the factors are similar, but with two distinctions; we have not only precedence from the US to consult, but we also have an EC decision behind us where some things are clarified.

Following the test set out by the EC we have already taken a step towards a rule of reason argumentation, including some strategic considerations which do follow the strategic approach suggested in chapter 6.2.2, but the reason why I do not believe the GC verdict captures everything is because it lacked the interest, or as they put it themselves, the technical and economic background to elaborate on the issues as the EC suggested.409

The EC test

Firstly we can state that we have two different products. The OS and WMP are two distinct products, as also WMP is available separately. The fact that Microsoft also made WMP codependent on the OS by commingling is a simple strategic move, to foster its users to choose Microsoft products. Microsoft kept this strategy even after the US settlement condemned the behavior, which at the very least meant that they knew that there was a risk that it would not hold as an efficiency defense. The fundamental improvement that IE could bring to the OS as a platform had some structural benefits as one could search and browse the contents of the PC in the same way as one browses the Internet.410 In the EU case those fundamental advantages do not exist. Furthermore the “value”, or benefit of the program as a media player is equal to any other application. The browser at least opens up a whole new world, which suits the “platform” side of an OS, which I believe gives a browser more weight and puts it in a higher tier compared to a media player.

There are however still issues with delimitation on what would constitute fair integration. When does a program turn from extra benefit to standalone program? The definition and purpose of an OS needs to be defined in the first place. Secondly, is it enough if the names of two products are different, would “Windows Media Player” be accepted as an integrated product if there also was a “Microsoft Media Player” with a slight modification for other OSs and stand-alone downloads? Microsoft does offer a range of OSs, one of which was the Windows XP Media Center Edition. This OS was aimed at being a media playback and entertainment version of Windows, however still built on the same foundation as the regular Windows XP. Would WMP integrated in that specific OS constitute a standalone product? It all depends on the circumstances of the specific case, which is why the game theoretical analysis is an appropriate way to assess these abuses, and navigate through the rule of reason in a systematically solid way.

Turning back to the EU case at hand, the same types of anti-competitive elements leading to foreclosure that we saw in the US case existed also here, with the difference that it was not Java that was the enemy, but rather the attempt from different media player application to make their own file formats into a standard. Basically they all tried to foreclose each other, but due to the

201/04 Microsoft v Commission [2007] ECR II-3601, paras 666-712 and 1090-1167. What is clear however is that this type of reasoning exists, as mentioned in the Guidance Paper, paras 28-31, and reinforced in the Post Danmark case. See Jones and Sufrin (n 11) 385-393; and Case C-209/10 Post Danmark A/S v Konkurrencerådet [2012].

409 Chapter 3.3.1.

410 Even though the improvement is not big enough to warrant a justification.
dominant position of Microsoft, other rules apply to them, because they are the ones with
enough market power to actually see the foreclosure through.

Looking at the coercion, part this is identical to the US case.411

The strategy and intent of Microsoft
Microsoft’s goal here is again to strengthen its OS by locking the user in by different means. This
time the fear is not that there will be a platform on top of the OS where Microsoft loses its
control, but it is rather a fight for the file formats. As discussed in chapter 3.3.1 there are some
industry standards that do work on most media players. To gain market shares in the media
player market (both inter-OS and intra-OS competition) the firms try to promote their own file
formats. There might be efficiency differences between these formats, but that is not the main
concern. The aim is to make the users use your own format. For Microsoft it has the advantage
that if they can make the market use the WMV files, it will strengthen both its media players on
other OSs (such as on Mac OS, as WMP would be required to view those files) as well as
foreclose the competition within Windows OS as well, as other players will be incompatible. The
risk when one format becomes the market standard is that the market will tip to Microsoft’s
technology, which could, when the competition is foreclosed, lead to a pricing abuses, dominance
in other markets, etcetera.

The average user
Comparing the average user of the start of the early 2000s (when the EU case was brought) with
the ones just a few years earlier in the 1990s (when the US case was brought), one can see a clear
increase in technical abilities due to technology becoming a more integrated part of society.
Installing a media player is also much less complex, than installing an OS. However, it is not only
about the knowledge, it also comes down to opportunity (considering when employers ban the
ability of the employees to install programs) as well as comfort – most people might not reflect
upon the intrinsic power given to Microsoft per default when not making a decision on a media
player, or a standard in general. Even the non-choice is a choice in itself that furthers the power
of a monopolist.

Rule of reason approach
When disregarding how the courts in fact came to a conclusion, and simply analyzing the pros
and cons of different options we see more and more similarities.412 When we weigh the anti-
competitive arguments against the pro-competitive arguments we see that the relation between
the arguments are roughly the same, however arguments on both sides are slightly weaker. It
seems like WMP is harder to assess than IE.

There is indeed harm to consumers based on the foreclosure that can occur. But what this
foreclosure means in measured harm is harder to assess. Granted, Microsoft will be able to drive
competitors out and then decide on file formats, compatibility, quality of files, but as mentioned
earlier; it seems like the IE case could have a far more severe outcome, posing a bigger threat.

411 See chapter 2.3.1.
412 Compare the cases as described in chapter 2.3.1 and chapter 3.3.1, as opposed to the analysis in chapter 6.2.2 and
this subchapter.
However, the justification we can find for actually allowing this tying arrangement to proceed is equally vague. Microsoft does not have many reasons to support why tying is justified. WMP does not add the same value to the user as a browser does. The reasons discussed here mainly involved potential possibilities and unproven improvements. Some business justification and efficiency claims were made, but they need to be proven, and there is nothing indicating that WMP would be better than its competitors.

The pro-competitive justification on Microsoft behalf contains that it is one product as it is tied to the OS in its code. This argumentation does not last long, since the only reason the code is commingled is to be able to claim this. The justification of the commingling of code only has a negligible effect on efficiency. Other justification could be a “one package solution” argument. By having the programs created by the same company that designed the platform on which it is based, the chances are higher that bugs do not appear, and that they work well together. One can compare this with the smartphones of today. Apple and Microsoft create their own hardware as well as software. They thereby have control of the whole production process. Therefore the systems manage to run quite smoothly compared to Android phones, even though the specifications on the hardware of Android phones in general are much more refined, and the Android phones in general have many more options of customization as well as choices for third party applications (and even OSs). The issue is one of optimization. However, a bottleneck for this kind of reasoning is that for the system in the EU case, we have Microsoft creating the platform and the program, but the hardware is still from third parties, which makes the argumentation limp. There are probably some efficiencies along these lines, but not to the extent that it is noticeable compared to the competition.

Remedies
Turning to the remedies in this case we again must assess what our goal is; what we want to achieve with the remedies. And also here we want to keep the entry barriers low, for rivals to be able to enter the market, should the competitiveness fade, or should prices reach the supracompetitive levels. The monopolist should be hindered from keeping potential rivals out with anything but competition on the merits.

Looking first at the possibility to fine the company, it is evident to most that a fine on its own will not be enough to stop a company like Microsoft from abusing its power when they see that it benefits them. Microsoft has been in quite a few lawsuits like this throughout history. The point worth making here is that when they see potential, they probably do an assessment of its value, and take the risk of being fined into account. A first-mover advantage, such as when they entered the browser market, brought them more good than a fine could ever undo. The same can be said for the WMP market. They were actually tying WMP for several years before they were punished for their conduct – and even after they did so as well, which is why the injunction of refraining from repeating came into force.

The behavioral remedies were just as well rather toothless, as the unbundling in effect changed nothing. Just 1800 copies of the unbundled version of Windows were sold. They technically did not have a first-mover advantage, rather than a second-mover position, however with their conduct (a sort of strategic move) they, in a way, “undid” Netscape’s first-mover advantage and took over the throne. The same can be said for the WMP market. They were actually tying WMP for several years before they were punished for their conduct – and even after they did so as well, which is why the injunction of refraining from repeating came into force.

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solution would have been to, as suggested in the US case, in the installation process give the user a choice between several media players. This would make sure that the consumers do have a choice. It might nevertheless not be cheaper or less controversial, as the user should still have a choice of opting out of the in-house technology, but in consumer welfare and societal welfare measurements it will however be justified, since it will give the best technology a better chance to prevail, and the individual would get just as much as it prefers. Also in this case it could give the consumers a choice between the five most used media players, and Microsoft could provide their “recommended” installation. In order to keep objectivity there could also be a rating system from an impartial source where users can see the reviews from others. But these are mere details. This system of course also has its limitations. To what extent should applications have an opt-in clause at the installation? The fair answer would be: just as many applications as markets that Microsoft tries to leverage itself into with unlawful and unjustified methods.

Among the behavioral remedies there was also a provision of providing information on reasonable and non-discriminatory terms, as in the US case. Sadly, the GC did not implement the remedy proposed by the EC, similar to the one in the US case regarding a compliance officer. This option would have been a sound way to effectively enforce compliance.

Final words
Antitrust is broad, and complex. The provisions available should be seen as a toolbox, and as we saw in the reviewed cases, situations can be complex, and there is a need to look at all kinds of abuse in play, and then make an overall assessment with a clear goal in mind. The complexity does not always make simple yes-or-no tests the best instrument, much to the courts’ dismay. The aims of the parties should be clearly understood, as well as the strategic implications they lead to. The courts should not only punish companies, as it sometimes seems as they do, but they are the institutions that should correct market failures, and help the sometimes-lost invisible hand.

In the Microsoft cases from the US and the EU that we have reviewed, there was a clear ideological divide. Two different approaches focused on two completely different things, but they came to somewhat different solutions in their respective jurisdictions. Being bound by rigid rules does not give satisfactory verdicts in complicated cases, and a step aside from this have been seen in the move from per se rules to rule of reason estimations in both jurisdictions. The essential point to remember here is that these estimations are quite arbitrary, since they are drawn to their (ideological) roots and not systematized. The strategic reasoning performed in this chapter managed to reach the same conclusions, which seem to satisfy the demands of both jurisdictions to a great extent, as well as give a model for assessing cases, so that the welfare discussions are not forlorn. This model will be elaborated further in the next chapter.
6. Conclusions

In antitrust, three types of policy positions can be held:
(1) no rule (the libertarian approach);
(2) per se rule (a clear line dividing which types of conduct are lawful and which are not); and
(3) a rule of reason.

Market failures do occur so regulation is indeed necessary, and antitrust has without a doubt reached a point of complexity, where per se rules are not viable. There is currently a large consensus on the use of a rule of reason, but as we have seen, when it comes to practicing law under this rule, the courts and lawyers are unsure of what it actually means, and how to apply it.

The old price theory based antitrust enforcement mainly used in the US has time after time shown to be unsatisfactory, or at the very least insufficient. The counterattack has been that there is no better solution, and when game theory is mentioned the same group frown and shiver.

Economics that nowadays have a profound part in antitrust is used because it simplifies situations. It creates proxies and rules, which sometimes can be simple yes/no rules in theory, but when applying these rules it is evident that the reality is more complex. Economic approach has in antitrust sadly been synonymous with price theory, and therefore strategic reasoning and behavioral reasoning have ended up in the shadow. It is important to remember that economics is not a natural science, but a social science, that should not be afraid to acknowledge this trait and actually take social interactions into account.

The EU is indeed taking a more economic approach, but it is still being criticized just as much from the US. This can be explained by the fact that the EU did not directly copy the price theory thinking of the US, but developed a more strategic approach on its own. Sometimes, however the application of this approach is not properly put into practice by the European courts, but this could partly be due to the structure of the EU, with the EC on one side, and the CJEU on the other.

6.1 What game theory has to say about the interpretation of the law

If game theory is understood as a machine that magically should give us the best answer to an antitrust case, then it is completely misunderstood. Just as price theory cannot give us a formula of objective numbers taken from a dominant company to assess the legality of its actions.

I argue that the application of game theory in antitrust is not solely about drawing matrices or game trees. These tools can increase the understanding of game theory, or economic strategic thinking, and in some cases illustrate mathematical proof. What I do try to bring forth, is that the strategic considerations, signaling, commitments, threats, and other choices – which are based on formal game theory – should be analyzed as they can provide solid unprecedented predictions.

There is a reason to why game theory is the main tool used in IO. The perfect competition and monopoly models of the old economy do give us a good framework in classrooms to work within, however when you are looking at the reality of our surroundings and the interactions of
companies there are per definition uncertainties. Companies do no disclose information to each other and therefore the information balance is asymmetric. A model that can describe the realities should also be used in understanding them when conflicts arise.

Game theory in antitrust can helps us in three areas:

1. rational;
2. structure; and
3. realistic predictions.

**What game theory does**

Game theory gives a more suitable proxy to understanding why companies take a certain action over another. It shows us that an action that seemed illogical can have explanations that are completely logical, as well as the best solution in a given situation. Game theory also gives us a structure that can be applied within the rule of reason. Following a certain pattern in the reasoning that has strong roots in economics, gives us efficient and predictable cases – which is not possible with binary economics.

The Areeda-Turner rule is an appreciated rule. It is easy to understand, and easy to use, which brings no surprise that American judges have grown fond of this rule. It does however have a fallacy as it may constitute an instruction manual on how to prey with impunity. In the same way, one can understand why the GC failed to apply a rule of reason in the Microsoft case in the EU, since no economic tradition existed, and there was no clear guidance on how to do so.

**Why it becomes more and more appreciated**

Many Nobel laureates in the past decades have received their prizes due to their new economic approaches, and the recipient of the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for 2014, Jean Tirole received his prize for his analysis of market power and regulation. The Swedish Academy of Sciences explained why Tirole had been so successful in his analyses:

> Before Tirole, researchers and policymakers sought general principles for all industries. They advocated simple policy rules, such as capping prices for monopolists and prohibiting cooperation between competitors, while permitting cooperation between firms with different positions in the value chain. Tirole showed theoretically that such rules may work well in certain conditions, but do more harm than good in others. Price caps can provide dominant firms with strong motives to reduce costs – a good thing for society – but may also permit excessive profits – a bad thing for society.

> The best regulation or competition policy should therefore be carefully adapted to every industry’s specific conditions. In a series of articles and books, Jean Tirole has presented a general framework for designing such policies and applied it to a number of industries, ranging from telecommunications to banking. Drawing on these new insights, governments can better encourage powerful firms to become more productive and, at the same time, prevent them from harming competitors and customers.

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415 Phiips (n 354) 233-234.
These italicized remarks are especially important here, as we have applied the same type of test in regards to predatory pricing for almost forty years throughout a range of industries, just as the convention of contractual tying was applied to technological tying.

That a certain individualization is needed for each case, should come as no surprise, it is in the nature of the rule of reason. In the following two structures of applications of tests with strategic considerations will be suggested; one for predatory pricing and one for tying. Despite the similar way the economic strategic thinking is applied to both exclusionary abuses – for instance in regards to intent – there is one obvious difference between the abuses, namely that one can be directly measured in monetary means.

6.2 Tests based on game theoretical models for predatory pricing and technological tying

The specific intent tests have been quite popular in the US, bearing the resemblance of the binarity of the per se rules. However, the welfare balancing approach, weighing the anti-competitive and pro-competitive arguments takes other relevant considerations into account, and is possible to apply through the structures of game theory in a rule of reason analysis. In the EU the situation is slightly easier, as the specific intent test is not hardwired into the economic minds. It has a more flexible approach, which is discernible in the way the EU competition law is intended to work – the problem however has been that the EU has not had the economic mindset for that long, to apply it in the intended way.

Due to the structure of game theory simpler tests such as consumer harm test, or no-economic sense test cannot be directly applied, but these aspects instead make part of the analysis and the assessment of the factors. With a consumer-harm test for instance there might be a case where the consumer harm is negligible compared to the welfare increase in society as a whole. Therefore these factors need to be weighted inside of the analysis.

The lessons from the US and EU antitrust cases
The approach may have been critical to both jurisdictions so far, but this has merely been to avoid the traps, but most importantly to identify the best practices – and there are many, in both the US and the EU.

The four cases analyzed in chapter 5 were chosen simply to lift the best practices from the case law that I believe have significantly improved the antitrust policies. Next to these practices I will however also list where I think the cases went wrong, both as a summary, but also to highlight where I believe the focus should lie in any suggested approaches to predatory pricing and technological tying. I will also elaborate on this in the proceeding two subchapters.


<table>
<thead>
<tr>
<th>US CASES</th>
<th>EU CASES</th>
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<tr>
<td><strong>Brooke Group</strong>&lt;br&gt; (+) Recoupment confirmed&lt;br&gt; (-) Limitations of recoupment</td>
<td><strong>AKZO</strong>&lt;br&gt; (+) Intent considerations&lt;br&gt; (-) No full market analysis</td>
</tr>
<tr>
<td><strong>Microsoft IE</strong>&lt;br&gt; (+) Systematic approach by the court.&lt;br&gt; (-) Remedies</td>
<td><strong>Microsoft WMP</strong>&lt;br&gt; (+) Proposed structure by EC&lt;br&gt; (+) Use of behavioral remedies&lt;br&gt; (-) Implementation of theory by the court&lt;br&gt; (-) Remedies</td>
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**Brooke Group**
Recoupment is an excellent way to identify whether a predatory scheme would work or not, and is essential to the rest of the analysis. However, to get the overall understanding of the situation, a full market analysis is needed, and what I expected was an analysis of multimarket predation.

**AKZO**
In AKZO the strategic intent consideration introduced was an essential step towards a modern economic analysis, which initiated an economic strategic thinking model in the EU. However this was stopped one step too early, and the intent test was applied too narrowly – ignoring the rival’s actions.

**Microsoft Internet Explorer (US)**
The reasoning in the Microsoft case, and the framework wherein the reasoning took place was of varying quality, but when it was good, it was exemplary and it was obvious that the US judges have a relatively high economic understanding. The remedies on the other hand were neither proportionate nor in no way improving the situation of antitrust.

**Microsoft Windows Media Player (EU)**
The proposed structure by the EC held high economic class, including a good strategic path, and a forward-looking reasoning in connection to the remedies. Unfortunately, this plan of the EC, drafted by their bright economists, failed as the GC did not know how to structure it, and combine it with their traditional legal reasoning. The remedies were also less developed than they could have been on the behavioral side.

**All in all**
In these cases the strategic thinking shines through. We see why game theory is an appropriate tool. We can explain and evaluate intent in AKZO. We can see how threats affected all four cases. We can see how promises affected AKZO and MS EU. We can analyze recoupment possibilities in the predatory pricing cases, Brooke Group and AKZO. We can explain why certain cost measurements, such as AAC and LRAIC are better than others in the cases involving intellectual properties. When these actions are identified we can understand the underlying considerations to determine whether a firm is using exclusionary abuses or not.
6.2.1 Predatory pricing – suggested approach

For the case of predatory pricing I have found that the best approach for avoiding injury to consumers (either directly or by injuring the competitors) would be to have a test consisting of both a threshold test as well as a rule of reason aspect. What the threshold test does is to rule out cases that are unfounded.

Figure 6.1.

Step 1 – Market analysis
In the first stage a simple review of the market is performed assessing three simple conditions:
(1) whether the price is low enough,
(2) whether the firm has sufficient market power for the predatory pricing to be an issue; and
(3) whether the market is susceptible to predatory pricing at all.

If the price is above ATC there is no reason to investigate the firm at all.\textsuperscript{417} Secondly the market power of the firm is important, as a smaller firm does not pose any threat. The market power can be assessed with a simple market share measurement. Thirdly, there might be other reasons that make the firm insusceptible to predatory pricing, for instance due to the concentration of firms, or because of the absence of entry barriers.

If these three conditions are not fulfilled, predation is not possible and there is no need for a further analysis. However, if they are met, the analysis moves on to stage 2.

\textsuperscript{417} We use the ATC here as it is an easy-applicable threshold, we will however use the alternative LRAIC standard in the in-depth analysis in step 3 below.
Step 2 – Strategic analysis
In this stage a more elaborate analysis is needed to see if predatory pricing is actually a threat. Firstly an assessment is needed to see if there is a plan for predatory pricing and if there is a plausibility for recoupment.

To assess the viability of a plan one has many different factors to take into consideration, and this is where the main strategic analysis actually takes place. The plan needs to be solid enough for the predator to expect that there is a chance of recouping losses in the future. The plaintiff needs to present persuasive evidence that this is the case. The economic evidence should find support in the economic conditions of a market, as well as the behavior of the agents in it, and make use of rational argumentation for its side. Even if something seems like a consumer benefit at the point, future assessments and profit possibilities must be supported. It is important to reiterate that this analysis is not only focused on factors regarding defendant, but elements from both the market, and the plaintiff’s costs and conduct can be taken into account in a strategic analysis, as the defendant’s pricing strategy might have been a response provoked by the plaintiff which bore strategic weight in the context.

In regards to the second requirement there needs to be a plausibility (or an actual occurrence) of recoupment. This analysis should show that there is nothing hindering such profits in the future. If for instance, the entry barriers are low, or if there are accusations of collusion among a high number of firms, this might indicate that recoupment is not a plausible threat. This occurrence of recoupment does not have to take place in the same market, but the losses can be recouped also in another market, if evidence supports that this was a part of the plan.

If there is no credible plan, or if recoupment is not possible, the analysis can stop at this point. However, if both these requirements are fulfilled, the court needs to move on to the last stage.

Step 3 – Efficiency analysis
As a part of the last stage there needs to be a more thorough price analysis, and finally an analysis of whether there is any justification from the defendant to why an alleged plan was conducted as it was.

In order to show that there indeed is a case of predation, below-cost pricing must be established. ATC and AVC are at this stage too imprecise, so we need to use better-calibrated standards. I suggest, the incremental cost standard with AAC and LRAIC instead of AVC and ATC respectively. These standards are superior to the ones used in both the Areda-Turner test as well as the AKZO test since AAC they give a more realistic comparison. AAC both excludes sunk costs incurred before the predation takes place, as well as gives a better approximation to the MC which the AVC actually tries to mimic. LRAIC is preferred due to also including research and development costs, even if those costs were incurred before the predation took place. These cost standards do not only make the average case more realistic, but it actually gives courts the possibility to assess industries with high fixed and low marginal costs, such as intellectual property industries.

418 Compare with Brooke Group, chapter 2.2.3.3 and chapter 5.3.1.
419 See chapter 4.5.2 and chapter 6.2.
Finally, coming to our last step, we give the defendant not only a chance, but also a framework in which it has the opportunity justify its business and its choices with an efficiency defense. This is the balancing act of the test where the anti-competitive claims are weighed against the pro-competitive justifications to see what the outcome would be. A thorough reasoning needs to take place to make sure that the defendant’s predation actually is despicable, and that there are no justifications. This is when, for instance intent can steer the verdict from non-predation to predation when the costs are in between LRAIC and AAC thresholds. However, it would not be easy to rationalize prices below the AAC threshold. There are also many other cases when there are general welfare advantages involved that would substantiate the conduct.

**Final words**

The first stage can be seen as “information to the public”, or simple guidelines for firms. They should know that if those are not fulfilled, they are not doing anything that can be deemed unlawful. The courts can therefore disregard that stage. The real test for the courts to assess entails step 2 and step 3. If those two steps are performed, the court should with a high enough certainty be able to distinguish whether predatory prices are set by a firm or not.

### 6.2.2 Technological tying – suggested approach

When assessing tying we will proceed in a similar to what we did in chapter 6.2.1 in regards to predatory pricing, however we will naturally have to modify our approach somewhat. The aim is also here to avoid injury to consumers, and this test will still contain a threshold test and a rule of reason aspect. The threshold helps us to screen out the unfounded claims that might appear, to make the justice system more effective.

![Flowchart](Image)
Step 1 – Market analysis
In this first stage we review two conditions that need to be met for tying to even be considered to be unlawful:

(1) market power; and
(2) separate products.

If the firm has no real market power (in the tying market) there is no real harm, as the consumer can choose another product without being leveraged by the dominant firm. The second one is that it needs to be separate products. If two products are integrated in the sense that you cannot buy any of the products separately, then the point of leveraging is moot, and it is just considered to be a product improvement. If these two conditions are not fulfilled, the conduct is not to be classified as exclusionary. However if they persist, we can move to step 2.

Step 2 – Strategic analysis of anti-competitive elements
In this step, an in-depth strategic analysis is needed to see if tying can compose a viable threat. An analysis is made on the tying market to assess whether there is a plan for foreclosure in the tied market.

Also here there are several factors to take into consideration. The central question here is if leveraging is done in any way by the dominant firm. Is the dominant firm trying to move its market power from the tying market to the tied market? First of all, tying is often performed together with other exclusionary conduct, for instance exclusionary contracts, and these aspects need to be included in the overall evaluation. These additional abuses are not part of the actual tying, but if they involve any exclusionary characteristics like threats or promises, they should still be taken into consideration when evaluating the lawfulness of the tying. The foreclosure effect is central, but the question is whether there was any form of coercion involved in the tying; or rather whether the consumer got a chance to choose. The existence of network effects also makes tying more powerful, which may affect the assessment. Lastly, entry barriers also play a role. If foreclosure is a risk, high entry barriers makes the abuse even more severe.

An example of an efficiency defense could be based on the strategic investments, where investments which make no economic sense are performed, in order to create fabricated grounds to why something is efficient.

This step involves gathering the detrimental aspects of a behavior (“the minuses”), which is what the case will be based on.

The plaintiff bears the responsibility to prove this, and if successful in proving this, the analysis moves on to step 3.

Step 3 – Efficiency analysis
The third stage, showing that there is justification for certain anti-competitive (side-)effects, bears great weight in technological tying, as improvements are the pinnacle of innovation.

These defenses can be based in something as trivial as the fact that a product improves, external efficiency gains as a positive development for society, or other types of positive justification. They should in a sense be objective, and not based on a synthetic argumentation. For instance illegally
tying two products together knowing that it is wrong, and then claiming that the untying has unreasonable costs is not valid argumentation. The assessment should be done ex ante. Lastly in the efficiency analysis it is important that the benefit it might bring should not be able to be fulfilled in another way; if a more efficient way is available, that is not in any way to the detriment of competition, tying is not allowed. It is naturally up to the defendant to prove the existence of efficiency justification.

An example of an efficiency defense could be either direct bonuses to consumers, or based on a pricing strategy. This pricing strategy on for instance a two-sided market could be shown to not apply too high prices on the tying market (the platform market) in addition to giving consumers the choices they want in the biggest possible way, and therefore show that it has less incentive to tie on the platform (the tied market). 420

This step involves gathering the beneficial aspects of the behavior (“the pluses”) if there are any, to see if there might even so be a meaning with the conduct. If there are none, the tying can easily be considered unlawful (for instance unfounded or fictitious factors). However, if there are beneficial aspects a weighing is needed, and we move to step 4.

Step 4 – Rule of reason analysis

When the anti-competitive and pro-competitive arguments are presented, the court needs to do an assessment to see whether the arguments in favor, or against lead to the most efficient outcome.

It is quite clear that there is a difficulty in assessing and evaluating the two types of arguments. Keep in mind that we, when analyzing tying, as opposed to the analysis of predatory pricing, do not have any prices or numbers to work with, which might give a fictional sense to it, however by using economics we have to make some estimations, and by using the strategic reasoning we can try to assess, for instance what the worst case scenario would be, or figure out what the firms were trying to achieve by their actions. This is the game theoretical framework, that will assist the courts to make strategically sound choices which will give structure and aim to an assessment.

Just like the predatory pricing test the first stage in the tying test is merely guidance for the market, and perhaps enforcement agencies. If the case is actually picked up by the court, it can most certainly start with stage 2, as the two conditions in any case need to be discussed in the analysis.

420 An example could be an integrated antivirus program that comes with an OS, which has the benefit of transactional costs (no need to search for one), the fact that you know (and trust) the company and the consumers avoid the risk of downloading malware in search for an antivirus program. If the consumer gets the chance to opt-out there should be no coercion involved either. The antivirus program could also be a fully integrated part of the OS, but the efficiency argument might get lost due to antivirus programs having tendencies to use a lot of computer resources. If no additional circumstances show intent to abuse, these could be examples of valid efficiency defenses.
6.3 Final words

Antitrust is right now in a very peculiar situation. With the new economic realities the world, and antitrust with it is becoming more complex. Economics is gaining importance, but at the same time problems have been identified with the old economic models used to assess antitrust thus far.

There is a general desire for new economic models that can solve these harder cases that have occurred, but the irony in the situation is that judges refuse to use the refined models because they are too complex.

The Areeda-Turner rule can no longer solve all cases we throw at it, and the per se rule of tying is also abandoned. What we are left with is a rule of reason – I argue for both abuses – which at the moment is, either not structured, and some who do structure it, do so on a basis other than economics. If we want an efficient, and still foreseeable development of the more complex antitrust we need to look at the strategic reasoning of game theory and apply it.

We do not need to take it as far as to have firms argue in the notions of mixed-strategy Nash equilibria and present the defense that an alleged abuse is not unlawful because \((1-p)\) is bigger than \((p)\) in courts, but we can still utilize the knowledge of this. What is presented in court simply bears more weight if sound economic strategy is backing a claim, however what is in fact presented in court is a story. And arguing why one story is more probable than another is what lawyers have done for hundreds of years, and judges have assessed these stories for just as long.
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