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2010

Online at <https://mpra.ub.uni-muenchen.de/33810/>  
MPRA Paper No. 33810, posted 30 Sep 2011 17:49 UTC

**GAMES JUDGES DON'T PLAY:  
PREDATORY PRICING AND STRATEGIC REASONING IN US ANTITRUST**

Nicola Giocoli\*

The paper analyzes the last three decades of debates on predatory pricing in US antitrust law, starting from the literature which followed Areeda & Turner 1975 and ending with the early years of the new century, after the *Brooke* decision. Special emphasis is given to the game-theoretic approach to predation and to the reasons why this approach has never gained attention in courtrooms. It is argued that, despite their mathematical rigor, the sophisticated stories told by strategic models in order to demonstrate the actual viability of predatory behavior fail to satisfy the criteria which guide the decisions of antitrust courts, in particular their preference for easy-to-apply rules. Therefore predation cases are still governed by a peculiar alliance between Chicago-style price theory – which, contrary to game theory, considers predatory behavior almost always irrational – and a Harvard-style attention for the operational side of antitrust enforcement.

JEL CODES: B21; K21; L41

WORD COUNT: 30,056

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I thank Sylvie Rivot and Herrade Igersheim for having invited me to present the paper as the Séminaire Cournot 2010 at the University of Strasbourg. I am also grateful for their comments to Francesco Guala, Ivan Moscati and the other participants to a MicroCafé Seminar at Bocconi University. Robert T. Masson provided helpful historical information. Salar Ghahramani, Alain Marciano, Robin Paul Malloy and Maurizio Mistri also commented on the paper at the STOREP 2010, HISRECO 2010, HES 2010 conferences. I am of course responsible for any remaining mistake.

# GAMES JUDGES DON'T PLAY: PREDATORY PRICING AND STRATEGIC REASONING IN US ANTITRUST

[N]o mere fact ever was a match in economics for a consistent theory  
(Milgrom & Roberts 1987, 195)

Strategic theories of predatory pricing are pristine theoretical existence proofs  
(Elzinga & Mills 2001, 2493)

We shall take into account of the institutional fact that antitrust rules are court-administered rules. They must be clear enough for lawyers to explain them to clients. They must be administratively workable and therefore cannot always take account of every complex economic circumstance or qualification  
(then-Judge Stephen Breyer in *Town of Concord v. Boston Edison Co.*, 915 F.2d 17, 1<sup>st</sup> Circuit, 1990, at 22)

## Introduction

At the Paul Samuelson Memorial Session during the 2010 AEA meeting, his colleague and friend Robert Solow recalled that, when challenged by a skeptical MIT engineer to state a proposition in economics that was true but not obvious, Samuelson named the principle of comparative advantage. What if he had answered “predatory pricing”, i.e., the proposition that by lowering price a firm may harm competition and consumers? Would that be a legitimate answer?

That the notion of predatory pricing (PP hereafter) is far from obvious, and perhaps even counterintuitive, is a no-brainer, given that a price reduction is normally deemed beneficial for consumers and a sign of healthy competition. But is it also true? This requires answering two different sub-questions. First, is it possible that a price may indeed be so low that it harms competition and consumers? Second, is it possible that a profit-maximizing firm may rationally decide to charge such a low price?

The MIT engineer’s reaction to Samuelson didn’t go on record, but even if he agreed that the comparative advantage principle was at the same time a true and not obvious proposition, he might have added a third requirement, namely, that the proposition also had practical relevance (which in that very case it clearly had!). In the case of PP, and assuming a positive answer to the previous sub-questions, this would amount to asking whether actual firms ever undertake predatory behavior

and thus whether PP is a real world phenomenon or just a theoretical construct. That this third query is at least as relevant as the other two is apparent since PP has to do with a very concrete activity like antitrust enforcement. Indeed, the century-long, and still ongoing, debate about PP has always focused on all the three questions and on the different, sometimes conflicting, answers that have been given along the years by economists, law scholars and courts.

The goal of the present paper is to focus on the most recent phase of the debate, namely, from the publication of the highly influential Areeda & Turner 1975 to the beginning of the new century.<sup>1</sup> This is an extremely interesting period under all respects – theoretical, legal and historical – because it witnessed substantial changes in the way the three above-mentioned questions have been answered by economists, law scholars and courts in the US. In particular, I will cast light on the controversial relation between strategic analysis and law enforcement: in a nutshell, when, how and why has modern game theory influenced the way US courts apply antitrust law to PP cases, if ever at all? I find this issue especially interesting not only per se, i.e., as a crucial ingredient in any historical reconstruction of the evolution of US antitrust law and economics, but, more generally, also because it may teach a useful lesson on the kind of features which make a formal economic model more likely to have an impact on the real world, via the reception of its main outcomes and prescriptions by real world agents like judges and courts. This in turn may help foresee the future pattern of antitrust enforcement by US courts, including the Supreme Court, especially on related subjects like the “hot” issue of predatory bundling.

The content of the paper is as follows. The first section contains a summary of the pre-1975 debate on predatory pricing. Section 2 deals with the first breaking point in our story, namely, Areeda & Turner 1975 and the reactions to it. The third and fourth sections cover the new game-theoretic methodology and the related new PP stories developed after 1982. Section 5 is dedicated to whether antitrust courts should follow the strategic approach to PP. The sixth and seventh sections cover more strictly legal ground and deal with the second watershed in our narrative, namely, the US Supreme Court’s *Brooke* decision which in 1993 effectively barred the strategic approach. Section 8 focuses on a recent, and largely unsuccessful, effort to renew the courts’ interest in strategic predation. Finally, the ninth section takes on again the issue of why judges and courts have refused to “play the games” economists have bestowed them to investigate PP cases.

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<sup>1</sup> I have covered the earliest phases of the debate in AUTHOR 2009.

## §1. From the “wilds of economic theory” to a “meaningful and workable” rule

“The predatory price-cutter is one of the oldest and most familiar villains in our economic folklore” (Koller 1971, 105). This folklore dates back to a couple of early 20<sup>th</sup>-century famous antitrust cases, such as *Standard Oil* and *American Tobacco*. Both cases featured a big firm, the villain in the story, charged of pricing down to a point where no competitor could survive, thereby becoming a monopolist. These and the other cases of predatory pricing (PP) fell either below the Sherman Act §2’s prohibition of monopolization or below the Robinson-Patnam Act’s ban of price discrimination.

For more than sixty years, US antitrust courts dealt with alleged predation episodes applying a common narrative well captured in the following quotation:

“The pre-1975 legal standard for predatory pricing hinged on two factors – unfair use of pricing power against new entrants or smaller firms, and protection of long run market competitiveness viewed primarily in terms of market structure. Economic efficiency was not specifically articulated as a legal policy goal. [...] Unfairness was emphasized under the Robinson-Patnam Act, while structural competitiveness was stressed under the Sherman Act.”

(Brodley & Hay 1981, 765-6).

Thus, the two basic ingredients of any allegation of predatory behavior had to be, first, the existence of the structural requirement of *market power*, and, second, the *intention* of unfairly exploiting a price reduction to increase or consolidate that power. Market power and predatory intent were the necessary features that antitrust courts had to detect in order to validate an accusation of predatory behavior.

US courts went on for decades inferring predation from dubious proofs of market power and exclusionary intent. If both requirements were met, a *per se* prohibition applied, leading to the automatic condemnation of the alleged predator. No special consideration was given to the relation between price and costs, i.e., courts did not feel obliged to check whether the low price was still above the predator’s costs and thus whether the exclusionary effect – if any at all – could only work against less efficient, higher cost rivals, for whom such a price might well be below cost (see e.g. Kovacic 2007, 44). Condemning a firm for predatory behavior in that case would of course generate an anti-competitive, inefficient outcome, and would amount to a blatant protection of inefficient competitors, rather than of competition. Worse than that, an excessively strict enforcement of PP violations would risk, to use modern IO jargon, *chilling genuine competitive behavior*, i.e., either condemning or discouraging normal competitive behavior in terms of welfare-improving price cuts.

Indeed, the ghost of killing “good” competition has haunted the whole history of anti-PP enforcement and has been the underlying argument of all its critiques.

The traditional legal approach was challenged in 1958 by a young Chicago scholar, John McGee, who set out to establish two simple results: first, that by applying standard price theory it was possible to demonstrate that the classic story of PP was untenable, and, second, that a price-theoretic assessment of the factual evidence in the most famous PP case to date, the 1911 *Standard Oil*, demonstrated that the condemnation of Standard Oil for predatory behavior had been largely groundless. McGee’s results laid the ground for the Chicago approach to PP, whose central idea – epitomized by Robert Bork’s classic presentation<sup>2</sup> – has since then been that profitable price cutting is at best a very infrequent, and probably an impossible, business behavior. It follows that, in the words of another authoritative member of the Chicago School, “[a]ny attempt to administer a rule against predation entails a significant risk of condemning the outcome of hard competition. [...] If there is any room in antitrust law for rules of *per se* legality, one should be created to encompass predatory conduct” (Easterbrook 1981, 336-337).

Despite being essentially fact-based, the most influential part of McGee 1958 was the theoretical one. What he and his generation of Chicagoans achieved was to establish price theory as the indispensable tool to check the validity of every story told by antitrust courts and agencies. In the specific case of predation, price theory provided a pair of good reasons why the usual stories were probably unsound. First, the observation that the predator usually suffered larger losses than the prey made it necessary for any dominant firm entertaining predation to have a “long purse” at his disposal, but, on the other side, also made it possible for any prey to resist predation thanks to the financial help of outside creditors or customers. Thus, no theoretical grounds could exist for a PP allegation, unless both the actual existence of the predator’s “deep pockets” and a specific reason for the prey’s impossibility of finding support in capital markets were explicitly proven. Second, high barriers to entry were also required in order to protect the predator’s recoupment phase from the possible arrival of new competitors or the re-entry of old ones. Again, the actual existence of these barriers had to be demonstrated if one wished to raise a convincing predation charge. Hence, price-theoretic analysis naturally led to an alternative story, one where PP was surely a rare and, perhaps, even an irrational strategy, so much so that price cuts and other allegedly predatory behaviors should always be considered as normal business practices, favorable to competition and market efficiency.

Yet, US antitrust courts did *not* follow McGee & c. As it turns out, the 1958 paper, so often quoted and debated in burgeoning legal and economic literature, was completely ignored by courts

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<sup>2</sup> See e.g. Bork 1978, Ch.7.

dealing with actual PP cases. Lacking an explicit endorsement by the Supreme Court, no lower level court dared raise doubts over the traditional legal stories and the attached *per se* prohibition. The loose standards of market power and predatory intent thus survived within a legal environment which traced the rationale for condemning PP not in protecting competition or promoting efficiency, but rather in defending a vague notion of *fairness* in the marketplace (cf. Brodley & Hay 1981, 792).

That fairness, rather than efficiency, be the real yardstick was apparent in the 1967 Supreme Court's majority opinion in *Utah Pie*, not without reasons considered "the most anticompetitive antitrust decision of the decade".<sup>3</sup> Fairness dictated that defendants in that case *had* to be convicted for price predation. Despite its being the *leader* in the Salt Lake City market of dessert pies, the single-plant, family-owned business Utah Pie deserved antitrust protection from the competition of the defendants, three big food conglomerates whose prices in Salt Lake City were lower than in the rest of the country, precisely because the latter were *big* food conglomerates, while the plaintiff was a *family-owned* business! As the dissenting Justice Stewart put it, the decision entailed that "...Utah Pie's monopolistic position was protected by the federal antitrust laws from effective price competition" (*Utah Pie*, at 706): the archetype of using antitrust law to defend a competitor, rather than competition.

*Utah Pie* is just the most prominent example of how US courts went on mishandling PP cases during the 1960s and 1970s, by still focusing on vague notions of "harm to competitors", "predatory intent" and "ruinous competition", while paying little attention to efficiency issues. Another Supreme Court's decision mirroring the same legal attitude came one year earlier, in the *Grinnell* case.<sup>4</sup> There the Court declared that Sherman Act §2 violations required two elements, namely, the possession of monopoly power and <<...the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.>> (*Grinnell*, at 570-1). Again, a vague notion of "willfulness" was crucially called into play. If, as customary, we take "willful" as synonymous of "intentional", it is hardly surprising that the application of the *Grinnell* dictum has caused troubles to US courts since then: indeed, *every* firm *willfully* acquires or maintains its market power, that is to say, even when it does so via "business acumen" or a "superior product" (Werden 2009, 68-9).

Both *Grinnell*, with its focus on intent, and *Utah Pie*, with its emphasis on the defense of competitors rather than competition, were symptomatic of the distance separating that branch of antitrust law from proper economic analysis. To cap all that, came the *Topco* decision,<sup>5</sup> where the

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<sup>3</sup> *Utah Pie v. Continental Baking Co.*, 386 U.S. 685 (1967). The negative judgment is in *Bowman* 1975 [1967], 455.

<sup>4</sup> *United States v. Grinnell Corp.*, 384 U.S. 563 (1966).

<sup>5</sup> *United States v. Topco Assocs. Inc.*, 405 US 596 (1972).

Supreme Court put on paper a real anathema against theoretical economics: <<Should Congress ultimately determine that predictability is unimportant in this area of the law, it can, of course, make *per se* rules inapplicable in some or all cases, and *leave courts free to ramble through the wilds of economic theory* in order to maintain a flexible approach.>> (*Topco*, 612, emphasis added). This jurisprudential attitude led to a very high percentage of convictions in predatory cases at federal courts level. According to Bolton et al. (2000, 2253), until the mid-1970s three out of four PP trials at federal level ended with the defendant's conviction.<sup>6</sup>

Such an outcome was matched in the same period by US federal agencies' aggressive behavior against price cuts made by dominant firms. As it turns out, the Department of Justice did not hesitate to bring *criminal* charges against alleged predators during the whole 1960s; still in 1977 the US Attorney General could announce in a public address his willingness to undertake criminal enforcement against PP aimed at destroying competitors.<sup>7</sup> Hence, it must be recognized that the traditional hostility of US antitrust courts and agencies against those price cuts made by dominant firms remained untouched well into the 1970s, as if McGee 1958 had never been written.<sup>8</sup>

Yet, McGee 1958 *had* been written, and, following it, also a whole bunch of new economic literature where, by making explicit use of price theory, either McGee's results had been strengthened or the possible rationality of predatory behavior had been defended in much sounder terms than those used by US courts, that is to say, via the development of theoretically sophisticated stories which showed that predation might well be profitable.<sup>9</sup> To the eyes of those scholars who did believe that PP potentially was a serious offense, but who, at the same time, did not want the *per se* illegality of predation to turn into a *de facto* prohibition of every legitimate kind of price competition, the situation in the early 1970s was troublesome. On the one side, we had a populist application of the PP offense by antitrust courts, founded upon very weak legal stories which had led to a list of wrong or, at least, very debatable rulings; on the other, we had several price-theoretic stories whose implications ranged from Chicago's suggested abolition of the predatory offense to the requirement that courts be capable of verifying the applicability of one of those sophisticated stories where PP actually turned out being rational business behavior – a requirement whose obvious consequence was to increase the risk of legal mistakes by courts unable “to ramble through the wilds of economic theory”.

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<sup>6</sup> In an oft-quoted study, Koller 1975 [1971] listed 123 federal PP cases, of which 95 had ended with the condemnation of the predator.

<sup>7</sup> Attorney General Griffin Bell, quoted by Kovacic 2007, 45.

<sup>8</sup> The first decision by a US court ever to mention McGee 1958 has been *Matsushita* in 1986, on which see below, §6.

<sup>9</sup> This literature is analyzed in AUTHOR 2009.

The deadlock was broken by two Harvard law scholars, Donald F. Turner and Phillip E. Areeda, who published a paper in the 1975 *Harvard Law Review* which became an instant classic.<sup>10</sup> The main idea was that, rather than struggling to reconstruct the plausibility of one or the other predatory stories available in the literature, courts should be required to apply a straightforward rule and then draw the consequences of the result. Thus, in place of a complex and increasingly controversial doctrine, Areeda & Turner suggested a simple, bright-line principle, directly derived from basic price theory. The rule was designed to be discriminatory enough to allow the identification of real predatory behavior and avoid the risk of chilling genuine competition. In the authors' words, <<[i]n this paper we will attempt to formulate meaningful and workable tests for distinguishing between predatory and competitive pricing by examining the relationship between a firm's costs and its prices.>> (Areeda & Turner 1975, 699-700). Thus, their rule aimed, on the one side, at giving a specific content to the otherwise generic and arbitrary expression "below cost pricing" which was often encountered in PP cases and, on the other, at being "meaningful and workable", i.e., easily applicable by a court. As I argue in more detail below (see §7.1), the latter goal constitutes the trademark of the Harvard approach to antitrust. As Justice Breyer put it in his tribute to Donald Turner, Turner's <<basic point of view>> was that <<[a]ntitrust policy cannot rest upon a laundry list of fifty or a hundred different factors.>>. In order to achieve its main goal, namely, the protection of the competitive process, law enforcement had rather to be based on <<...soundly based rules using a few key factors that bench and bar can understand and that courts and agencies can administer.>> (Breyer 1996, 726).

But which of the various notions of cost should become the threshold value for the new rule? In Areeda & Turner's short run, static, linear cost model, the answer came directly from price theory: the relevant notion had to be *marginal cost*. Hence, no price equal or greater than short run marginal cost could ever be considered predatory, while any price below that level should be presumed predatory (ibid., 711-2).<sup>11</sup> Yet, this version of the rule clashed with the authors' operational purpose: actual courts would in fact find themselves in troubles if called to estimate a firm's marginal cost. Keeping in mind their goal of being "meaningful and workable", Areeda & Turner

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<sup>10</sup> At the time Donald Turner was still the leading figure of the duo: a Harvard PhD in economics (in 1947) and law professor from 1954 to 1979, he authored with Carl Kaysen an influential handbook on antitrust law and economics (Kaysen & Turner 1959) and headed the Antitrust Division in the US Department of Justice from 1965 to 1969, where he created the position of Special Economic Assistant to the Assistant Attorney General, the top job in US federal administration for an antitrust economist. With Phillip Areeda (another Harvard law professor and outstanding antitrust scholar), he also authored the monumental Areeda & Turner 1978. Details on Areeda and Turner's lives and contributions can be found in the Winter 1996 memorial issue of the *Antitrust Bulletin*.

<sup>11</sup> Note that the rule directly aimed at distinguishing pro-efficiency from anti-efficiency price cuts (every price below marginal cost being necessarily welfare-reducing), but neglected the issues of whether predation was profitable and whether it was a real world phenomenon (our second and third questions in the Introduction). In other words, Areeda & Turner 1975 took it for granted that the court had an adequate reason to undertake the inquiry and apply the rule. See on this Easterbrook 1981, 276.

offered as a solution to replace in actual litigations marginal cost with a proxy, *average variable cost* (AVC). Hence, the final version of *Areeda & Turner rule* (ATR henceforth) sounded like this:

“... we conclude that: (a) A price at or above reasonably anticipated average variable cost should be conclusively presumed lawful. (b) A price below reasonably anticipated average variable cost should be conclusively presumed unlawful.” (ibid., 733).

It was in this version that, to paraphrase Keynes’s famous dictum, the ATR “conquered [US courts] as completely as the Holy Inquisition conquered Spain” (Keynes 1973 [1936], 32).

And it is from this conquest that our narrative proceeds.

## §2. Playing by the rule

**2.1** It is hard to say whether the ATR had a larger effect on US antitrust courts or on antitrust literature, as in both cases it was a huge one. As far as courts are concerned, the ATR is a rare instance of an economic idea which immediately and significantly affected law enforcement. The rule radically changed the courts’ attitude towards PP: from a percentage of victories in PP litigations of over 75% (as calculated by Koller 1975 [1971]), plaintiffs’ success rate fell to less than 20% in the period 1975-1993, and in particular to 0% in the five years immediately following the publication of Areeda and Turner’s paper – that is to say, no plaintiff’s victory in PP cases went on record in 1975-1980.<sup>12</sup> Just to mention a few more data, Areeda & Turner 1975 has been quoted by more than 100 antitrust courts between 1975 and 2000,<sup>13</sup> and six of these courts did not even let the *Harvard Law Review*’s ink dry before applying the new rule, as they did so between early 1975 and mid-1977!<sup>14</sup> Thus, it is an euphemism to say that ATR was swiftly embraced by US courts and it is hardly an exaggeration to claim that the rule created a situation of *de facto* per se lawfulness of every price cut, turning PP litigations, as a commentator put it, into “a defendant’s paradise” (Williamson 1977, 305).

Why did US courts so eagerly endorse the ATR? A preliminary answer at this stage of the paper may be found in the above-mentioned dire straits of PP enforcement in the late 1960s - early 1970s. Attacked by many fronts for the theoretical weakness – if not outright inconsistency – of the stories behind their application of antitrust law to PP cases, courts seemed all too happy to adopt a simple,

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<sup>12</sup> See Bolton et al. 2000, 2253-4.

<sup>13</sup> Actually, 109 times out of the 448 *significant* PP cases in the same period (the term “significant” meaning those cases where predation is referred to in the case overview or core terms). The pct. of hits is a striking 24%! Source: Lexis.

<sup>14</sup> The rule immediately affected the DOJ as well: already in 1976 the Department dismissed one big antitrust case precisely because it fell short of satisfying the marginal/average variable cost test: see Williamson 1977, 285, fn.5.

highly operational rule which exhibited the prestigious label of price theory, itself a warranty that, apart from material mistakes in calculating prices and costs, no decision based on it could ever be accused of being devoid of solid theoretical foundations. Hence, the immediate success of ATR revealed a clear preference by antitrust courts for rule-based decisions over story-based ones.<sup>15</sup>

**2.2** The ATR impact on the literature was, if possible, even stronger and faster than in courts. A fierce debate was instantaneously sparked by Areeda & Turner's paper, with big names involved, such as Mike Scherer, Richard Posner, Oliver Williamson, Robert Bork, Dick Schmalensee, Alvin Klevorick and William Baumol, all of whom published relevant contributions between 1976 and 1979.<sup>16</sup> These were followed in the next couple of years by survey articles on PP theory and policy, such as McGee 1980, Brodley & Hay 1981 and Easterbrook 1981. It goes beyond the limits of the present paper to analyze this post-ATR literature in detail. Thus, I will just single out its main threads and outcomes.

As far as the former are concerned, two major issues were tackled. First of all, the rule vs. story dichotomy, as some of the contributors, though critic of Areeda and Turner's specific solution, embraced their overall goal of achieving a "meaningful and workable" rule capable of replacing all the dubious predatory stories told by pre-1975 courts. On the contrary, other participants to the debate were against what they considered a gross simplification of not-so-simple an issue, and pressed hard for a return to a story-based approach, i.e., in antitrust jargon, for making recourse to a full *rule of reason* inquiry. A third position was held by those scholars who argued that PP was hardly an issue at all and thus were in a sense neutral with respect to the rules vs. stories debate as they believed that every rule or story, if rigorous enough, would inevitably reveal that predation could never be rational business behavior.

The champion of the rule of reason approach was Mike Scherer who also happened to be the first to react against Areeda & Turner's paper. This is remarkable because Scherer also came from Harvard University, so what we have here is an instance of an Harvard antitrust economists dismissing an argument by two prominent Harvard antitrust lawyers. Maybe the inf feud also had to do with the defense of the economists' own territory,<sup>17</sup> but the main reason behind it was Scherer's prescience of the inevitable outcome of ATR in courts, namely, the *de facto* legalization of every price cut by market leaders – something no supporter of Harvard's structure-conduct performance mantra could digest. Hence, he argued that it was both unrealistic and analytically wrong to apply a

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<sup>15</sup> We will return to this issue below, §7.

<sup>16</sup> Scherer 1976; Posner 1976, Ch.7, and 1979; Williamson 1977; Bork 1978, Ch.7; Schmalensee 1979; Joskow & Klevorick 1979; Baumol 1979. Remarkably, most of this literature appeared in law, not economics, journals.

<sup>17</sup> Indeed Scherer began his attack by harshly complaining that Areeda and Turner simply did not know price theory enough to offer a rigorous argument (Scherer 1976, 869).

simple short-run price cost rule for assessing whether a price be socially undesirable and predatory. Only a complete examination of facts, intent and market structure<sup>18</sup> – i.e. a full-blown rule of reason methodology – could save courts from making wrong decisions.

In their reply, Areeda and Turner pointed out that long run welfare effects – of the kind which had to be evaluated for applying the rule of reason – are intrinsically speculative and indeterminate, so much so that no suitable administrable rules could be formulated to give them recognition. Scherer’s checklist of relevant features to be assessed in order to validate a price cut could not be realistically used either *ex ante* by a monopolist wishing to determine the legal floor for its pricing policy or *ex post* by a court. Hence, in the very spirit of their 1975 paper, they concluded that <<Scherer’s constructs for determining what price will maximize long-run welfare have no operational utility for antitrust law purposes. [...] We adhere to our position that a test which is reasonably determinable and which plainly maximizes short-run welfare is the most sensible solution.>> (Areeda & Turner 1976, 897).<sup>19</sup>

Scherer had failed to understand that Areeda and Turner never intended to deny that, say, even an above-cost price set by a dominant firm might well be harmful for competition and welfare. Their whole point was that, given the institutional limitations of courts and agencies, there was no reliable way to condemn such behaviour without chilling pro-competitive conduct. Indeed, calling into play as an essential ingredient of law enforcement elements like the defendant’s intent <<...was precisely the evil that Areeda and Turner were seeking to avoid, and the evil committed by earlier decisions...>> (Hovenkamp 1996, 835).

Yet Scherer’s suggestion found more favorable reception in authors such as Dick Schmalensee or Alvin Klevorick. The former argued that, absent any simple predation model with a clear test, the only two robust approaches to PP were either the “hands off”, Chicago-style one – i.e., to drop the conduct from the list of proscribed practices – or Scherer’s rule of reason, this being <<... the only one economically defensible general policy choice>> (Schmalensee 1979, 1027). The latter, in an influential paper with Paul Joskow, suggested a two-tier structuralist rule of reason approach, premised on the circumstance that no straightforward rule based only on behavioral considerations

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<sup>18</sup> <<[A] thorough examination of the factual circumstances accompanying the monopolist’s alleged predatory behavior, how the monopolist’s officials perceived the probable effects of its behavior (i.e., intent), and the structural consequences actually flowing from the behavior>> (Scherer 1976, 890).

<sup>19</sup> Curiously enough, these critiques were echoed by Chicago champion Robert Bork, who deemed Scherer’s proposal simply unworkable. In reference to Scherer’s list of features on which courts were called to inquiry, Bork claimed that: <<There could hardly be drawn a list of criteria less fit for judicial employment. Those items on the list that would not be altered by the monopolist’s knowledge of the rules are unknowable by either courts or economists. It is a mistake to suppose that all of the questions posed by in abstract geometric representation of demand and cost phenomena can usefully be addressed in a court proceeding.>> (Bork 1978, 155). In his rejoinder to Areeda and Turner, Scherer acknowledged that speculative elements were inescapable in his suggested procedure, but also remarked that speculation was not new to antitrust adjudication, nor were the information requirements as big as implied by Areeda and Turner’s reply (Scherer 1976b, 903).

(such as the ATR, but also the rules by Williamson or Baumol, on which see below) might provide a proper means for distinguishing among different market situations and thus minimizing judicial errors. Only their two-tier rule of reason – which required a Harvard-style structural analysis in the first stage and a behavioral inquiry in the second stage, but only for those cases where structural analysis yielded a reasonable expectation that the predator might have actually exploited its monopoly power – could combine a sufficient flexibility in response to market specificities and the minimization of implementation costs (Joskow & Klevorick 1979, 243). Moreover, their approach looked consistent with one of the latest Supreme Court decisions on the matter at that time, namely, the highly debatable *Grinnell* test which, as I said before, required assessing, first, whether the firm had monopoly power in the relevant market and, second, whether it had willfully acquired or maintained that power “as distinguished from growth as a consequence of superior product, business acumen or historic accident”.

Finally, this view found another authoritative endorsement in the conclusions of Joseph Brodley and George Hay’s 1981 survey on PP.<sup>20</sup> While acknowledging that <<[p]rior to 1975, predatory pricing was a loosely structured, somewhat opaque area of law in which the generality of the legal standard left room for the exercise of judicial discretion. The legal decisions, which failed to reflect a systematic use of economic theory, were at least partially influenced by the perceived fairness or unfairness of the dominant firm’s pricing policies...>> (Brodley & Hay 1981, 792), a few years’ experience with ATR had convinced them that, due to <<[t]he adoption of a marginal cost pricing rule by several courts [...] ...the range of judicial discretion was seriously confined.>> (793), so much so that <<...consistent litigation losses by plaintiffs demonstrated that for all practical purposes a predatory pricing plaintiff could not meet the standard imposed by the marginal cost rule. [...] [The rule] holds dominant firm pricing per se legal.>> (ibid.). The outcome was unacceptable both because <<[m]ore recent economic literature [...] fails to demonstrate a consensus justifying the dismissal of predatory pricing as irrational behavior.>> (ibid.)<sup>21</sup> and because <<...the courts did not purport to adopt the marginal cost pricing rule as a device for eliminating the predatory pricing offense and establishing the per legality of dominant firm pricing. On the contrary, they adopted it without explicitly considering the drastic effect it would have on legal decisions.>> (ibid.). Their conclusion once more endorsed a rule of reason solution, as the authors provocatively asked: <<...do not all of the preceding considerations suggest a renewed emphasis on the values and insights inlaid in long-standing judicial experience, built upon case-by-

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<sup>20</sup> Hay was chief economist at the US Department of Justice from 1973 to 1980. He is credited with having played a major role in convincing the DOJ to hire “real” (i.e., PhD) economists in order to apply “real” economic theory to antitrust issues (R.T. Masson, personal communication, April 21, 2009).

<sup>21</sup> On the specific literature summoned by the authors in this passage, see below.

case adjudication, and on the advantage of incremental policy change, achieved gradually and with opportunity for self-correction?>> (794).

The reason I have given so much room to the Scherer et al.'s position in the debate is that their views foreran one of the main outcomes of the subsequent game-theoretic literature on predation, namely, the impossibility of identifying a so-called "bright line standard", i.e., a simple rule capable of discerning with high reliability when a given price/quantity pair set by a firm could be deemed predatory. As I explain below, the application of strategic reasoning to PP forces the plaintiff in any given case to devise a plausible story explaining why the available facts constitute evidence of predatory behavior. Though game theory suggests that all plausible PP stories have to fall within one or the other of a few general categories, every court will have to examine the soundness of the specific story offered by the plaintiff and thus to adopt a rule-of-reason kind of scrutiny. In short, Scherer's rule of reason and game-theoretic reasoning share a hostility towards the application of simple, mechanical rules and a clear inclination for careful, case-by-case analysis.

**2.3** Even the opposite view in the post-ATR debate is more interesting for its background and general implications than for the specific suggestions. This was the position of those who remained faithful to Areeda and Turner's message, yet argued for a different, better rule than the ATR. The list of alternative rules is quite long, the main ones being those suggested by the likes of Richard Posner (who argued that, since the real problem of PP was when a less efficient predator killed a more efficient rival, a price should be automatically considered exclusionary if and only if set at a level calculated to exclude from the market an equally or more efficient competitor: see Posner 1976, 188)<sup>22</sup>, Oliver Williamson (who focused on entry deterrence and claimed that an output, rather than a price, rule made more economic sense, in particular a rule forbidding a market leader to expand its short run output following a rival's entry, regardless of the price being above AVC: see Williamson 1977, 334) and William Baumol (whose quasi-permanent price cut rule left the market leader free to cut prices following entry, but forbade him to re-raise the price in case the entrant left the market: see Baumol 1979, 4).<sup>23</sup> What is really remarkable in those rules is not their specific content, but the kind of analysis which supported them. All the authors in this stream of literature recognized that *the* major fault in Areeda and Turner's analysis was their having downplayed the fact that PP is a kind of strategic behavior which necessarily involves intertemporal

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<sup>22</sup> Also see Posner 1979, 939-944.

<sup>23</sup> To this we might add the second stage of Joskow & Klevorick's 1979 two-tier approach. The authors suggested that courts adopt for that stage both the basic AVC version of the ATR, as a sort of quick check of predation, and a total cost standard, whereby a price should be deemed predatory if less than average total cost (ATC) or, in case of multi-product firms, average incremental cost (see Joskow & Klevorick 1979, 245 ff.). The latter notion was also the basis of Ordover & Willig 1981's rule. The notion of average incremental cost (AIC) had been first proposed in Baumol 1979, 9, fn.26.

considerations – a critique also shared by Scherer and the other supporters of the rule of reason approach, but which was more biting in the case of authors endorsing Areeda and Turner’s operational urge.

The author who emphasized most this drawback in Areeda & Turner 1975 was Oliver Williamson. Indeed, his 1977 contribution to the debate may be taken as the clearest exposition of the strategic and intertemporal aspects of PP before the advent of formal game theory. Thus, his model explicitly acknowledged:<sup>24</sup> *i*) that predation could be used for entry deterrence as much as for the elimination of existing rivals;<sup>25</sup> *ii*) that the standard notion of “sacrifice profits now for higher profits tomorrow” necessarily entailed a kind of strategic reasoning and had to be explicitly modeled in an intertemporal setup; *iii*) that PP could be used strategically as a signal to deter future entry; *iv*) that, crucially to Williamson’s argument, the market leader might strategically perform some pre-entry actions, like building an excess capacity, which aimed at preempt entry itself (a point for which Williamson recognized his debt to the formal model of pre-entry strategic choices in Spence 1977); and *v*) that the leader’s strategic adaptation to the law had also to be considered when devising a rule aimed at addressing predatory behavior. Nonetheless, Williamson still endorsed Areeda and Turner’s operational goal, while rejecting Scherer’s proposal.<sup>26</sup>

As I said before, Williamson rule looked at the leader’s output and imposed that he abstain from increasing his quantity following a rival’s entry. The rule was clearly addressed at neutralizing the leader’s threat to make recourse to his pre-entry-built excess capacity in order to flood the market and thus push the price below the level any entrant would find sustainable. This would make the leader’s (socially inefficient, but privately long run profitable) choice to build an excess capacity irrational in the first place. Williamson also noted that ATR could not prevent, or prohibit, this kind of pre-entry behavior, as long as the price following post-entry output expansion was still above the leader’s marginal or average variable cost. It followed that, despite Areeda and Turner’s claims, the ATR was unable to warrant social efficiency both before and after entry (*ibid.*, 335).

In the same spirit came the 1979 Baumol rule. The paper’s goal was explicitly that of proposing <<...a simple rule that enjoys significant optimality properties with respect to economic efficiency. Equally important, the rule is relatively easy to administer.>> (Baumol 1979, 1). Reasoning in intertemporal terms, Baumol recognized that the threat caused by PP to competition and welfare was not a function of the relationship between price and costs, but rather a matter of the

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<sup>24</sup> See Williamson 1977, 284-287.

<sup>25</sup> More than that: according to Williamson, specific examples might be built where PP was seemingly unprofitable with respect to the exclusionary goal and yet fully rational in view of the entry deterrence purpose.

<sup>26</sup> This in a long footnote where he argued that following Scherer would entail replacing antitrust enforcement with a sort of market regulation by a price commission: <<Rather than slip inadvertently into a regulatory posture – which, experience discloses, is typically hostile toward competition – antitrust is better advised to seek simple rules enforceable in court.>> (Williamson 1977, 288, fn.16).

responsiveness of pricing to changing competitive conditions (ibid, 3). This was testified by the fact that a leader might temporarily cut its price when entry occurred, only to raise it again after the entry threat disappeared. The suggested rule would let the leader free to lower its price in response to entry, but would also force him to bear the long run consequences of his choice by forbidding him to re-raise the price for a fairly long period of time. Such a rule was explicitly addressed at destroying the “low profits now, higher profits tomorrow” rationale of PP, and also had the side benefit of ensuring that only efficient entrants would survive, as these would be the only firms capable of sustaining the leader’s low market price in the long run (ibid., 5).

These two examples of post-ATR rules suffice for my point: in view of the later history of PP law and economics, the most remarkable outcome of the intense debate following Areeda & Turner 1975 was the emphasis on the strategic and intertemporal features of PP. This was not entirely novel stuff, because similar considerations had also been raised during the 1960s and early 1970s debate stemming from McGee 1958.<sup>27</sup> But never before had the strategic and intertemporal character of predatory behavior been more clearly revealed than in Williamson’s or Baumol’s paper. More than that, these and similar papers explicitly made the point that only by focusing on these features could the rationality of PP be demonstrated. In other words, giving full weight to strategic and intertemporal aspects was the necessary, and often also sufficient, condition to prove that PP might well be a profitable business strategy and so could really happen in the real world, thereby deserving the application of antitrust law to avoid its anti-competitive consequences. Given that ATR could not handle the strategic and intertemporal features of PP, some of the authors in the post-ATR debate aimed at devising new, better rules to fill the gap, while others denied that any simple rule could ever effectively handle them. In short, at the end of the 1970s everyone involved in the theoretical debate shared the notion that only a properly constructed *story*, with explicit room for strategic and intertemporal elements might justify the existence of PP as an antitrust violation.

**2.4** Even the authors in the Chicago tradition could not avoid dealing with these features. For example, after recognizing that the pioneer of the Chicago approach to PP, McGee 1958, had neglected strategic considerations in his analysis, Posner underlined their relevance by noting that: <<Since classical (or, one might add, modern) economics contains no generally accepted theory of strategic behavior, it is not surprising that the Chicago school should not have been particularly concerned with predatory pricing. Eliminate strategic considerations, and it becomes impossible to construct a rational motivation for predatory pricing without assuming (very uncongenially to a

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<sup>27</sup> The most “strategically oriented” paper had been Yamey 1972. See AUTHOR 2009 for more details.

Chicagoan) asymmetric access to the capital markets for financing a period of below-cost selling. But to ignore strategic considerations is not satisfactory.>> (Posner 1979, 939).<sup>28</sup>

All Chicagoans contributing to the post-ATR debate had at least to take position with respect to the role played by strategic and intertemporal considerations, if only to dismiss their relevance. Think of Bork's 1978 critiques against Scherer's proposal.<sup>29</sup> In these words one may read a leitmotif of Chicago view not only with respect to PP, but to antitrust enforcement in general, namely, the idea that courts will never have the amount of information required to properly perform a rule of reason analysis without running the risk of incurring in serious mistakes. This critique applies to the rule of reason, but also – indeed, more forcefully – to the kind of stories underpinning the post-ATR view of PP, as even those stories may well be considered a manifestation of the <<...abstract geometric representation of demand and cost phenomena.>> (Bork 1978, 155). Bork recognized that, theoretically speaking, nothing was impossible with respect to PP – a statement which we may reinterpret as the acknowledgement that a rigorous story in which PP is rational business strategy may always be told – but stressed that the real issue was <<...the probability of the occurrence of predation and the means available for detecting it.>> (ibid., 145).

Or think of McGee's 1980 reassessment of predatory pricing where, while defending what he himself called the “diehard Chicagoan position” according to which attempts at predation <<...have been rare, and [...] successful attempts will be found to be still rarer.>> (McGee 1980, 292, text and fn.15),<sup>30</sup> he claimed that if a workable rule was ever to be called forth, it had to be a cost-based rule. Among the reasons for this thesis, McGee gave both the difficulty of establishing, inherent ambiguity and effective irrelevance of the price cutter's intent and of his rivals' mental states, on the one side, and the impossibility to distinguish in the real world between short-run and long-run profit maximization, on the other (ibid., 292). Two reasons which clearly addressed, and countered, the building blocks of those <<...increasingly complex and speculative models...>> of predation with strategic and intertemporal features.<sup>31</sup>

Bork's critiques were echoed by Easterbrook 1981. In one of the earliest papers in the Chicago tradition to acknowledge the pending game-theoretic revolution in IO, Easterbrook devoted two long sections to “Signaling from one market to another” and “Strategic commitments” (ibid., 282 ff.). In the first he dealt with the argument that a firm may aim at building a reputation of ruthless predator in order to persuade rivals to stay out of, or abandon, its markets. The analysis was not explicitly game-theoretic, but a few hints here and there illuminated the reader about what was soon

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<sup>28</sup> Posner was at that time still unaware of the imminent game-theoretic revolution in IO.

<sup>29</sup> See above, footnote 19.

<sup>30</sup> McGee's words will be almost verbatim reproduced in 1986 by the Supreme Court in its famous *Matsushita* dictum <<... predatory pricing schemes are rarely tried, and even more rarely successful.>>, on which see below, §6.

<sup>31</sup> A more explicit critique against the entry deterrence view of PP is at pp.298-300 of McGee 1980.

to happen in IO literature. First, Easterbrook referred to a work on cooperative game theory by Lester Telser where it is shown that no determinate solution exists to the game of threats between the leader and the entrants when more than two firms were involved (Telser 1972). Then he offered the gist of Reinherdt Selten's chain store paradox (see next §), namely, that under perfect information no predation will ever occur, yet without quoting Selten's seminal paper (Easterbrook 1981, 285-286).<sup>32</sup> Finally, he claimed that in case of less than perfect information <<[t]he solution to the game becomes even more murky [...] If each firm is uncertain of the other's costs, neither has a clearly superior strategy.>> (ibid., 286). Easterbrook's conclusion was trenchant: <<it has not been proved that predatory signaling is a profitable strategy. [...] ...the inconclusive arguments about signaling are inadequate to justify legal intervention.>> (ibid., 288).

A similar skepticism pervaded the following section of Easterbrook's survey, dedicated to "Strategic commitments", in particular Michael Spence's model of entry-detering investment (Spence 1977) and Williamson's output rule. According to Easterbrook, entry deterrence theories of PP were basically flawed,<sup>33</sup> so much so that <<[a]ny attempt to condemn capacity selection decisions as predatory carries with it an unavoidable risk of deterring firms from selecting the most desirable response to change.>> (Easterbrook 1981, 290). Moreover, he noted that <<A strong case can be made that limit pricing<sup>[34]</sup> does not exclude entry under any circumstances.>>. The paper he mentioned in support of such a categorical statement was one by P. Milgrim (sic!) and J. Roberts, titled "Equilibrium limit pricing doesn't limit entry" (see ibid., 297, fn.74), that is to say, the early version of the enormously influential Milgrom & Roberts 1982a which, as I argue below, officially launched the modern game-theoretic approach to PP.

In conclusion, the main element of novelty emerging from the heated post-ATR debate was brought by neither the appeals to the return to fully-fledged rule of reason scrutiny nor the search for more refined cost-based or quantity-based rules. Regardless of their beliefs about the frequency and seriousness of PP as an antitrust offense, all the authors involved in the debate either built, or at least made use of, predation stories which contained explicit intertemporal and strategic features. Static, non-strategic analysis – of the kind underlying the old legal approach to PP cases or Areeda & Turner 1975 – looked totally inadequate for dealing with predation. At the same time, these

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<sup>32</sup> What he refers to in fn.48 is a 1980 NBER paper by R. Masson and *R. Roberts* (sic! The real co-author was Robert Reynolds) which however has never been published. In a personal communication of April 21, 2009, Robert Masson told me that the paper was rejected by the *Rand Journal of Economics*. The work eventually led to a publication in the 1985 *Journal of Industrial Economics*, but only after the addition of a third co-author (David Easley) and the injection of a formal argument based on Harsanyi's games of incomplete information (instead of the rational expectations approach used in 1980). The published paper is Easley, Masson and Reynolds 1985, one of the most quoted contributions to the game-theoretic literature on PP.

<sup>33</sup> Among the defects, it is remarkable that Easterbrook (1981, 295) mentioned the fact that in Williamson model only the incumbent was supposed to act strategically, while the entrants were modeled as sticking to a rigid decision rule.

<sup>34</sup> Easterbrook considered limit pricing equivalent to Williamson's argument. Also see the previous fn.

stories showed that the Chicago mantra of PP as “rarely tried and even more rarely successful” had at least to be qualified, if not wholly discarded, in view of plausible narratives showing that predation could actually be rational business behavior. Even those authors who abided by Areeda and Turner’s operational imperative and thus synthesized their contribution in terms of a court-friendly rule, recognized that the call for new rules stemmed from the inadequacy of the ATR to discriminate among price cuts in a strategic and intertemporal environment. And even those others who still stuck to the Chicago mantra could not avoid dealing with the new, richer stories of PP if they wished to uphold their derogatory thesis.

**2.5** What was the outcome of the post-ATR debate in US antitrust courts? As with the original Areeda & Turner 1975, the impact has been fast and relevant. Out of 249 significant<sup>35</sup> PP cases in the period 1975-1992, at least 18 quoted Scherer 1976 (the first in 1977), 18 referred to Williamson 1977 (first hit in 1978), 6 to Baumol 1979 and 10 to Joskow & Klevorick 1979 (Source: Lexis). In terms of actual law enforcement, absent a new Supreme Court pronouncement on the issue, most courts endorsed a kind of “augmented ATR”,<sup>36</sup> which amounted to considering, respectively, surely lawful and surely unlawful any price above average total cost and below average variable cost, while considering only presumably lawful – a presumption rebuttable by evidence of intent and market structure – any price between AVC and ATC.

The “augmented ATR”, which recalled the solutions suggested by Joskow & Kleovrick 1979 and Brodley & Hay 1981, brought to an “enforcement equilibrium” in that, far from the populist excesses of the pre-ATR era, plaintiffs enjoyed for a decade or so a low, but non-negligible, success rate in PP cases: about 17% between 1982 and 1993, up from almost nil in the years immediately after the ATR (see Bolton, Brodley & Riordan 2000, 2254). Adding the out-of-trial settlements, this is a number which might well represent a balanced approach to the violation. The equilibrium was broken only in 1993, with the Supreme Court’s *Brooke* decision which caused the success rate in PP litigations to drop once more to 0%, leading to a new era of *de facto* legalization of any price cut by a dominant firm – an era which still goes on today.

Leaving to §§6-7 my assessment of *Brooke*, two remarks need be made here. First, US antitrust courts seemed to be receptive to the kind of PP stories told in the post-ATR literature, *but only as long as these stories were translated into an operational cost-based rule* like the “augmented-ATR”. In other words, rather than being persuaded by the intertemporal and strategic arguments underlying the new stories, courts were attracted by the higher flexibility of the new rules with respect to the strict yes-or-no character of the original ATR. This confirms that at least some of the

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<sup>35</sup> On the meaning of “significant” in this context see fn.13.

<sup>36</sup> As Bolton, Brodley & Riordan (2000, 2253) called it.

economists involved in the debate had apparently learned Areeda and Turner's lesson on how to have an impact on courts – i.e., by offering simple, highly operational rules.<sup>37</sup>

The second remark is that, theoretically speaking, the “enforcement equilibrium” should have shifted in the *opposite* direction. As I said before, the year 1982 marked the official beginning of the new game-theoretic approach to PP, an approach which in the following two decades has produced several rigorous demonstrations that, far from being irrational, predatory behavior may well be the most profitable choice for a dominant firm in a variety of plausible settings – in other words, that many convincing stories may be told in courts to demonstrate that PP is an actual possibility. Moreover, one of the key findings of the new approach has been the absence of any necessary relation between a predatory price and the leader's production costs; this entails that the boundaries of the “augmented ATR” may well be trespassed, as even a price above ATC may still be predatory if properly interpreted in terms of a rigorous strategic story. Thus, one should expect that, much as it had happened in 1975, US antitrust courts should have swiftly embraced the new theories and, accordingly, revised upward their conviction rates in PP cases. Yet, the opposite actually happened: *Brooke* shifted the enforcement equilibrium further away from where adherence to the new strategic theories should have led it. Indeed, as I detail in the rest of the paper, the game-theoretic approach to predation has been almost totally neglected by US antitrust courts.

### **§3. It's a brand new game: the methodology of strategic predation**

The development of rigorous strategic models of PP in the early 1980s is a landmark in the history of modern game theory. These were among the earliest models where new techniques and solution concepts were applied to analyze so-called *asymmetric information games* (AIG henceforth), i.e., games devoid of the traditional assumption of perfect information. It goes well beyond the boundaries of this paper to investigate how and why AIG were developed, as well as their influence on the rise of modern information economics (including mechanism design theory) and on the establishment of game theory as the hard core of neoclassical economics (a result the first

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<sup>37</sup> Such an extreme view of US courts' pro-rules attitude may be softened in form, though *not* in substance, by following Thomas Kauper's thesis, namely, that courts' acceptance of price theory meant that very tight boundaries were set to the kind of stories which could be told in litigations. If a story making economic sense could not be told in support of the plaintiff's argument, a PP charge had to be summarily disposed of. This established what Kauper calls a “could test”: go on with the trial in search of facts only when economic harm *could possibly occur*, i.e., only when a plausible, theoretically-sound story exists to explain it. It follows that the mid-1970s – early 1980s cost-based rules were nothing but the manifestation of the failure of plaintiffs' PP stories to pass the “could test”. For example, the ATR simply meant that, according to price theory, no plausible PP story could be told if price was higher than AVC (Kauper 1993, 348-9). §§3-4 show that game-theoretic IO aimed exactly at providing a new set of plausible PP stories.

generation of game theorists had largely missed).<sup>38</sup> Suffices here to say that, thanks to the contributions of Reinherd Selten and John Harsanyi and the related extension of strategic analysis to games with imperfect or incomplete information, it is hardly an exaggeration to speak of a late 1970s / early 1980s “resurrection” of game theory – a fresh start whose eventual consequences may be best appreciated by comparing the discipline’s relevance within economics before and after those crucial years. Indeed, the circumstance that some of the foundational papers of the AIG literature also were the milestones for the strategic approach to PP may somehow make up for a more thorough reconstruction, as the gist of the argument supporting the strategic analysis of predation may also partly capture the motivations behind the overall “resurrection” of game theory.

The crucial role played by Selten in this story makes it hardly surprising that one of those key papers was the classic Selten 1978, with the celebrated chain store paradox. In that paper Selten proved that no predation existed in the game equilibrium under perfect information. Yet, from the viewpoint of antitrust law and economics, the real message of Selten’s result – and the correct way to interpret it – was the opposite, namely, that PP was not a problem *only* under the heroic assumption of perfect information, because the assumption was crucial for the logic of backward induction to generate the paradoxical outcome. Thus, the paper was like an invitation to game theorists to investigate what the game equilibrium would be with the addition of a bit of imperfect or incomplete information. Given that the specific instance of economic behavior which Selten had chosen in order to grant actual content to his formal result was PP, it was natural for those accepting Selten’s invitation to build their new games around predation stories.

Why did Selten choose PP as the theme for his seminal paper? More importantly,<sup>39</sup> why did predation provide such a fertile ground for the new game-theoretic literature? Part of the answer is obviously that, since the postwar years, IO problems in less-than-perfectly competitive markets have always constituted the most natural setting for game theory. But why PP in particular (i.e., a problem of dominant firm behavior), rather than more obvious picks, like, say, oligopoly or collusion? The answer lies in what economists had already noticed as the necessary intertemporal and strategic character of predation. The simple notion of “cut price now to earn more profits tomorrow” creates a very friendly environment for AIG modeling because it is a notion which – generally speaking – calls for the formulation of sequential strategies by both the predator and the possible prey(s), with each of these strategies entailing an account of a firm’s knowledge about the rival’s characteristics and the expectations about its behavior. Moreover, several stories existed to render in plain language the chain of ideas and behaviors underlying a predation episode. As we know from the previous §§, these were all features of PP which economists had already well

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<sup>38</sup> It is a story still awaiting to be fully told, but see AUTHOR 2009a.

<sup>39</sup> Especially in view of Selten’s own answer to the previous question: see Selten 1978, 158, fn.1

understood by the late 1970s. What game theorists were required to do was just to formalize them by either transforming the existing PP stories into formal sequences of actions and beliefs or inventing brand new ones.

This explanation may even be strengthened a little bit by arguing that PP offered highbrow game theorists the ideal environment to give actual import to what would otherwise look like purely abstract arguments (think of the new solution concepts for Bayesian games), totally detached from real world problems. In other words, assuming you were a game theorist, still striving in the early 1980s to persuade the wider audience of economics practitioners of the practical relevance of your analytical tools, the problem of predation offered an excellent opportunity<sup>40</sup> to score a few easy points. Indeed, by focusing on the much more realistic case of imperfect or incomplete information, AIG also scored a point in terms of higher realism than the standard price-theoretic models, based as they were on the (often implicit) assumption of perfect information.<sup>41</sup>

The events following Selten 1978 are fairly well known by anybody acquainted to modern IO. In 1982 two pairs of authors, John Milgrom and Paul Roberts, David Kreps and David Wilson, published a set of papers (Milgrom & Roberts 1982a, 1982b; Kreps & Wilson 1982) which, by applying AIG to the twin problems of limit and predatory pricing, marked the official beginning of the *modern* game-theoretic approach to antitrust economics, where the italicized word “modern” should be read as synonymous of “à la Harsanyi-Selten”, i.e., of games under less than perfect information. After this first inflow, a flood of strategic literature followed, so much so that at the end of the 1980s the entire field of IO had been re-designed in terms of game-theoretic tools, methods and ways of reasoning. One of clearest signs of the success of game theory in conquering IO – thereby fulfilling after more than 40 years the prediction first formulated at the time of von Neumann and Morgenstern’s *Theory of Games and Economic Behavior*<sup>42</sup> – was the publication in 1989 of the *Handbook of Industrial Organization* (Schmalensee & Willig eds. 1989), a *magnus opus* and fundamental reference where game-theoretic modeling was simply ubiquitous.

The common idea in the three foundational papers (see Milgrom 1988) was that, in a realistic setup of less than perfect information, a firm endowed with market power may try to discourage a competitor from entering, or remaining in, the market by manipulating its beliefs. The idea was first introduced by Milgrom & Roberts 1982a, who applied it to limit pricing, but soon extended by the

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<sup>40</sup> Though not the only one. Think of the literature on mechanism design theory which was flourishing in the same period (see AUTHOR 2009a).

<sup>41</sup> I just mention here another possible explanation for the game theorists’ choice, namely, an “ideological” willingness to apply the new tools of AIG in order to counter the success (especially in courtrooms) of the Chicago approach to antitrust, of which the new legal attitude towards PP was one of the clearest instances. This is for example what may be drawn from Robert Wilson’s brief explanation of the motivation behind the AIG literature: see Wilson 1992, 306. We will examine an explicit effort in this direction below, §8.

<sup>42</sup> <<This work [i.e., AIG] holds some promise of yielding a partial and much-belated realization of some of the hopes that were expressed in the early years of game theory.>> (Milgrom & Roberts 1987, 187).

same authors, as well as by Kreps and Wilson, to PP. When a firm considers entering a market, it must base its decision on its expectations of post-entry profits. This depends on whether the incumbent responds aggressively and, if so, on the intensity of the aggressive response (say, how much will the price fall following entry?). Hence, the potential entrant's expectations are crucial in determining its entry decision. But the incumbent can, by its actions, influence these expectations.

While it would be impossible to manipulate a rival's beliefs under the perfect information setup of price-theoretic models, the addition of even a small amount of either asymmetric or incomplete information makes the trick. For example, by responding aggressively to entry, a predator may be able to convince that specific entrant, or any other future entrant, that entry into that market is unprofitable. It follows that predation does not even have to "kill" the competitor in order to achieve its goal of affecting the rivals' expectations and thus be a profitable strategy; in the case of a multi-market incumbent, it is not even necessary that the incumbent directly profits from its price-cutting in the contested market. Moreover, opposite to McGee's 1958 result (which Milgrom and Roberts *wrongly* took as the state-of-the-art on PP in IO literature),<sup>43</sup> if the incumbent does succeed to drive a competitor out of the market, new entry will *not* inevitably follow as soon as the incumbent raises its price to reap the benefits of its success because it is now possible that other potential entrants – having witnessed the poor lot of their predecessor – will no longer expect to earn a profit by entering.

Assessing their achievement in a 1987 paper, Milgrom and Roberts identified PP as the best example of the theoretical gains provided by the AIG perspective. Totally neglecting the outcomes of the post-ATR debates, and in clear reference to the most extreme Chicago position, they claimed that around 1980 the only consistent analysis of PP, based as it was on the compelling logic of standard price theory, indicated that predation could not be expected to succeed and was not a rational strategy. Notwithstanding real world instances of PP by dominant firms, mainstream economists were unshaken: <<... because no mere fact ever was a match in economics for a consistent theory, these ideas began to represent the basis for a new consensus.>> (Milgrom & Roberts 1987, 185). Yet, this consensus decisively rested on the implicit assumption of symmetric information. It was precisely here that their contribution had brought a crucial improvement, first and foremost in terms of the realism of the model's conclusions: AIG showed that predation could well be rational under more realistic informational settings, so much so that we should expect to see predatory strategies being undertaken by real world firms if not effectively deterred by legal prohibitions. Milgrom and Roberts proudly concluded that in a few years the AIG methodology had allowed the first truly satisfactory treatment of a very old IO issue like PP. This was a general

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<sup>43</sup> See Milgrom & Roberts 1987, 185. This position was only partially corrected in Milgrom & Roberts 1990, 113-115, where they still failed to mention the strategic-oriented post-ATR literature.

result: the kind of business behavior emerging from AIG's equilibria captured a lot more of the richness of observed reality (ibid., 187).<sup>44</sup>

Another crucial innovation brought by AIG to PP literature was the dismissal of cost considerations as the crucial tool for demonstrating actual predation. As remarked by Milgrom & Roberts (1990, 115), game-theoretic models undermine the ATR and all its variants because AIG not only shows that predation can be profitable, but also that predatory prices bear no necessary relation to the incumbent's marginal or average costs. This is the logical consequence of the fact that predation aims at affecting the rivals' expectations of future profits: why should such an effect depend on the incumbent's production costs? At most, it should depend on *the entrant's* costs – and possibly on none's costs at all. As a confirmation, the PP stories emerging from the AIG literature make hardly any reference to production costs.

Before turning to these stories, we need to remark that among the early 1980s game-theoretic models also featured a rigorous formulation of the traditional deep-pocket version of PP, so frequently referred to in the legal realm (see above, §1). In a 1984 paper Jean-Pierre Benoit showed that even that story, effectively demolished by McGee 1958, could nonetheless be given a solid theoretical basis, provided some asymmetric information (about, say, how deep a firm's pocket is) was injected in the model. Assume the entrant is financially constrained as in the classic legal story. If the incumbent is uncertain about the entrant's willingness to fight predation until bankruptcy, then PP episodes may actually happen. In other words, under less-than-perfect information a predatory price war – aimed at the “usual” goal of driving the entrant out of the market (not, as in the other AIG models, at deterring other potential entrants) and ending up with either cooperation or the entrant's defeat – may obtain as an equilibrium phenomenon (Benoit 1984). Thus, as long argued in the legal literature, it may sometimes be rational for a firm which is financially stronger than another to use its deeper pockets to set a low price and force the rival out of the market. Note that this is the only instance of an AIG-based story where below-cost pricing is essential for predation, though even here price need not be below the predator's MC as in ATR: what is needed is that price be set so low that it generates a negative cash flow for the prey. Hence, it is the prey's costs that matter, not the predator's.<sup>45</sup>

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<sup>44</sup> On superior realism, rather than higher rigor, being the true plus of AIG also see Philips 1988, Ch.7.

<sup>45</sup> It must be added that Benoit model is the weakest, theoretically speaking, among those of the first AIG generation. For a critique see Milgrom & Roberts 1990, 120; Motta 2004, 435.

#### §4. And a new playbook too!

Apart from Benoit 1984, the new game-theoretic playbook of PP only contained stories where predation was used to manipulate the other firms' beliefs. Three basic plots were offered in the AIG literature (see Milgrom & Roberts 1990). In the first, so-called signaling models (Milgrom & Roberts 1982b), the incumbent has an information advantage about a market feature which is key to the prey's exit and output decisions – for example his own (i.e., the incumbent's) production costs. The prey may infer the rival's costs by observing his pricing behavior, but this is exactly where the possibility arises for the incumbent to bias the rival's inferences by setting a predatory price in order to look like a “tough” (i.e., low-cost) rival.

However, at the equilibrium of the signaling game (a rational expectation equilibrium) PP does *not* induce the prey to underestimate the profitability of continuing operation or overestimate the predator's toughness. It follows that, according to Milgrom & Roberts's story, predation does *not* cause the prey's exit nor restrains her future price and output choices because it *fails* to affect her beliefs. Why then should the incumbent be willing to undertake PP if it is not going to succeed? The answer provided by Milgrom & Roberts is a perfect example of the game-theoretic logic: the prey is so rational that it is perfectly capable of understanding the incumbent's incentives, so much so that were the latter *not* to prey, the former would conclusively infer that he is “soft” (i.e., has higher costs) and thus would compete more aggressively against him.

Two remarks are of order here. The first is obvious: if PP fails, why should it be a concern for antitrust law? Such a concern would be justified only in case the prey is less than perfectly able to “read” the predator's incentives and thus may be induced to wrongly exit the market. Moreover, the prospect of facing low profits due to predation by a better-informed incumbent may well deter entry in the market even if, should entry occur, the predation would not succeed. In the latter case, antitrust law might legitimately be concerned about the dynamic inefficiency of entry deterrence, rather than by the static welfare loss of post-predation monopoly.<sup>46</sup>

The second remark is that this kind of story clearly shows the irrelevance of marginal or average cost. Indeed, the predator aims at convincing the prey that his costs are lower than they actually are, but this has no relation with the predator's actual costs. It follows that a price capable of biasing the prey's beliefs may even be greater than the incumbent's ATC: such a price would be predatory in Milgrom & Roberts' story, but would be perfectly legal under the ATR and all its variants.

A second category of AIG-based PP story is the so-called signal-jamming model (as in Fudenberg & Tirole 1986). Again the element of incomplete information is provided by an unobservable

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<sup>46</sup> See Milgrom & Roberts 1990, 127 and 129.

variable that the prey is trying to gauge and again there is a distribution of observable correlates of the unobservable variable which depends on the incumbent's actions. However, there is no assumption that the latter has an informational advantage over the prey. Hence the predator's action cannot depend on the value of the unknown variable as in signaling models because that variable is unobservable to him as well. An element of informational asymmetry does exist, though: the predator's actions which affect the observable correlates of the unobservable variable cannot be known by the prey.

The typical setting for rendering this story in plain language is that of test-marketing predation. Assume the prey is running a marketing test for a product to be launched in a market where the predator is already active. The incumbent may then try to disrupt the prey's test by secretly lowering his price (say, by offering discounts to his distributors or loyal customers) or by undertaking any other action which may lead the prey to misread the test's results and underestimate the profitability of entry in that market.<sup>47</sup> As in signaling models, predatory behavior has no effect on the prey's equilibrium choice. Thus, the predator fails once more in his goal of excluding or disciplining the rival. Yet, predate he must, given the prey's rational expectation that he will try to do so. Again this fact may deter some entry, thus raising antitrust concerns.

The third kind of story is perhaps the most well known and has to do with the incumbent's reputation, as in Milgrom & Roberts 1982a and Kreps & Wilson 1982. Here the incumbent's goal is explicitly to deter future entry by preying on current rivals, independently of whether the predation actually induces the target to exit the market. The informational asymmetry here is that it is private information to the predator whether he would prey in a specific market. The fact that the "willingness to prey" is private information means that, from the prey's viewpoint, there is a positive probability that the incumbent is a "natural predator", i.e., a firm always preying his rivals. As a consequence, failure to prey once destroys reputation of being a natural predator forever, leading to future entry of all possible rivals. It follows that preying may be worthwhile for the incumbent even if it is immediately costly, since fighting entry is the only way to preserve an incumbent's reputation and thus deter future entry. The natural setting for these reputation models is that of multi-markets firms where what happens in one market is observable by actual and potential rivals in other markets. The more the markets, the greater the incentive to preserve reputation by always fighting entry.<sup>48</sup>

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<sup>47</sup> The unobservable variable, unknown to both firms, is the prey's profits or market share; the observable correlate is the test result; the predator's unobservable, and test-disruptive, action is the secret price cut.

<sup>48</sup> A fourth version of PP story also deserves to be mentioned in that it avoids some of the drawbacks of reputation models. In the latter, it is necessary to introduce a number of restrictive assumptions, say, that entry occurs sequentially in one market at a time by a different entrant (this actually means that each predation episode never aims at preventing simultaneous entry in other markets), that the incumbent's type may only be one of the two extremes (natural predator

Note that while in the first two kinds of story the only negative effect of PP is the unintended one against future entry (the intended one against active rivals or actual entrants being nil), in reputation stories every new entry which is met by a predatory response further strengthens the incumbent's reputation and thus has further deterrence effect. Consequently, this is the kind of predation which causes more troubles from the viewpoint of antitrust. Still, even in reputation models there is no relation between price and incumbent's cost, thereby making the ATR and its variants totally irrelevant. More generally, preying-for-reputation, exactly like preying-for-signaling or preying-for-jamming, is a pole apart from the yes-or-no character of straight tests like the ATR. Every behavior aimed at affecting a rival's beliefs may vary quite a lot in breadth and intensity, but this makes it much harder for antitrust enforcers to detect it. Moreover, the fact that the welfare costs of PP are said to come more from dynamic inefficiency (deterrence of entry, which means undesirable obstacles to new investments and new products) than from static one (straightforward deadweight loss due to post-predation monopolization) makes the whole story much more debatable and the costs themselves extremely difficult to assess, if not purely virtual.

Summing up, AIG reputation models suggest that predation is a real possibility: the lack of complete information can lead to an equilibrium where not only entry is deterred by predation, but predation has actually to occur. This result requires a set of conditions (Phlips 1988, 217-8), namely, that the predator be a multi-market firm which starts to predate after entry has occurred in one of its markets and whose predatory strategy is a price cut which brings the price below the non-cooperative equilibrium level at which entry would be profitable for the entrant, thereby making entry value negative. Crucially, the prey must be unsure whether the price cut is predatory as she can interpret it as implying that entry is unprofitable under normal competitive conditions. This uncertainty is what makes the identification of predatory behavior a fortiori difficult for antitrust courts (*ibid.*, 231).

In the first half of the 1980s, a strong theoretical argument was developed showing that it was simply wrong (or, if you wish, bad economics) to argue that PP was necessarily irrational. It

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or "natural pacifist"), that once predation has begun in any market there is no reason why it should stop. An important paper by Easley, Masson and Reynolds (EMR) relaxed these assumptions, allowing for simultaneous entry in several of the monopolist's markets in an AIG setting similar to that of reputation models (Easley, Masson & Reynolds 1985; on this model also see Phlips 1988, 211-217). In EMR story the monopolist may wish to prey only to gain extra time, that is, just to slow down entry in other markets, with full awareness that entry will eventually occur. The paper also explains why the incumbent may decide to stop preying after just one or two episodes. Above all, it gives the possibility – though not the certainty – to characterize different types of incumbent depending on the nature of the post-entry, non-predatory equilibrium. In other words, the incumbent's type is indistinguishable pre-entry and is only limitedly distinguishable post-entry, meaning that in some cases it is impossible to say whether the post-entry equilibrium price level is the outcome of a predation episode or of "normal" competition. The latter feature of EMR model is remarkable because it may account for the fact that, in practice, it is quite difficult for courts, businessmen and economists to distinguish a predatory from a normally competitive price (i.e., the price which would emerge in an ordinary, non-cooperative equilibrium).

followed that predatory behavior did deserve the attention of antitrust law as it might well be a real world phenomenon. Though the argument was purely theoretical, it was marketed in terms of a bunch of plausible stories<sup>49</sup> (signaling, jamming, and, above all, reputation-building) which could be verified against the facts of actual antitrust cases. What courts were ideally called to do was to look for evidence supporting one of those stories and, for the rest, trust game theory as far as the necessary relation between the story itself and the predatory character of the firm's behavior was concerned. Above all, no costs had to be estimated and no bright-line rule could be applied. Contrary to Areeda & Turner's operational urge, game theory showed that dealing with PP cases necessarily required that courts undertake the painstaking work of disentangling the litigation facts in order to bring to surface the outline of one or the other of AIG stories.

## §5. The AIG playbook in courts

It is remarkable for our narrative that the first critiques against the AIG methodology came from two of the authors who had contributed to develop it. Milgrom & Roberts 1987 lists several issues which should be carefully assessed before applying their own models' prescriptions to law enforcement. First of all, the assumption of equilibrium is much more demanding in AIG models than in traditional price-theoretic ones. According to Milgrom and Roberts, the latter are largely incomplete models, devoid as they are of any precise timing of actions, or description of the available information, or explicit modeling of out-of-equilibrium behavior, etc. Such incompleteness makes it easier to accept the equilibrium assumption because there would be little else on which to focus. Hence, vague stories of how and why equilibrium is achieved suffice in price-theoretic models (Milgrom & Roberts 1987, 187). On the contrary, AIG forces the theorist to be much more rigorous in her work: for example, no informal appeal to learning or adjustment to equilibrium can suffice because if there is repeated play in the game, this should be modeled explicitly. It follows that the equilibrium assumption is naturally more troublesome in those models – but this is hardly a defect, as it stems from their greater completeness (ibid., 188).

The second problematic issue is the stronger rationality requirements. Milgrom and Roberts admit that AIG agents are much more sophisticated in their inferences, calculations and forecasts than in the price-theoretic world of competitive markets with given equilibrium prices (ibid.). While it is obvious that the rationality standard goes up as soon as we distance ourselves from the world of

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<sup>49</sup> Recall Kauper (1992)'s "could test" mentioned in fn.37 above. Indeed, the *Kodak* decision, on which Kauper's suggestion is founded, looked at that time quite promising to the supporters of a new approach to antitrust law based on theoretically plausible stories. More on *Kodak* below, §7.2.

perfect information, still what they call “a quantum leap” is entailed by the rationality assumption in AIG, namely, the ability to fully anticipate the other players’ complex responses, including the fact that those responses <<...depend on subtle inferences that competitors draw, often by very intricate reasoning, from their conjectures about others’ behavior and their observations.>> (ibid.). In short, agents in AIG models are called to solve much more difficult decision problems than in price-theoretic ones. This in turn makes the equilibrium assumption much more implausible. Moreover, it is natural to conclude that <<...the descriptive accuracy of the super-rationality assumption does seem minimal.>> (ibid.).

Yet, it is a third issue that is of utmost importance for our narrative. This has to do with the robustness of the AIG models’ results. Milgrom and Roberts underline <<...the apparent sensitivity of the results to alterations in what one might think is [the] fine structure of the models.>> (ibid., 190). Indeed, the best AIG literature<sup>50</sup> has demonstrated that introducing just <<...a tiny bit of private information into such a model can radically change its equilibrium outcomes...>> (ibid.). In a sense, the AIG technique is *too* powerful since by introducing the “right” amount of information asymmetry, one can show that <<...almost anything can be made an equilibrium.>> (ibid.). This result, formally proved by Fudenberg & Maskin (1986), belongs to the class of Folk Theorems and has ominous consequences in terms of the practical applicability of AIG models by antitrust courts.

Just to give a hint of what this entails (see §9 for further discussion), the result may be interpreted as indicating that PP is just one of the infinite possible equilibrium outcomes of a given strategic situation, namely, the one emerging when firms are attributed a very specific set of beliefs descending from a very specific kind of informational imperfection – precisely *that* set and *that* imperfection out of an infinite array of possibility. Borrowing from Milgrom and Roberts, one could then legitimately ask which of the infinite possibilities of information asymmetry have “survival value”, i.e., correspond to a situation (e.g. a distribution of predator’s types) to which competing firms ascribe a positive probability. Or, more succinctly, one could wonder whether AIG stories are really plausible or just conceptually possible.<sup>51</sup>

Before digging more deeply on such a crucial issue, let’s go back to Milgrom and Roberts for a further questionable feature of AIG when viewed as a tool for antitrust law making. The models analyzed in §4 show the possible rationality of a behavior which is predatory in both intent and form, though not exactly the type of conduct traditionally termed “predatory” as it entails no necessary relation between a firm’s price and its production costs. Should this new specie of predatory behavior be of concern for antitrust law? As we said above, strategic predation can be socially costly because it deters future entry, although it may fail to eliminate current rivals. Hence,

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<sup>50</sup> Here they refer to their own 1982b and to Kreps & Wilson 1982.

<sup>51</sup> For economic models as merely “possible worlds” see Rappaport 1998, Ch.7.

Milgrom and Roberts concede that it would be good to prohibit it, *if it could be correctly identified* (Milgrom & Roberts 1990, 133). The problem is that, in order to identify it, we should be able to recognize what is a firm's "right" price, where "right" means, in the AIG context, the price the firm would charge if the market and information conditions were such as to exclude any possibility to affect the rivals' behavior or beliefs. Yet, determining such a price is, as Milgrom and Roberts recognize, a mind-boggling problem. Hence, their surprising conclusion:<sup>52</sup> <<Doing so would surely cost more than any efficiency gain one might realize from reducing the height of dead-weight-loss triangles. [...] If so, it may be best simply to give up on attempts to control predation, even if one believes that it can and does occur.>> (ibid., 134).

Let me summarize this argument as follows. The whole point of AIG is to show that PP may indeed be rational, but since PP bears no relation to costs (and thus to cost rules), it is impossible to identify it objectively and cheaply, hence it is better to ignore it as an antitrust violation. In short, game-theoretic models demonstrate that the only kind of rational predation is one no antitrust court or authority will ever be able to fight and detect!

The same paradoxical conclusion may be reached if we consider how another early supporter of AIG, Louis Philips, describes the procedure through which a court should detect PP behavior in actual antitrust cases. Philips admits that in the vast majority of cases, alleged predation is doubtful – itself hardly a surprise, given that strategic predation explicitly requires the existence of these doubts (Philips 1988, 240-1). The only way a court may achieve a sufficient degree of certainty about a predation violation is by collecting evidence related to one of the AIG stories. The evidence need not be about whether the prey was forced out of the market or whether her cash flow remained positive. What should be proved by either the plaintiff or the court is that the alleged predation turned a profitable entry opportunity into an unprofitable one. This, notes Philips, amounts to showing that, absent the incumbent's price cut, there was room in the market's normal competitive equilibrium for an additional firm as well as that, as a result of the cut, the market price went below the noncooperative (i.e., Nash) equilibrium level (ibid., 241).

The point is that such a proof is extremely difficult to provide in practice for at least two reasons. First, because AIG show that predation may occur only when there is sufficient uncertainty about the low price being the outcome of normal competition or predatory behavior. Second, because the theoretical yardstick for discussing whether in the market there was room enough for an additional firm is the post-entry competitive equilibrium, with its implied price and market shares. But how may a court effectively compute this equilibrium given the necessarily incomplete information about costs and/or demand? Here Philips is quite optimistic (or, one might say, just a dreamer) in

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<sup>52</sup> All the more surprising if we think that AIG results are usually interpreted as conducive to a stricter enforcement of anti-PP prescriptions. See e.g. Motta 2004, Ch.7.

that he argues that real world firms are always capable of computing their own market's Nash equilibrium. After all, he says, the noncooperative equilibrium is the "natural outcome" of imperfect competition under incomplete information. It follows that both the incumbent and the entrant should be able to say what the post-entry competitive price and market shares would have been in case of entry and no predation. The court should then just take this information and use it as the yardstick to evaluate the actual market performance (ibid.).

This argument might be easily rejected by playing an Austrian tune and recalling – as in Demsetz 1992, 215 – that the main reason why our societies rely on (and defend) competition is precisely because *nobody* can calculate what the equilibrium prices would be in its absence. But the real counter-argument to Philips is much simpler than that. Leaving aside the firms' actual possibility to compute it, it is sufficient to recognize that no court or judge would ever buy the idea that an esoteric concept like Bayesian-Nash equilibrium<sup>53</sup> be the "natural outcome" of less-than-perfectly competitive markets, for the very simple reason that the rationality requirements behind this and similar solution concepts are far too strong to be taken seriously in any real life situation. Thus, at the very best, the complexity of game-theoretic models makes them unattractive to antitrust courts and judges eager for simple rules and worried about the risk of committing too many Type I errors, i.e., wrong condemnations of innocent, pro-competitive price cuts (see McChesney 2004, 51). Indeed, most Nash equilibrium refinements are, at best, just normative notions which show how ideal players, potentially capable of deploying the full power of their rationality, should behave (and reason) in specific strategic situations. They are, in Ariel Rubinstein's terms, just fables.<sup>54</sup> But if the kind of game theory behind AIG is just prescriptive, how could a given court or judge ever apply it when deciding a concrete antitrust case?

That this has been the attitude of US antitrust courts may be easily demonstrated by looking at trial databases. According to Lexis, of the hundreds of federal cases dealing with PP indictments up to the year 2000,<sup>55</sup> *none* ever mentioned Milgrom & Roberts or Kreps & Wilson or Benoit or Fudenberg & Tirole, or even Ordover & Saloner 1989's survey on the game-theoretic approach to monopolization and antitrust. And even turning to the predation stories underlying AIG, what we find is just a handful of references (four or five overall) to either reputation or signaling. Recalling the immediate and huge impact of Areeda & Turner 1975 and its follow-ups (see above, §2), we

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<sup>53</sup> A Bayesian Nash equilibrium is defined as a strategy profile and set of beliefs specified for each player about the types of the other players which maximize the expected payoff for each player given their beliefs about the other players' types and given the strategies played by the other players. It is a solution concept which naturally yields a multiplicity of equilibria in dynamic games if no further restrictions are placed on the players' beliefs. As already said, the problem of multiplicity only makes things worse in terms of the notion's concrete applicability.

<sup>54</sup> <<As economic theorists, we organize our thoughts using what we call models. The word "model" sounds more scientific than "fable" or "fairy tale" although I do not see much difference between them.>> (Rubinstein 2006, 881).

<sup>55</sup> If we consider only those cases where the words "predatory" or "predation" feature in the either the overview or the core terms, there are more than 440 cases in the time span 1975-2000 and more than 260 in 1990-2000.

may conclude for the almost complete fiasco of AIG in affecting the way US antitrust courts handle PP cases.

## §6. Game over: *Brooke* and the triumph of Chicago School

In the previous §§ we have explained how things radically (and quickly) changed in both the doctrinal environment and the lower courts' attitude after the publication of *Areeda & Turner* 1975. It is now time to complete our story, by illustrating when and how the transformation reached the Supreme Court. The first application by the Supreme Court of the ideas emerging from the debate on the various price/cost rules came in 1986, with the *Matsushita* decision.<sup>56</sup> There the Court endorsed the principle that a charge of predatory behavior had to be supported by evidence on the relationship between the defendant's price and cost, along the lines of the post-ATR literature. Moreover, as a second requirement, the plaintiff had to show if and how the predator, after excluding its rival(s), could make up for the sacrifice of short-term profits suffered during the period of below-cost pricing – the so-called *recoupment test*, which a few years later became the hallmark of the crucial *Brooke* decision.<sup>57</sup>

In the latter the Court did something unprecedented in antitrust cases, that is to say, it set aside a jury verdict based on a review of the sufficiency of the evidence,<sup>58</sup> and explicitly declared that plaintiffs in a PP case must not only show that the defendant has a genuine possibility of preying the rival, by either forcing its exit or disciplining it, but also that the defendant has a strong prospect of recouping the losses suffered during predation.<sup>59</sup> Specifically, the 1993 Court stated that, first, PP requires proof of below-cost pricing (though no specific cost rule was referred to)<sup>60</sup> and, second, that PP requires proof of recoupment. Hence, below-cost pricing is just a necessary, but not a sufficient condition for monopolization. In order to satisfy the second requirement, plaintiffs must not only prove that below-cost pricing either excludes or disciplines the prey, but also that the

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<sup>56</sup> *Matsushita Elec. Indus. Co v. Zenith Radio Corp.*, 475 US 574 (1986).

<sup>57</sup> *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 US 209 (1993). Indeed, Glazer (1994, 607, fn.13) downplays the novelty of the recoupment test in *Brooke*, saying that after *Matsushita* the requirement was “yesterday’s news”, so much so that the *Brooke* plaintiff (which Glazer himself represented during all stages of the litigation) easily accepted the need to prove recoupment – and even succeeded at that.

<sup>58</sup> This means that the appellate court addresses the facts that were brought up in the lower court. Since appellate courts do not hear factual evidence, but only matters of law, the only way to bring up facts at the appellate level is to ask the court to review the sufficiency of the evidence. It amounts to asking whether, taking the record in total, the trier of facts could have reasonably drawn the conclusions reflected in the judgment of the lower court.

<sup>59</sup> More precisely, that a “dangerous probability” of recoupment exists if the case is a Sherman Act §2 violation, while a “reasonable prospect” of recoupment is required if the case is a Robinson-Patman Act, anti-price discrimination violation. *Matsushita* was an instance of the former, *Brooke* of the latter.

<sup>60</sup> It was just required that price be below <<...some measure of incremental cost.>> (*Brooke*, at 223).

predator will afterwards be able to raise the price above the competitive level *and* that this will compensate him for the losses of the predatory phase.

The recoupment test itself entails *two* different elements of proof: the plaintiff must demonstrate not only that the successful predator has been, or will be, able to raise price above the competitive level (so-called *recoupment capability*), but also that the increase has been, or will be, sufficient to compensate the predator for its predatory losses (so-called *recoupment sufficiency*). Moreover, in order to prove the actual, or prospective, profitability of predation, plaintiffs are required by *Brooke* to demonstrate as a necessary precondition that the market structure is such as to potentially allow recoupment in the first place – something which in turn calls for, at the very least, a proof of structural features such as market concentration, existence of entry barriers and the predator’s capacity to absorb the prey’s market share (see Bolton et al. 2000, 2255-6). The accusation will be summarily dismissed absent the demonstration of the proper structural conditions, or of any other of the various prongs of what after 1993 has been called the *Brooke test*. Far from being inconsistent with, or in opposition to, the ATR and its variants, the recoupment test has actually provided defendants in PP cases with a second, alternative weapon: after 1993 a defendant can prevail in summary judgment by winning in either the recoupment or the price-cost part of the *Brooke* test (Hovenkamp 1996, 833).<sup>61</sup>

What makes *Brooke* so important for our story is that it was the first time after the ATR “revolution” that the Court made its own views about PP fully explicit. These consisted in a strong skepticism about the robustness of predation claims, and a true sea-change from the Court’s earlier idea of competition as so fragile a process that it had to be protected by any significant price reduction operated by big firms.<sup>62</sup> Indeed, the *Brooke* Court went much farther than the simple endorsement of either the ATR or one of its variants.<sup>63</sup> Not even the observation of below-cost pricing, combined with the *theoretical* possibility of recouping (which, as we know, is by itself quite unlikely), should be considered sufficient to validate an accusation of predatory behavior if the proof of the *actual* likelihood of sustained supra-competitive pricing and recoupment were lacking. Hence, as noted by Kobayashi (2010, 44), the idea was explicitly rejected that the mere theoretical possibility of welfare harm could provide a basis for antitrust liability. The Court noted

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<sup>61</sup> The fact itself of applying summary judgment to an antitrust case – a solution explicitly disfavored by the Supreme Court in *Poller v. CBS*, 368 US 467 (1962, at 473), heralded the sea-change in jurisprudential attitude towards antitrust violations: see on this Hovenkamp 1996, 822. In American law a summary judgment is a determination made by a court without a full trial. A party applying for summary judgment will try to persuade the court, via sworn statements and documentary evidence, that there are no material issues of fact remaining to be tried, as well as that the undisputed material facts require judgment to be entered in its favor.

<sup>62</sup> See Boudreaux et al. 1995, 58. Glazer (1994, 606) notes that the *Brooke* plaintiff’s case was *very* strong, so much so that the decision, as well as the Court’s willingness to take a procedurally unusual step, says a lot about the latter’s general attitude towards PP.

<sup>63</sup> Though Areeda and Turner themselves had briefly mentioned the recoupment test in their paper (see Areeda & Turner 1975, 698).

that, although the plaintiff's economic expert had presented a theory of predatory price discrimination<sup>64</sup> and affirmed his belief that, *according to that theory*, a reasonable possibility existed that the defendant's behavior might have injured competition, <<...this does not alter our analysis. When an expert opinion is not supported by sufficient facts to validate it in the eyes of the law, or when indisputable record facts contradict or otherwise render the opinion unreasonable, it cannot support a jury's verdict.>> (*Brooke*, at 242).<sup>65</sup>

As we already know, the most visible outcome of *Brooke* has been that after 1993 no plaintiff has won a PP case at federal courts level – a conviction rate of 0% out of the 39 PP federal cases in the 1993-2000 period. It is not hard to see why. As noted by Bolton et al. (2000, 2258-9), the combination of the exacting standard of proof set by the *Brooke* Court plus the theoretical skepticism that PP can ever be a plausible business strategy plus the judicial neglect of modern strategic theories of PP (of the kind analyzed in the previous §§) easily explains the plaintiffs' miserable success rate after 1993, which in turn validated Glazer (1994, 633)'s dismal prophecy for the future of PP as an antitrust violation. In short, after *Brooke* price cuts made by dominant firms have once more become *de facto* legal in the US, as it had already happened in the immediate post-ATR period.

But where did the *Brooke* test come from? What brought the 1993 Court to completely reverse its 1960s attitude? In particular, given that the role of the recoupment test is precisely to warrant that no PP accusation may end up deterring competitive behavior,<sup>66</sup> where did the Court take the very idea that there may exist some competitive practices which, though potentially harmful, cannot be sanctioned without causing a bigger damage to other, surely pro-competitive conducts?

The most obvious answer is that this view, first developed by the Court in *Matsushita* and then fully formalized in *Brooke*, marked the triumph in US antitrust law of the Chicago School. Evidence in favor of this interpretation is abundant in the two decisions. According to the *Matsushita* Court, predatory strategies are *implausible* in terms of economic theory because they are unlikely to work and especially costly when failing. It follows that, as McGee had already put it (see above, §2.4), <<...predatory pricing schemes are rarely tried, and even more rarely successful.>> (*Matsushita*, at 589). Moreover, given that cutting prices in order to increase business is recognized as <<...the very essence of competition ... >>, it turns out that <<... mistaken inferences in cases like this one are especially costly, because they chill the very conduct the antitrust laws are designed to protect.>> (*ibid.*, at 594). Thus, <<...if the factual context renders

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<sup>64</sup> Recall that *Brooke* was a Robinson-Patnam case. See fn.59.

<sup>65</sup> The Court will play a similar tune a few days later in the *Daubert* decision: see below, §9.

<sup>66</sup> According to Hovenkamp (1996, 836), proving that the possibility of recoupment is concrete is tantamount to saying that PP is rational behavior, and thus likely to occur in that specific situation.

respondents' claim implausible – if the claim is one that simply makes no economic sense – respondents must come forward with more persuasive evidence to support their claim than would otherwise be necessary.>> (ibid., at 587). The point that validating loose PP accusations would risk deterring pro-competitive behavior is made even more forcefully by the *Brooke* Court: <<As a general rule, the exclusionary effect of prices above a relevant measure of cost either reflects the lower cost structure of the alleged predator, and so represents competition on the merits, or is beyond the practical ability of a judicial tribunal to control without courting intolerable risks of chilling legitimate price cutting>> (*Brooke*, at 223).

As we know well, the central argument of Chicago critique against PP was at the same time theoretical and practical. On the theoretical side, starting from McGee 1958, Chicago main point had been precisely that, as a rational business strategy, PP was “rarely tried and even more rarely successful”; on the practical side, Chicago had warned that condemning a firm for cutting its price would send a terrible signal to the business world, deterring the most pro-competitive behavior of all. Accordingly, the *Matsushita* Court referred to <<...a consensus among commentators...>> that price predation is “rarely tried, and even more rarely successful”, quoting in support the full line-up of Chicago anti-PP classics, from McGee 1958 and 1980 to Bork 1978, from Koller 1971 to Easterbrook 1981, plus the ever-present Areeda & Turner 1975 (see *Matsushita*, at 589).

From here it is just a small step to credit as the direct inspiration of the many hurdles set in front of a PP accusation by the *Brooke* Court one of Chicago main “articles of faith” (Crane 2009, 24), namely, the belief that courts and agencies are at best highly infirm when it comes to policing competition – to say it differently, that US antitrust law is founded on the principle that *market* processes are usually superior to *legal* or *administrative* processes at the task of allocating scarce resources. Consistently with this strong belief, antitrust law should proscribe only those behaviors which are flagrantly anti-competitive, leaving to other parts of the law (say, property, contract or tort law) and to incentive-guided market behavior the protection and enhancement of total welfare. The commonest interpretation is that both *Matsushita* and *Brooke* decisions just endorsed this point of view.

It follows that the recoupment test was established as the functionally best screen for PP cases: asking whether recoupment is feasible under the plaintiff’s theory of predation is in fact a much simpler question than the – only apparently – straightforward one: “is the defendant’s price below an appropriate measure of its cost?” (see Boudreaux et al. 1995, 72). Recoupment analysis requires less information than price-cost comparisons because a single finding, such as “other competitors exist” or “entry in the market is easy” or “customers may undertake effective counterstrategies”, is

sufficient to invalidate the test and thus lead to the summary dismissal of the plaintiff's claim – leaving the final word to the market, in line with the core tenet of Chicago economics.

The irony of *Brooke*<sup>67</sup> is that the Court went so far in its decision and established so harsh a standard that plaintiff lost the case despite having substantially demonstrated that defendant had actually engaged in a successful predation strategy. This, according to Glazer (1994, 623), entailed a very *un-Chicago* claim of the superiority of the Court's knowledge over that of market participants themselves. Indeed, the *Brooke* plaintiff accepted the need to prove a plausible recoupment scenario, presented evidence and expert testimony about the objective characteristics of the market showing how defendant could realistically recoup the losses of the predatory phase designed to discipline his rival, and even relied on documented market analysis by the defendant's own management showing that the latter materially acted (by investing millions of dollars) on the belief that a predatory campaign would create a reasonable possibility of lessening competition – in short, the plaintiff had provided the *Brooke* Court with both the “story” and the “intent” (ibid., 625). The fact that it lost anyway means, among other things, that after *Brooke* courts need no longer defer to the informed judgment of market agents.<sup>68</sup> This obviously clashes with the above-mentioned “article of faith” of Chicago economics: <<...the Court's willingness to assume that a sophisticated marketplace actor [the defendant] did not know what it was doing and was, in essence, acting irrationally is actually at odds with the Chicago School's reliance on the wisdom of marketplace actors.>> (ibid., 626).<sup>69</sup> So strong was the 1993 Court's persuasion (fully in line with Chicago views) against the validity of PP claims that a finding of violation was precluded, no matter what the evidence might reveal about the defendant's intent and behavior and no matter what the decision might entail for the broad issue of where market knowledge actually resides.

## §7. Killing games: part II and III

The next pages deal with two other possible explanations of the post-1980 Supreme Court jurisprudence on PP cases, and in particular of its failure to take into account the novel ideas coming from game theory and the so-called Post-Chicago approach to antitrust.<sup>70</sup> These are not

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<sup>67</sup> At least according to the admittedly very partial reading of Glazer 1994: see above, fn.57.

<sup>68</sup> <<*Brooke Group* gives courts license to ignore such evidence [about market agents' knowledge] when it conflicts with their own convictions about what will happen in the marketplace. It tells them that they need not be influenced by the marketplace actors themselves.>> (Glazer 1994, 626).

<sup>69</sup> To add further irony, the plaintiff, in the effort to uphold the relevance of the defendant's beliefs and conduct, relied on the scholarship of no less than Chicago champion Frank Easterbrook (see Glazer 1994, 626, fn.103).

<sup>70</sup> This name characterizes an approach to antitrust law and economics which aims at replacing the Chicago School as the leading theoretical engine for the application of economic theory to competition policy and enforcement. The

intended to deny the validity of the most traditional explanation offered in the previous §, but rather to integrate it, by showing that the straightforward equation “*Matsushita & Brooke* = Chicago antitrust law and economics” does not tell the whole story.

**7.1** The first alternative reading is suggested by Bill Kovacic’s great 2007 paper in the *Columbia Business Law Review* (Kovacic 2007) and emphasizes the role played by three famous Harvard law scholars like Areeda, Turner and, above all, Stephen Breyer.<sup>71</sup>

As noticed before, the recoupment notion had already been briefly mentioned by Areeda and Turner in their 1975 classic,<sup>72</sup> and the paper itself was explicitly mentioned by the Supreme Court among the doctrinal sources of *Matsushita*. But according to Kovacic (2007, 48-9), even more influential on the latter decision has been then-judge Breyer’s 1983 ruling in *Barry Wright*<sup>73</sup>. There Breyer had explicitly endorsed the policy trade-off between the short and long term effects of predation which had animated the post-ATR debate (see above, §2). Yet, his “standard” concern with the possible deterrence of pro-competitive behavior caused by too strict an enforcement of anti-PP law did *not* stem in that decision from the same kind of preoccupations of Chicago economists, but rather from the very feeling that had motivated Areeda and Turner in 1975 (see above, §1), namely, the fear that courts and antitrust agencies often lacked the ability to handle difficult antitrust cases and, consequently, that antitrust law might suffer serious credibility blows from too many unsound decisions.<sup>74</sup>

Kovacic claims that caution about the administrability of rules and the capacity of antitrust institutions to implement them have been the main contributions of Harvard Law School to modern US antitrust. Though sharing the general concern about deterrence effects,<sup>75</sup> Harvard preoccupation was not identical to Chicago’s: while the latter had a theoretical (one would say, ideological) foundation in the alleged superiority of markets in allocating scarce resources with respect to every

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analytical backbone of the Post-Chicago approach is provided by game theory in general, and by AIG in particular. Baker 1989 is considered the informal manifesto of the approach. On Post-Chicago law and economics see for instance Cucinotta et al. 2002.

<sup>71</sup> A Harvard law professor since 1967 and a judge on the First Circuit Court of Appeals since 1980, Stephen G. Breyer has been appointed in 1994 as Associate Justice of the US Supreme Court.

<sup>72</sup> See above, fn.63. At page 698 of Areeda & Turner 1975 we read that: <<...predatory pricing would make little economic sense to a potential predator unless he had [...] ... a very substantial prospect that the losses he incurs in the predatory campaign will be exceeded by the profits to be earned after his rivals have been destroyed>>.

<sup>73</sup> *Barry Wright v. ITT Grinnell Corp.*, 724 F.2d 227 (1<sup>st</sup> Cir., 1983).

<sup>74</sup> In his tribute to the memory of Donald Turner, Breyer wrote that from the mid-1960s <<...it was becoming increasingly apparent that, to create coherent antitrust policy, reliance upon statute, precedent and instinct alone would not work. Unless informed by economics, disciplined with intellectual rigor, and administered with an understanding of industrial practicality, enforcement of the antitrust laws risked uncertainty, economic hardship, and injuring the very consumers they were meant to protect.>> (Breyer 1996, 725).

<sup>75</sup> The passage of Breyer’s *Barry Wright* quoted by the Supreme Court is indeed that: <<[W]e must be concerned lest a rule or precedent that authorizes a search for a particular type of undesirable pricing behavior end up by discouraging legitimate price competition.>> (*Matsushita*, 594).

other institution, the former addressed the practical side of antitrust law enforcing. It follows that the *Brooke* test may be read, at least in part, as the outcome of Harvard scholars' insistence that competition policy should take into account the limitations of US antitrust institutions, and thus give prominence to a few simple and fully operational principles which all courts and agencies may easily apply.<sup>76</sup>

Kovacic's thesis is confirmed by taking a closer look at Justice Breyer's antitrust doctrine.<sup>77</sup> First as a judge in the Court of Appeals of the First Circuit and then as a member of the Supreme Court, Breyer has always decided in antitrust cases in favor of bright-line rules and safe harbors whenever the benefits of exhaustive analysis using all the available economic tools would not justify the costs. *Barry Wright* is exemplary in this regard. In that ruling Breyer rejected an allegation of "unreasonably low price", establishing a bright-line rule which – in the same spirit of ATR – effectively immunized from antitrust scrutiny any price which exceeded both incremental and average costs, thus providing a major channel for bringing Areeda and Turner's proposal into mainstream antitrust jurisprudence, including the Supreme Court's.

In the same decision Breyer also rejected a Ninth Circuit test developed in another PP case which admitted that even a price exceeding average total cost could be predatory if it had been used strategically in order to discipline competition.<sup>78</sup> Crucially, the test was not dismissed via a theoretical argument (say, because price theory proved that pricing above ATC could never harm consumers), but rather on the claim that any rare instance of possible welfare loss caused by such a price did not justify the costs of the fully-fledged rule of reason analysis required to undertake the test. Far from denying that antitrust enforcement could enormously benefit from the insights and rigor of economic theory, Breyer remarked that: <<...while technical economic discussion helps to inform the antitrust laws, those laws cannot precisely replicate the economists' (sometimes conflicting) views. For, *unlike economics, law is an administrative system* the effects of which depend upon the content of rules and precedents only as they are applied by judges and juries in courts and by lawyers advising their clients.>> (*Barry Wright*, at 234, emphasis added). These words immediately preceded the famous passage where Breyer argued that he did not want, for the sake of pursuing every economic complexity and qualification, to risk sacrificing the "bird in hand"

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<sup>76</sup> This view is shared by Bruce Kobayashi, who argues that, far from pushing towards an accurate and economically sophisticated measure of the profit sacrifice incurred by an alleged predator, the Court's real purpose in *Brooke* was to make clear that antitrust enforcers have to accept that their measurement tools are too imprecise to evaluate a firm's business strategy without creating an intolerable risk of deterring pro-competitive behavior (Kobayashi 2010, 60-61). Here, according to Kobayashi, lies a possible explanation for the failure of sophisticated game-theoretic models to affect US courts' attitude towards PP, a point we will return to in the following pages.

<sup>77</sup> See Greenfield & Matheson 2009.

<sup>78</sup> Note that, in confirmation of the early development of (informal) strategic arguments, such a Ninth Circuit test actually predated AIG: see *William Inglis & Sons Baking Co v. ITT Continental Baking Co.*, 668 F.2d 1014 (9<sup>th</sup> Circuit, 1981), at 1035.

of above-cost price cuts, surely benefiting consumers in the short run, for the “bird in the bush” of possible lower prices in the long run (ibid.). Such a clear vision of the policy tradeoff, inevitable in every PP case, between sure short term gains and potential longer term gains has been very influential in US antitrust jurisprudence. Indeed, themes from Breyer’s First Circuit opinions have profoundly affected some of the most significant Supreme Court’s antitrust decisions over the last twenty years.<sup>79</sup>

The suggested interpretation finds further support in Breyer’s voting pattern as a Supreme Court Justice (he joined the Court in 1994). An institutionalist perspective on the comparative competence in decision-making and an overall leaning towards technocracy seem to motivate his decisions. For example in *Trinko*<sup>80</sup> he concurred with Justice Scalia’s opinion in expressing a preference for regulatory decision making by administrative agencies, rather than antitrust enforcement by generalist judges, on account of the superior competence of the former with respect to the latter. In *Leegin*<sup>81</sup> his dissent in favor of rules rather than standards was motivated on the ground that juries may have difficulty in applying open-ended, economically dense standards.

One may legitimately ask whether Justice Breyer’s rule-based antitrust jurisprudence is merely synonymous with pro-defendant. The answer is negative, as Breyer’s actual message in *Barry Wright* was just that definite rules should be applied in appropriate cases – a message which does not necessarily lead to systematically pro-defendant outcomes in antitrust litigations. The real issue upon which Breyer has exercised his enormous influence is that a court’s choice between bright-line rules and more open-ended inquiries (aka, stories) should turn on considerations which have nothing to do with the problem of whether a given conduct (say, a price cut) is or is not anti-competitive. As he famously said in another First Circuit decision: <<We shall take into account of the institutional fact that antitrust rules are court-administered rules. They must be clear enough for lawyers to explain them to clients. They must be administratively workable and therefore cannot always take account of every complex economic circumstance or qualification.>> (*Town of Concord v. Boston Edison Co.*, 915 F.2d 17, 1<sup>st</sup> Circuit, 1990, at 22). What matters most here, Breyer’s opinions seem to have little to do with the Harvard vs. Chicago controversy which

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<sup>79</sup> Starting from the early 1990s, the Court has ruled in favor of defendants in an unbroken line of antitrust case. Several of these decisions adopted a “safe harbor” approach protecting the defendant’s conduct which was clearly inspired by the *Barry Wright* doctrine. For example, the *Matsushita* Court cited the “bird in hand” principle to emphasize the dangers of mistaken inferences in PP litigations. The Court then reiterated the same concern in *Cargill* and, later, in *Brooke*. Even the controversial – and eventually withdrawn – *Section 2 Report* by the US Department of Justice, which aimed at harmonizing the DOJ enforcement of anti-monopolization statutes with the most widely accepted legal doctrine and economic theory (Department of Justice 2008), echoed many of the themes of Breyer’s jurisprudence and quoted *Barry Wright* more than ten times.

<sup>80</sup> *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko LLP*, 540 US 398 (2004).

<sup>81</sup> *Leegin Creative Leather Products Inc. v. PSKS Inc.*, 551 US 877 (2007).

constitutes in so many historical reconstructions the main driving force of the evolution of the last 30-40 years of US antitrust law.<sup>82</sup>

**7.2** The other alternative reading of *Matsushita* and *Brooke* hinges upon the internal logic of Supreme Court's decisions. The reconstruction starts from 1984, when the Court argued in *Monsanto*<sup>83</sup> – a §1 conspiracy case – that a single piece of circumstantial evidence which could have resulted from either a conspiracy or independent behavior was insufficient for a plaintiff to survive a motion for judgment notwithstanding the verdict.<sup>84</sup> The general principle was that, for a plaintiff to defeat a motion for a directed verdict<sup>85</sup> under a claim of concerted price fixing, evidence had to be presented, either direct or circumstantial, that “tends to exclude the possibility” that the alleged conspirators acted independently (*Monsanto*, at 753). In other words, whenever the circumstantial evidence produced by the plaintiff might have been caused by pro-competitive behavior, the Court required that the “tends to exclude” principle be satisfied in order to avoid deterring firms from undertaking a legitimate, pro-efficiency behavior.<sup>86</sup>

The *Monsanto* principle reveals that the “avoid chilling competitive behavior” argument pre-dates *Matsushita*. In his masterful study of the latter decision, Nickolai Levin underlines that the principle itself may well have been the outcome of the rise of Chicago antitrust scholarship, as well as of the Court's Harvard-style desire to employ economics in order to revive and strengthen antitrust law (Levin 2005, 1630). Yet, he also underlines that later decisions, such as *Matsushita*, should be read *first and foremost* as the Court's effort to delimit and clarify the meaning of the *Monsanto* principle. In particular, *Matsushita* should be seen as the effort to extend the principle to a summary judgment context in PP cases. As the Court put it:

<<To survive a motion for summary judgment or for a directed verdict, a plaintiff seeking damages for a violation of [Sherman Act] §1 must present evidence that “tends to exclude the possibility” that the alleged conspirators acted independently. Respondents [...] must show that

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<sup>82</sup> See Crane 2009, 10-11. Concerning *Trinko*, Kovacic (2007, 67-8) underlines how the ideas contained in Justice Scalia's majority opinion are hardly the outcome of Chicago School thinking alone (allegedly championed in the Court by Scalia himself) and should be more correctly considered the product of a Scalia/Breyer collaboration.

<sup>83</sup> *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 US 752 (1984).

<sup>84</sup> Judgment notwithstanding the verdict is a type of judgment in American courts whereby the presiding judge in a civil jury trial may overrule the decision of a jury and reverse or amend their verdict. In literal terms, the judge enters a verdict notwithstanding the jury findings. This intervention permits the judge to exercise discretion to avoid extreme and unreasonable jury decisions and occurs when the judge believes there were insufficient facts on which to base the jury's verdict, or that the latter did not correctly apply the law. The procedure is similar to a situation in which a judge orders a jury to arrive at a particular verdict, called a directed verdict (see next fn.).

<sup>85</sup> A directed verdict is an order from the judge presiding over a jury trial that one side or the other wins. Typically, the judge orders a directed verdict after finding that no reasonable jury could reach a decision to the contrary.

<sup>86</sup> <<It is of considerable importance that independent action by the manufacturer, and concerted action on nonprice restrictions, be distinguished from price-fixing agreements, since, under present law, the latter are subject to *per se* treatment and treble damages.>> (*Monsanto*, at 763). Also see Levin 2005, 1630-1.

the inference of conspiracy is *reasonable in light of the competing inferences* of independent action or collusive action that could not have harmed respondents.>>

(*Matsushita*, at 587-8, emphasis added).

Hence, a new requirement of “reasonable in the light of competing inferences” was developed by the Court, which immediately applied it to the PP case under scrutiny: cutting prices being the very essence of competition, there obviously existed a possible inference of pro-competitive behavior in the light of the observed price reduction, so much so that the motion for summary judgment could not be survived by the *Matsushita* plaintiff.

A few lines before the above-quoted passage, the Court had also argued that: <<...if the factual context renders respondents’ claim implausible – if the claim is one that simply makes no economic sense – respondents must come forward with more persuasive evidence to support their claim than would otherwise be necessary.>> (ibid., at 587). The combination of the two passages leads Levin to read into the new, “reasonable in the light of competing inferences” principle the Court’s clarification that the *Monsanto* “tends to exclude” doctrine also applies to *plausible* allegations: even in front of a plausible inference of antitrust violation, there may still exist a pro-competitive explanation of the same behavior.

Levin’s remark is crucial for our narrative. Not surprisingly, these two key passages immediately precede the fourth section of *Matsushita* decision (pp.589 ff.), namely, the pages where the Court openly addressed Chicago scholarship in order to explain why PP schemes had to be considered implausible on the basis of rigorous economic theory. As argued by Levin (2005, 1632), with the explicit reference to Chicago doctrine, the *Matsushita* Court set forth a new definition of “reasonableness”: starting from 1986 the term “reasonable” incorporates what Levin calls “*a case-external dimension*”, that is to say, the idea that the reasonableness of any specific inference in an antitrust case also depends on how permitting the inference might affect, or deter, market competition in general. It is in this specific sense that *Matsushita* is commonly said to have established a gate-keeping role for courts in antitrust cases (Crane 2007, 77): judges and juries are required to assess the reasonableness of plaintiff’s inferences and in doing so they also have to take into account the external effect on social welfare and market efficiency of either admitting or not a certain inference.

Although the new dimension of reasonableness is confirmed by the several Circuit courts which, using the gate-keeping power granted them by *Matsushita*, have limited admissible inferences of

harmful business behavior,<sup>87</sup> Levin’s study shows that the interpretation of the joint *Monsanto-Matsushita* principle is still an open issue in American law. Does the “tends to exclude” requirement applies to all antitrust cases? Or does it apply only to implausible inferences? Or does it apply only when there is a significant risk of deterring pro-competitive behavior? Take the second (“implausibility only”) reading. This would fit nicely with how the *Matsushita* Court thought of PP stories, inasmuch as, by following Chicago doctrine, predation turns out to be a strategy that no rational, profit-maximizing firm would ever pursue. Yet, recalling that, by its own words, the Court extended the *Monsanto* principle to plausible inferences, it is the third (“deterrence only”) reading which seems more respectful of the Court’s decisions, as the latter aimed at establishing a precautionary requirement against the case-external risk of causing welfare losses by chilling pro-competitive behavior.

The latter reading also seems consistent with another Supreme Court decision in *Kodak*.<sup>88</sup> Despite being a case of tying, *Kodak* deserves a place in our story because it marks the first (and the only, to date) time the Court has admitted into its reasoning an argument based on the notion of imperfect information. As we know, information problems are at the heart of the AIG-based PP stories; more generally, they represent the gist of the whole Chicago vs. Post-Chicago debate. In a nutshell, while the Chicago School believes that information-based issues in market competition should better be left to contract law, i.e., to the firms’ ability to protect themselves through contracts, Post-Chicago scholars argue that, on account of their negative effects on competition, imperfect information problems must be placed at center stage of antitrust law. This divergence hinges upon a deep theoretical issue, namely, the role of information problems in the analytical core of the two viewpoints, respectively, price theory and game theory.

In *Kodak*, the Court seemingly – and quite surprisingly – sided with Post-Chicago in that it argued that imperfect information alone may suffice to destroy an otherwise competitive market. Thus the Court effectively equated imperfect information to other, more traditional anti-competitive features, such as a big market share (see Lande 1993, 194-5). Moreover, the decision established the imperfections in information as a crucial element for defining the relevant market in any given antitrust case, since their very existence may significantly narrow the extent of the market (for example, by preventing customers from turning to potential substitutes of whose existence they may just be unaware: *ibid.*, 197).

*Kodak* quickly became the subject of a hot debate which still goes on among US antitrust scholars. The decision – and its possible extensive interpretation – were immediately recognized as

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<sup>87</sup> For a partial list of PP cases see e.g. Crane 2007, 78, fn.122. Crane notes that the gate-keeping role has been mainly exercised in cases involving the application of *per se* rules, first and foremost PP cases.

<sup>88</sup> *Eastman Kodak Co. v. Image Technical Services Inc.*, 504 US 451 (1992).

capable of shaking the entire antitrust world. According to Kauper (1993, 359), *Kodak* <<...does reflect an unwillingness [of the Court] to be governed by the rational consumer teachings of the price theorists across the board...>>. Another early commentator, Robert Lande, praised it as “a punch on Chicago’s chin”,<sup>89</sup> and identified a list of antitrust areas which might well be revolutionized by the Court’s new ideas (Lande 1993, 198 ff.). Not surprisingly, these were the areas where Chicago influence had been felt more strongly starting from the mid-1975, and even less surprisingly PP featured prominently among them.<sup>90</sup> In the following years *Kodak* has become the flagship of Post-Chicago antitrust, as the adherents to this approach have seen it as the best weapon to start demolishing the Chicago fortress.

The reactions against *Kodak* have been equally strong. A prominent, *non-Chicago* antitrust scholar has argued that the decision is no less than <<...a failed experiment in a type of economic engineering where antitrust has no place...>>, something which would transform antitrust <<into a free-ranging engine for repair of any contract that either deceives or has not taken every possible contingency into account.>> (Herbert Hovenkamp, as quoted by Crane 2009, 13 and 14). Yet, the real issue for our narrative is to note that *Kodak* has been at the same time *the only* imperfect-information-based Supreme Court’s decision and *the last* plaintiff victory in a Supreme Court’s antitrust case to date. Thus, it seems the Court has clearly refused to embrace the extended interpretation of that decision suggested by Lande and other commentators. How to explain then the Court’s sole incursion into the realm of imperfect information? Where did this decision actually come from? Why it had no follow-ups, at least at the highest Court’s level?

To answer these questions we refer once more to Levin 2005, who reinterprets *Kodak* as an outcome of the Court’s internal logic, in particular of its effort to clarify the extent of the *Monsanto/Matsushita* principle. As it turns out, this interpretation also leads to a new reading of *Brooke*, which would in turn represent the Court’s solution to the issues raised by *Kodak*. Rather than embodying the judicial byproduct of the epic clash among competing law and economics schools (Harvard, Chicago, Post-Chicago), the whole sequence *Monsanto – Matsushita – Kodak – Brooke* would thus represent the physiological outcome of the evolution, and clarification, of the Supreme Court’s antitrust jurisprudence.

Levin (2005, 1632) starts from the 1992 Court’s explicit remark that *Matsushita* <<...did not introduce a special burden on plaintiffs facing summary judgment in antitrust cases [...] *Matsushita* demanded only that the nonmoving party’s inferences be reasonable...>> (*Kodak*, at 468). Hence, the Court refused to limit the range of plausible inferences beyond those pertaining to cases where

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<sup>89</sup> Though Kauper (1993, 359) acknowledged that it was <<...hardly a knockout punch>>.

<sup>90</sup> Yet, although he did refer to the predator’s possibility to strategically modify its rivals’ expectations, not even Lande mentioned any AIG paper or result in support (1993, 200).

the defendant's behavior <<...appears always, or almost always, to enhance competition.>> (ibid., at 479).<sup>91</sup> But if *Matsushita* placed no special burden on plaintiffs, nor expressed a favor for defendants in antitrust cases, it follows that the specific refusal to grant summary judgment to defendant Eastman Kodak was justified by the circumstance that the latter's behavior was *not sufficiently competitive* on its face: << We note only that Kodak's service and parts policy is simply not one that appears always or almost always to enhance competition, and therefore to warrant a legal presumption without any evidence of its actual economic impact. In this case, when we weigh the risk of deterring pro-competitive behavior by proceeding to trial against the risk that illegal behavior will go unpunished, the balance tips against summary judgment.>> (ibid.).

In short, according to Levin, what the *Kodak* Court tried to do was just to give a specific solution to the procedural issue left open by *Matsushita*, namely, "how often" an observed business behavior had to be pro-competitive in order to trigger the inference limitation of the original *Monsanto* principle and thus lead a court to "shut the gate" in the plaintiff's face. The answer was that it was not sufficient for the behavior to be generally more favorable than harmful to competition, because the principle of limitation could be invoked only when the behavior was "always, or almost always" pro-competitive.<sup>92</sup> Remarkably, the Court considered cutting prices to be precisely one such case, and thus classified PP as a paradigmatic example of – to borrow Levin's term – *theoretical implausibility*, i.e., of an inference which might even be factually plausible were it not for *current* economic theory clearly indicating that it was very unlikely correct (Levin 2005, 1695).<sup>93</sup> If Levin is right, then it is probably incorrect to read too much into *Kodak* as far as the Chicago vs. Post-Chicago theoretical controversy is concerned – and even less so with respect to the possibility (or desirability) for AIG-based analysis of PP to gain access to courtrooms.<sup>94</sup>

The limited impact of *Kodak* on later antitrust decisions by the Supreme Court is demonstrated by the next case it had to deal with, i.e., *Brooke*.<sup>95</sup> Suffices to note that *Brooke*'s hallmark, the

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<sup>91</sup> Note that the *Kodak* Court explicitly referred to the fact that the plaintiff's theory of predatory pricing in *Matsushita* <<...was "speculative" and was not "reasonable".>>, i.e., made no economic sense (*Kodak*, at 468) – hardly the words one would expect in a decision allegedly aimed at punching Chicago-style antitrust law.

<sup>92</sup> Yet the Court did not clarify how the "degree" of pro-competitiveness of a certain business strategy had to be assessed. Were later courts to take total (or consumer) welfare as the lone yardstick, the *Monsanto/Matsushita* principle would then turn out to have been truly instrumental to the definitive triumph of the Chicago approach. *Kodak*'s silence has left lower courts relatively unconstrained on this point.

<sup>93</sup> The reference to current, or accepted, economic theory highlights the importance of assessing the validity of the theory itself. One year later the same Court will tackle the issue of what constitutes "accepted science" in *Daubert* (see below, §9).

<sup>94</sup> The only sensible way *Kodak* may help the game-theoretic approach to PP seems to descend from its providing an instance of the Court's inference, made under the rule of reason, that proof of anticompetitive effects may serve as proof of market power. Indeed, the logic of defining market power in terms of a firm's conduct and its welfare effects would be clearly favourable to the new approach (see Bolton et al. 2000, 2265)

<sup>95</sup> On the circumstance that the *Kodak* Court's "nod toward standard" (read: towards plausible stories and away from bright line rules) has been ignored by the Court itself in more recent §2 cases, see Crane 2007, 67-8. Crane also investigates the impact of *Kodak*-based new penchant for standards at lower courts' level: see ibid., 70.

recoupment test, established a sharp differentiation between PP and every other instance of exclusionary conduct. In the latter (like e.g. the alleged tying in *Kodak*), the inference of injury to competition may be drawn by looking just at the conduct itself and at market structure. In predation cases – and only in them – a further requirement need be satisfied in order to obey *Brooke*. The fact that an accusation of PP was seen by the 1993 Court as the only instance of “investment in the creation of market power” by a dominant firm which called forth a much tighter standard of proof may thus be read as the Court’s willingness to clarify that *Kodak*’s reasoning did *not* apply to PP cases.<sup>96</sup> In any case, we are miles away from the optimistic claim that *Kodak* be exemplar of the fact that: <<When modern theory [read: imperfect information theory] has been properly briefed to the Supreme Court in other types of antitrust cases and when convincing factual evidence supports the predatory or exclusionary theory, the Court has been willing to follow modern theory.>>.<sup>97</sup>

## §8. A game saver?

In the previous §§ we have offered three possible explanations for *Brooke*. Yet, regardless of whether the decision should be seen as a manifestation of the triumph of Chicago School price theory or as an outcome of a Harvard-style concern for administratively feasible rules or as an application of the *Monsanto/Matsushita* principle of reasonable inferences – or probably as the result of all the three combined – the fact remains that after 1993 no plaintiff has ever won anymore a PP antitrust case at Federal courts level.<sup>98</sup> This is all the more significant given the recent trend in US antitrust courts to favour standards over rules (see Crane 2007), although the *Brooke* principle itself may best be depicted as not a pure rule-like one, but rather as a combination of a rule-like part (the price-cost rule) plus a standard-like part (the recoupment test, entailing a structural analysis).

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<sup>96</sup> It may legitimately be asked why the Court did not make one step further and established the *per se* lawfulness of every price cut by non-collusive firms. Boudreaux et al. (1995, 76-8) argue that, following the Supreme Court’s own justification of *per se* rules (i.e., that rules are justified in preference to standards whenever the risk of possible welfare losses are clearly outweighed by the sum of potential gains plus the sure savings of administrative costs), *Brooke* should have contained a rule legalizing price cuts. As to the objection that the “always or almost always” principle of *Kodak* might have refrained the Court from doing that, on account of the sheer possibility of rare circumstances of harmful price cuts, that would be an instance of what Easterbrook calls “the never fallacy”, i.e., of the idea that, unless a business practice never harms consumers, it is always better for antitrust courts to be left free to determine whether in a specific case the practice under scrutiny may have actually been harmful (Easterbrook 1992, 129-30).

<sup>97</sup> Bolton et al. 2000, 2267, fn.160. Another optimistic reading draws on the fact that both *Matsushita* and *Brooke* were cases not of single firm predation but of alleged conspiracy for predation by tacit coordination. Hence one could limit their validity – including the Court’s harsh critiques against the plaintiffs’ PP theories – to the case of (always highly debatable) theories of tacit coordination (ibid., 2258).

<sup>98</sup> Of particular import among recent decisions is the summary judgment against the Department of Justice in *United States vs. AMR Corp.*, 335 F.3d 1109 (10<sup>th</sup> Cir. 2003). The judgment came on account of the government’s inability to meet the requirements of *Brooke*. Moreover, the government’s reputation theory of predation was explicitly dismissed at the district court level as “subjective and unverifiable”. See Crane 2007, 71, and Monti 2007, 72-3.

Yet, some IO economists did not let *Brooke* go unchallenged. What sounded totally unacceptable to them was that the Supreme Court had authoritatively endorsed Chicago-style price theory just when the game-theoretic approach was replacing it as the hard core of mainstream economics in general, and of modern IO in particular. Historically speaking, the critique was well taken. Indeed, it may be argued that even *before* the game-theoretic revolution Chicago price theory had never achieved in economics the same status and success that it has enjoyed in courtrooms. Leading IO economist Stephen Martin has vigorously claimed that economics in general, and industrial economics in particular, never considered Chicago so-called “tight prior equilibrium method” and its implication, the static, non-strategic approach to competition, as mainstream. Far from representing *the* method of economic theory, Chicago economics has always been considered an idiosyncratic version of the neoclassical theory of perfectly competitive markets, of hardly any utility in the analysis of imperfect competition and antitrust (see Martin 2007).

Regardless of the historical validity of Martin’s claim, it is a no-brainer that since the mid-1980s the advent and quick rise to dominance of game theory set the record straight in the marketplace of ideas: strategic reasoning has become *the* way of doing IO analysis. Yet, in the last three decades many US antitrust courts have considered Chicago views as representative of the whole IO community. In the subfield of price predation, and at the highest judicial level, this attitude is epitomized by the *Brooke* decision.

In reaction to that trend, economists Patrick Bolton and Michael Riordan and law scholar Joseph Brodley have published a few years after *Brooke* an important paper aimed at re-proposing the case for a game-theoretic approach to PP in a way which could make it acceptable by US courts (Bolton et al. 2000; BBR henceforth). The central question of the paper is how to solve the tension between legal decisions like *Brooke* and the outcomes of modern economics. BBR correctly identify the main reason behind the judicial skepticism on PP in the assumption of perfect information underlying the kind of economic models which, more or less explicitly, courts seem to follow when deciding over predation charges (BBR 2000, 2249). As we know, the assumption was typical of the static, non-strategic approach to PP which led the way until the late 1970s. According to BBR, courts still adhere to this approach, wrongly believing that it still mirrors the economists’ consensus. What courts seem to ignore is that such a consensus does not exist anymore (if it ever existed at all), because modern IO models are, at the same time, more sophisticated and more realistic in that they assume imperfect information and build around it plausible predation stories (ibid.).<sup>99</sup> In particular, the authors complain that the *Brooke* Court omitted from its analysis of

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<sup>99</sup> Note once more the emphasis on the higher realism of game-theoretic models of PP – hardly an innocuous claim if only we consider the kind of rationality requirements agents in those games are assumed to possess and apply: see above, §5.

recoupment any consideration of strategic issues (ibid., 2258), totally neglecting the new game-theoretic models which explain PP as a potentially profitable strategy in a dynamic world of imperfect information.

Consistently with this view, BBR offer a new, more general and strategic-oriented definition of PP as <<...a price reduction that is profitable only because of the added market power the predator gains from eliminating, disciplining or otherwise inhibiting the competitive conduct of a rival or potential rival. [...] a predatory price is a price that is profit-maximizing only because of its exclusionary or other anti-competitive effects.>> (BBR 2000, 2242-3). Yet, they also admit that this and similarly economics-based definitions are not operational in terms of applicable legal rules. Hence they propose a five-step approach which aims at being, at the same time, *i*) faithful to modern IO economics, *ii*) consistent with *Brooke* doctrine, and, *iii*) fully operational for courts.

Taking the lead from Joskow & Klevorick 1979 (see above, §2.2), the five steps are divided in two tiers. The first tier, which operates as a screening device, contains three steps: 1) prove the existence of a market structure facilitating PP, 2) prove the plausibility of a predation scheme, 3) prove the probability of recoupment. Only when the first tier has given positive answers to all three steps, i.e., only for those cases surviving the first-tier scrutiny, the court should move to the second tier, which requires more exacting proofs: 4) prove that price is below cost, 5) prove there is no efficiency defense justifying the predator's behavior.<sup>100</sup> The advantage of a two-tiered approach is that, in the same spirit of *Brooke*, it allows cases to be eliminated via the examination of less resource-consuming factors, i.e., before requiring expensive proofs about the firm's costs or its efficiency justifications. Moreover, the three steps in the first tier are fully consistent with the necessary conditions for a PP trial established by the *Brooke* Court (BBR 2000, 2264).

The most important steps for us are the second and third. According to *Brooke*, to reach proof of PP and recoupment plaintiff must show that predation is plausible *ex ante* and probable *ex post* (see above, §6). BBR argue that *ex ante* plausibility may be demonstrated by proving the existence of a predatory scheme, i.e., by giving enough evidence supporting a *credible story* of predation.<sup>101</sup> But, where can the plaintiff look for such a story? BBR's answer is straightforward: modern game theory has provided a whole playbook of possible predatory schemes (see above, §4). It follows that a plaintiff providing evidence in support of one of those strategic stories of PP could legitimately claim that her argument rests on the rigorous foundations of mainstream economics (ibid., 2266-7). As to *ex post* probability, BBR argue that it may be shown by proving either that one or more rivals

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<sup>100</sup> The defendant would obviously bear the burden of proof in this last step.

<sup>101</sup> The proposal is therefore in the same spirit of Kauper's "could test": see above, fn.37. It remains to be seen whether any game-theoretic story of PP may satisfy the *Monsanto-Matsushita* "tends to exclude" principle (see above, §7.2). More on this below, §9.

have been excluded from the market or at least that post-predation market conditions exist which make future recoupment likely. In order to prove the latter, BBR suggest a cost standard, like Baumol's AIC or Joskow & Klevorick's AAC (ibid., 2271-2; see above, §2.2-3).<sup>102</sup>

The philosophy behind BBR's proposal is clear. The only way to reconcile modern economics with current legal doctrine is to go back to a rule of reason approach, though policed by a cost rule.<sup>103</sup> The element of novelty comes from the way rule of reason analysis should be undertaken. Rather than chasing evidence about the ambiguous notion of predatory intent, the analysis should be guided by, and search for, the elements of one of those PP stories told by the game-theoretic literature. This would capture what the authors consider a peculiarity of predation as an antitrust violation, namely, its being too multi-faceted a phenomenon to be identified by a single factor or behavior (say, a single cost rule). In this respect BBR argue that, despite its "strategic" inclination (see above, §2), the whole post-ATR literature missed the point, with the only exception of Schmalensee 1979, who indeed suggested that the most proper approach to PP should be a case-by-case analysis, capable each time of selecting the particular economic model which happens to fit the factual circumstances of the specific case (ibid., 2252).

Before examining the critiques raised against BBR proposal, let me point out an internal inconsistency in their argument. Much as Milgrom and Roberts had done before, BBR identify in McGee 1958 the theoretical pillar of the exceedingly lenient, if not entirely *laissez faire*, approach followed by US antitrust courts vis-à-vis PP charges. That paper is said to epitomize the Chicago price-theoretic view, with the crucial assumption of perfect information being the key to explain why there is no room for PP as a rational business strategy in static, non-strategic models: <<For a long time, McGee's analysis provided the only coherent economic theory of predatory pricing. While some resisted McGee's conclusion that predatory pricing was irrational, no rival theory emerged.>> (ibid., 2244). This statement is clearly instrumental to BBR's thesis that the real problem behind so many pro-defendant decisions be strictly theoretical, so much so that it might be solved only by summoning in courtrooms a better kind of theory, namely, game theory. But we already know that, far from ever being "for a long time" the "only coherent economic theory" of PP, McGee 1958 was even less accepted by courts, which almost completely ignored it. More than that, BBR themselves betray their own statement, as they claim that what they call <<the populist era of predatory pricing enforcement>> ended abruptly not because of McGee's paper, but rather because of Areeda & Turner 1975. They say that: <<The enforcement climate changed radically in

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<sup>102</sup> Thus, as far as the recoupment step is concerned, BBR's proposal brings us back to the old price-cost stuff. One may legitimately wonder how to reconcile this aspect of their proposal with AIG's strong claim that predator's costs have no relation whatsoever with the profitability of predation (or, for that matter, with their own claim that one of the weakest aspects of *Brooke* was the absence of any strategic view of recoupment).

<sup>103</sup> Again the analogy with Joskow & Klevorick 1979 is apparent.

1975 upon the publication of the Areeda-Turner article>> (ibid., 2250), and then offer data about PP convictions confirming the U-turn (see above, §2.1). Given the Harvard affiliation of both Philip Areeda and Donald Turner, it is rather curious that BBR attribute them the raise to dominance among PP courts of Chicago price theory!

Much more than an historical quibble is at stake here. By emphasizing the purely theoretical foundations of the mistaken doctrine followed by post-1975 courts, BBR seem to neglect the real reason behind the ATR success, namely, its being a simple, fully operational rule. In other words, that it wasn't McGee 1958, but rather Areeda & Turner 1975, who really turned the tables of PP enforcement did *not* depend on analytical issues – or, for that matter, on the Chicago vs. Harvard controversy – but first and foremost on the courts' eagerness to adopt a bright-line rule capable of restoring the credibility of antitrust enforcing after so many years of discredited rulings in PP cases. Under this respect, the *Brooke* doctrine just put an authoritative – and long overdue – seal upon a well established attitude.<sup>104</sup>

The implications of BBR's incomplete reconstruction are wider than expected. If the real motivation behind the new, post-1975 attitude of US courts was practical, rather than theoretical, serious doubts may be raised about the concrete possibility of BBR's appeal to the “right theory” – i.e., AIG – to persuade courts to modify their approach. If what judges and juries long for are simple, ready-to-use rules, any proposal calling for a return to fully-fledged rule of reason analysis, including the necessity to trace the evidence supporting complicated stories of strategic predation, is condemned to irrelevance, regardless of its own theoretical merits. This kind of mistake has frequently spoiled PP literature. For example, we now that some of the critics of the ATR committed it, though others did not (see above, §2). It is the same mistake made by the early generation of AIG theorists, though again more acute authors like Milgrom and Roberts were somehow aware of it (see above, §5). Above all, it is the very mistake which most clearly accounts for the failure of game theory to have any effective influence upon PP legal doctrine. It wouldn't take long for the critics of the game-theoretic approach to IO in general, and to predation issues in particular, to point this out.

## **§9. Judges don't play – should they?**

The reaction to BBR's proposal was almost immediate. University of Virginia economists Kenneth Elzinga and David Mills penned a spicy reply where they argued that: <<Although strategic

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<sup>104</sup> BBR's statement is indeed inconsistent with the “double helix” interpretation of the recent history of US antitrust law suggested by Kovacic 2007.

theories of predatory pricing are exemplary in their coherence and rigor, their potential to add value to antitrust policy is much more modest than [BBR] admit.>> (Elzinga & Mills 2001, 2475). What game theorists achieved was to identify sufficient conditions for complete and internally consistent stories explaining why a rational firm endowed with monopoly power could profitably make recourse to PP. By doing that, the strategic approach was complementary, rather than alternative, to standard price theory. Indeed, no author working in the latter tradition ever argued that PP was *always* irrational, but only that the conditions making it a profitable business strategy were quite improbable as well as that the means to detect this kind of violation would be overtly expensive and difficult to apply. In this respect, game theory did manage to reformulate some of the existing loose stories of PP and give them more consistency and plausibility (ibid., 2476-7).

However, Elzinga and Mills remark that the predictions which may be drawn from such game-theoretic reformulations are far too sensitive to the underlying assumptions. Hence, the new PP stories may apply only to <<...factual situations that fit the theory's stringent requirements.>> (ibid., 2477). Hence, we are back to step one, because in order to apply these stories courts need first to prove that facts support them. For example, a court would first have to show that the asymmetry in either information or financial resources – necessary for a dominant firm to prey the rival by successfully misleading her beliefs – actually exists in the case's actual circumstances. But this is exactly what price theorists have always admitted (say, in the deep pocket story).

Strategic stories only make things worse in this respect. First, because they impose a higher standard of judging given the intrinsic fragility of their prescriptions (just think of how a game equilibria may drastically vary as a consequence of slight variations in the assumptions). Here BBR fail to <<...acknowledge that proving a more demanding theory calls for a more discriminating factual inquiry.>> (ibid., 2475). Second, because the key assumption of many of these models which must be empirically proven, namely, the informational asymmetry (the “incumbent-know-best assumption”, as Elzinga and Mills call it), is actually unobservable or unverifiable.<sup>105</sup> Third, one should also be sceptical about the overly simplified market structure underlying all game-theoretic models of PP where the asymmetry between firms is magnified ad hoc. Again, while a PP story may well be plausible in a stylized market, it may not necessarily be so in a more complex setting, closer to real world ones (ibid., 2478).

BBR proposal is also questionable under the procedural side. According to its supporters, a plausible game-theoretic story supported by some ex ante evidence on market structure and the likes should suffice to prove predation in court, with little if no role left for ex post – i.e., after the price cut – evidence. Yet, one might legitimately wonder what BBR would suggest when the market

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<sup>105</sup> Elzinga & Mills 2001, 2478. Yet, they acknowledge that other game-theoretic models exist where equilibrium PP may ensue without assuming any asymmetry at all: see the learning curve model by Cabral & Riordan 1997.

structure and performance do *not* fit ex post the ex ante inferences of injury to competition. This, according to Elzinga and Mills, is what actually happened in some crucial cases, where either the FTC's or the Supreme Court's cautious behavior with respect to PP allegations has been vindicated by ex post market developments (ibid., 2486). Among them features <<...the poster child for the game theoretic approach...>> to predation, i.e., the 1984 *General Foods* coffee case<sup>106</sup> where ex post data clearly showed that <<... had game theoretic interpretations persuaded the FTC to restrain [*General Foods*]'s aggressive pricing, coffee drinkers and competition would have been injured, not the other way round.>> (ibid., 2489).

In short, the prescriptions stemming from the game-theoretic approach have no general analytical value and little practical use: <<Strategic theories of predatory pricing are pristine theoretical existence proofs. Their value lies in identifying sufficient theoretical conditions for predatory pricing to arise as an equilibrium outcome.>> (ibid., 2493-4). The new models answer the question: <<When, as a matter of economic theory, can predatory pricing occur?>>, but this, as Elzinga and Mills note, is *not* the relevant question antitrust courts have to answer – the latter actually being, first, <<Under market conditions actually observed, is predatory pricing the most plausible explanation for an episode of low prices?>>, and, second, <<Are these conditions distinguishable from legitimate competition in the market?>> (ibid., 2479). As these questions clearly show, enforcement of PP law is a practical issue of “is”, not a theoretical issue of “can”.<sup>107</sup>

We devoted so much room to Elzinga & Mills 2001 because it is exemplary of the empirical and theoretical objections raised by economists and law scholars against the strategic approach to PP. Their critique concerning the unobservability or unverifiability of the crucial “incumbent-know-best” assumption aptly summarizes the doubts raised in the literature about the alleged higher realism of game-theoretic models with respect to price-theoretic ones. Other examples in this vein<sup>108</sup> are the scepticism about the heavy burden of rationality required for firms to calculate their equilibrium strategies or the concern about the extreme fragility of the equilibrium itself, symbolized by the Folk Theorem for AIG (see §5). The theorem's thesis that there always exists a context (formally, a set of beliefs) within which one can tell a plausible strategic story of PP depicts an “anything goes” environment which makes the approach itself unacceptable in courtrooms.

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<sup>106</sup> *General Foods Corp.*, 103 FTC 204 (1984). The case is taken as exemplary by both BBR and Milgrom & Roberts 1982b.

<sup>107</sup> Recalling again Kauper's “could test” (see fn.37 above), it is apparent that, by rejecting BBR proposal, Elzinga and Mills also refused the idea that just passing the “could test” (i.e., that a PP story could exist) may be sufficient for a court to avoid summarily dismissing a PP case. This seems consistent with Levin's interpretation of the *Monsanto/Matsushita* principle (see above, §7.2).

<sup>108</sup> Recall that these objections were first raised by Milgrom and Roberts themselves: see above, §5.

The argument may be summarized by saying that game theory cannot suggest the certainty, or even the plausibility, of a certain outcome, but just its logical possibility.<sup>109</sup> As Sam Peltzman noted when reviewing the 1989 *Handbook of Industrial Organization*, what game-theoretic IO models amount to is <<... an almost interminable series of special cases>>, whose conclusions <<...tend to be very sensitive to the way problems are defined and to the assumptions that follow.>> (Peltzman 1991, 206). The very same flexibility of strategic models which lies behind their enormous success in modern IO makes them less apt to produce robust predictions, and thus eventually explains their inability to influence antitrust courts.<sup>110</sup>

The problem is particularly acute in the case of imperfect or incomplete information models, like AIG ones, which require some structure on the beliefs of the market participants. Indeed, there always exists a whole set of stories an antitrust economist may tell in her court testimony, each corresponding to a specific beliefs structure of the competitors, with little if any factual element to pick the “right” one for the case at hand. Starting from rough details of the firms’ behavior, AIG models yield many potential equilibrium outcomes, with no clear way to choose among them. Thus even the most basic antitrust issues have no clear outcome in a Post-Chicago model: anything goes in the AIG world!

The chances that such a world might fare well within the US system of antitrust enforcement – little as they already were – have been wiped off by the same Supreme Court which delivered the *Brooke* decision. In the famous *Daubert* case,<sup>111</sup> the Court established the principle that to be admitted in court an expert testimony must be not only “relevant”, but also “reliable”. The new standard – which applies to any kind of scientific, technical or other specialized knowledge, including economic knowledge – has significantly restricted the scope for expert testimony, entitling courts to a gate-keeping function with respect to the admission of scientific experts.

The literature about the interpretation and impact of *Daubert* on US jurisprudence is huge. To our aim here, it suffices to note that, according to the Court, an expert testimony may be considered “reliable” only if it is scientifically valid, while in order to be “relevant” it must be related to the facts of the matter. It follows that, as far as antitrust law is concerned, an economist may be admitted in courtroom only if her testimony is such as to, first, provide a scientific theory capable of distinguishing between anti- and pro-competitive explanations of the business behavior under

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<sup>109</sup> Also see Kobayashi 1997, 418-9. That modern economic models too often amount to sheer “possibility proofs”, i.e., non-constructive arguments showing just the logical possibility of a certain outcome, is a problem that goes well beyond the boundaries of IO, let alone PP theory. This is not the proper place to investigate more deeply such a delicate issue but see, in a similar vein, AUTHOR 2009c, 144-5.

<sup>110</sup> Also see Kovacic & Shapiro (2000, 55), who note that the only way a court can tell whether in a given case a certain business behavior is welfare improving or welfare reducing is to conduct a fully-fledged rule of reason analysis – hardly a progress with respect to what 1960s antitrust practitioners already knew.

<sup>111</sup> *Daubert v. Merrell Dow Pharm. Inc.*, 509 US 579 (1993). *Brooke* was decided on June 21<sup>st</sup>, *Daubert* came one week later, on June 28<sup>th</sup>.

scrutiny, and, second, apply the theory to the facts of the case. Given that for the *Daubert* Court science means falsifiability, i.e., the specification and testing of logical hypotheses, it has been argued that <<...the *Daubert* standard provides judges with a useful tool to separate economic science from economic fiction.>> (Coate & Fischer 2001, 852).<sup>112</sup>

The characterization of expert knowledge provided by *Daubert* fits well into our reconstruction. Among the fields of antitrust law where the underlying economic theory looks prone to fall under a *Daubert* challenge, PP is one of the most notable instances, both in its classic, pre-McGee version and in its modern, game-theoretic rendition. This is of considerable import for the current debate in antitrust law and economics. As we know, the foundations of the Post-Chicago approach lie in modern game theory; hence, a *Daubert*-based dismissal of the latter on account of its lack of “reliability and relevance” would sound ominous for the possibility of Post-Chicago arguments to find hearing in – let alone be endorsed by – a US court. On the contrary, the rejection would lend support to the Harvard-based skepticism against those economic theories which fail to satisfy the requirements of effective applicability by courts and agencies. How can a theory which is either unreliable or irrelevant, or both, provide an operational tool for the solution of concrete antitrust cases? It follows that the *Daubert* doctrine may be in tune with Harvard emphasis on operational rules and on the limited knowledge and capability of antitrust institutional enforcers, while it heralds bad news for Post-Chicago supporters.

Indeed, according to Coate & Fischer (2001), the Post-Chicago approach, with AIG at its foundations, has run into big troubles when faced with a *Daubert* challenge. While Chicago models are, generally speaking, falsifiable, Post-Chicago ones are so specialized in their underlying assumptions that they are difficult to test (*ibid.*, 823-4). And even admitting that they may be accepted as “reliable science”, it is even more debatable that they be “relevant” in the *Daubert* sense, i.e., that they are able to produce fact-based outcomes (*ibid.*, 828). The empirical fruitfulness of these models is in fact almost nil because their mathematical results only hold when the underlying assumptions are exactly met. Thus, Post-Chicago models cannot be applied to evaluate real world situations: on the one side, the virtual facts upon which they are founded cannot be verified in a courtroom; on the other, the real facts in the trial record are of little or no use in assessing the models themselves (*ibid.*, 832). The verdict is inevitable: the *Daubert* standard requires courts to reject as mere opinion any expert testimony of this kind.

As remarked by Coate & Fischer, a series of post-*Daubert* decisions by lower courts has shown a high degree of skepticism against Post-Chicago claims, when no further evidence is provided relating the challenged conduct to actual market facts or when those facts are indistinguishable from

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<sup>112</sup> Langenfeld and Alexander 2008 offer some data on the “survival rate” of economists’ expert testimonies in antitrust cases when challenged according to the *Daubert* doctrine.

the results of pro-competitive behavior. It goes without saying that PP is a prominent instance of the Post-Chicago difficulties with respect to *Daubert* challenges, so much so that it is not by chance that Coate and Fisher single out BBR's proposal (see §8) as a perfect example of <<...how a [Post-Chicago] theory can degenerate into mere opinion...>> (ibid., 835), and thus be doomed under the *Daubert* doctrine.

The infinite array of outcomes which may possibly arise as equilibria make game-theoretic models, and any expert testimony based upon them, inevitably ad hoc. In the specific case of PP, notwithstanding the theoretical progress brought by AIG, the observation continues to stand that predation theories are so variegated <<...for the same reason that 600 years ago there were a thousand positions on what dragons looked like.>> (Easterbrook 1981, 264). This is obviously a boon in view of the extreme freedom and flexibility it grants to researchers,<sup>113</sup> but is an indictment in terms of the actual applicability in courts. A theoretical result which merely points to a *possible* anticompetitive outcome of a given business strategy is insufficient to win the attention of a post-*Daubert* court. Indeed, were courts to accept an expert testimony <<... that fails to rise above “mere speculation”<sup>[114]</sup> in order to infer that a particular market outcome was the result of anticompetitive conduct rather than the natural result of the competitive process, the result would be a chilling effect on the competitive process.>> (Coate & Fischer 2001, 807, footnote added), i.e., the very kind of risk that *Matsushita* and *Brooke* tried to avoid.

### **Conclusion: law is not a playground**

In a 1989 paper<sup>115</sup> MIT economist Franklin Fisher distinguished between *generalizing* and *exemplifying* theories: the former are those which proceed from wide assumptions to inevitable consequences and which speak in terms of what *must* happen given the background circumstances; the latter are those which focus on determining what *can* happen and are highly sensitive to the assumptions used (Fisher 1989, 117). As Fisher himself recognized, oligopoly theory belongs to the exemplifying category: a lot of different things may happen in an oligopoly model and there is no full theory of what *must* happen given well-defined, measurable circumstances. Hence, he argued oligopoly theory was just a collection of <<...a large number of stories, each one an anecdote

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<sup>113</sup> And not only to researchers. As noted by Coate & Fischer (2001, 837), the wealth of stories available in AIG are also <<...immensely liberating to aggressive antitrust enforces.>>.

<sup>114</sup> These were the words the Eight Circuit Court used to reject the testimony of no less than Stanford professor and future AEA President Robert Hall following a successful *Daubert* challenge in *Concord Boat Corp. v. Brunswick Corp.*, 207 F.3d 1039 (8<sup>th</sup> Cir. 2000).

<sup>115</sup> A mini-classic whose relevance is hard to underestimate, as even the present paper's title clearly shows.

describing what might happen in some particular situation.>> (ibid., 118). Fisher added that the advent of game theory had only made things worse in this respect, because the only kind of generalizing result had been a *negative* one, namely, the Folk Theorem, which <<...tells us that we cannot hope for a general oligopoly theory based only on cost and demand functions and free of the context in which oligopolists operate.>> (ibid.).

In the light of Fisher's distinction and of our analysis in the previous §§, it turns out that the answers to the three basic questions of PP – does it exist theoretically? is it profitable? is it real? (see Introduction) – provided by the Post-Chicago, game-theoretic approach are unable to achieve the status of a generalizing theory, i.e., of the only kind of theory which may find hearing in a US antitrust court, especially after *Brooke* and *Daubert*. Thus, we may claim that the real motivation for the courtroom failure of strategic models of PP is to be found in the irredeemable inconsistency between the exemplifying theories proposed by contemporary IO economists and the kind of arguments considered acceptable by judges or juries. No amount of rigorous theorizing showing the profitability of predatory behavior, nor the empirical observation of successful predatory episodes have managed to modify the legal response to PP, which has remained faithful to the operational imperative of a relatively administrable “bright line” rule, provided of course the rule itself be based on “relevant and reliable science”. What the Supreme Court did in its 1993 *Brooke* decision was therefore *not* to provide any sophisticated yardstick for assessing PP, but rather to proclaim the inherent difficulty and imprecision of any such assessment, and with it the dubious scientific status of any theoretical claim supporting the existence and profitability of predatory behavior.

It is now customary to place *Brooke* within the Court's more general drive, going on throughout the 1990s and still continuing today, to “fix the Court's antitrust” by realigning its doctrine to the findings of modern IO.<sup>116</sup> According to the standard narrative, the strategic turn of IO, with the rise of the Post-Chicago approach, has been the inevitable reaction by those economists who, against the courtroom triumph of the *laissez faire* Chicago approach, employed game theory to rescue and, at the same time, strengthen with a more rigorous dressing some of the old Harvard antitrust mantra prohibiting several of the most typical behaviors by dominant firms. In this story, the *Brooke* decision would simply be representative of all those courts which still stick to Chicago price theory, unaware that this approach has long lost its central status within mainstream economics.

As I tried to show in the paper, this reconstruction is plausible, but at best incomplete. To begin with, asking whether the *Brooke* Court was following Harvard or Chicago is a false problem – or, if you like, a trivial one, since the only correct answer is “both”. This because both approaches entail faithfulness to the simple rule-based view of antitrust enforcement in general, and of PP

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<sup>116</sup> On this general trend see Elhauge 2007; Werden 2009.

enforcement in particular. It is standard price theory, the common ground of both approaches, which imposes adherence to this view. On the contrary, game-theoretic IO points to the opposite direction, i.e., away from simple, mechanical rules and back to a story-based assessment of every predatory case. Hence, the real dichotomy which need be investigated is not Harvard vs. Chicago, but rather rules vs. stories.<sup>117</sup>

Once the terms of the question have been properly identified, it remains to explain why, starting from the mid-1970s most US antitrust courts, and chiefly among them the Supreme Court, have expressed a clear preference for a rule-based approach to predation cases, thereby killing any concrete chance for the game-theoretic methodology to gain any hearing in courtrooms. My bottom line is simply that the history of PP law and economics shows that, at the end of the day, it is the legal argument – *rectius*, the legal attitude with respect to a certain way of presenting an argument – which prevails, rather than the rigor or elegance of one economic theory or another. To quote from Tom (1997, 457): <<The outcomes of particular formal models may be less important than the tendency of the game-theoretic perspective to reinforce the litigator’s traditional emphasis on “the story” at the expense of the appellate judge’s traditional emphasis on “the rule”.>>, and it goes without saying which of the two emphases is destined to prevail in courtrooms.

As to the reason why courts may prefer simple rules to more flexible, but also more complicated, stories, it is apt to go back to Breyer’s 1990 dictum in *Town of Concord*: <<We shall take into account of the institutional fact that antitrust rules are court-administered rules. They must be clear enough for lawyers to explain them to clients. They must be administratively workable and therefore cannot always take account of every complex economic circumstance or qualification.>> (*Town of Concord*, at 22). The price for being consistent with such an obvious truth has been that, as an authoritative commentator and former FTC associate director put it, <<[i]n the one area in which economists’ game-theoretic approaches seemingly offered new possibilities for plaintiff victories – predatory pricing – the post-Chicago approach has failed to deliver.>> (McChesney 2004, 51). A very low price, at least for antitrust judges and juries. Indeed so low that it has allowed the Chicago predator to defend its leadership in the US courtroom “market” at the expense of post-Chicago preys.

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<sup>117</sup> See Crane 2007 for a general assessment of this dichotomy. Note that the “safe harbors” approach, a hallmark of Chicago antitrust, is just a different name for a pro-defendant, rule-based approach.

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