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Abstract: This paper focuses on the differences between Article 82 and Section 2, reflecting largely on the American experience. We start with a discussion of the American experience and use that as a background from which to examine the European law on monopolies. American law is more conservative (less interventionist), reflecting the error cost analysis that is increasingly common in American courts. The second half of this paper provides an empirical comparison of the American and European regimes. Although a preliminary empirical examination suggests that the scope of a country's monopolization law is inversely related to its degree of trade dependence, the actual relationship between trade dependence and the scope of monopolization law appears to be an inverted U.

Keywords: monopolization, Section 2, Article 82, empirical antitrust, international antitrust

I. Introduction

Although there are more than 100 competition law regimes around the world, the United States and the European Union are by far the most important. Both systems have laws constraining the conduct of monopoly firms. In the U.S. this part of competition law is called monopolization law, while in the EU it is called dominance law. We will use the terms interchangeably below. This paper will survey the doctrinal differences and empirically examine the determinants of monopolization law in the U.S. and EU.

In the U.S., the law governing monopolies is provided by Section 2 of the Sherman Act and the judicial opinions interpreting it.[1] In the EU, monopolization law is provided by Article 82 of the European Community Treaty and related case law.[2] Sherman Act Section 2 says that "[e]very person who shall monopolize, or attempt to monopolize, or combine or conspire with any person or persons, to monopolize any part of trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony."[3] Article 82 says that "[a]ny abuse by one or more undertakings of a dominant position within the common market or in a substantial part of it shall be prohibited as incompatible with the common market in so far as it may affect trade between member States."[4] It then provides several examples of types of abuse.[5]

These provisions are both invitations to their respective courts to develop a common law of competition governing dominant firms. In this respect, the American experience is illuminating because it began much earlier than the European effort. The Sherman Act was enacted in 1890, giving us more than 100 years of case law interpreting it. The case law interpreting Article 82 goes back to the early 1970s.[6]

This paper focuses on the broad differences between Article 82 and Section 2, reflecting largely on the American experience.[7] We start with a discussion of the American experience and use that as a background from which to examine the European law on

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[1] For an overview and discussion of statute and case law on monopolization, see PHILLIP AREEDA ET AL., ANTITRUST ANALYSIS 368-342 (6th ed. 2004).

[2] For an overview, see FAULL & NIKPAY: THE EC LAW OF COMPETITION (Jonathan Faull & Ali Nikpay eds., 1999).

[3] The Sherman Antitrust Act, 15 U.S.C. §2 (2000).

[4] Treaty Establishing the European Community, Dec. 24, 2002, 2002 O.J. (C 325) 33, 65 [hereinafter EC Treaty].

[5] EC Treaty art. 82 provides,
Such abuse may, in particular, consist in:
  (a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;
  (b) limiting production, markets or technical development to the prejudice of consumers;
  (c) applying dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;
  (d) making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

[6] FAULL & NIKPAY, *supra* note 2, at 117-203.

[7] For a recent comparison focusing on general enforcement issues, see Douglas H. Ginsburg, Comparing Antitrust Enforcement in the United States and Europe, 1 J. Comp. Law & Economics 427 (2005).

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monopolies. In general, American law is more conservative (less interventionist) – reflecting the error-cost analysis that is increasingly common in American courts.

Although a preliminary empirical examination suggests that the scope of a country's monopolization law is inversely related to its degree of trade dependence,[8] the actual relationship between trade dependence and the scope of monopolization law appears to be an inverted U. As import penetration rises from an initial base level, dominance law increases in scope and then reaches a point where it declines. This is consistent with the theory that domestic firms seek legal protection from competition until a point is reached at which the benefits from additional protection no longer exceed the costs of obtaining it.

The empirical evidence also has implications for the comparison between the U.S. and EU. Any such comparison should control for factors that determine the scope of monopolization law. In comparison to the European countries that were members of the EU before 2004, monopolization law in the U.S. does not appear to be narrower in scope when one controls for the economic and demographic factors that influence it. However, in comparison to the post-2004 enlarged EU, U.S. monopolization law is narrower in scope. Monopolization law is narrower in EU countries with a socialist background. The scope is broader in EU countries with a Scandinavian legal background.

The empirical analysis is for the most part a search for the contemporary determinants of monopolization law, and an inconclusive one at that. The factors that one would expect to be important – wealth, international trade, sectoral composition, size of government – all turn out to be so, but in complicated ways. Wealth, as measured by per capita GDP, is by far the most important factor influencing the scope of monopolization law in the U.S. and EU.

II. Monopolization Law in the U.S. and the EU

A. Section 2 Law

Almost every statute is an invitation to courts to develop a common law based on it.[9] That is because the text of a statute is hardly ever sufficient to resolve all disputes concerning its meaning. Disputes over interpretation inevitably arise and those disputes wind up in court. Judges are called on to fill in the interpretive gaps of the statute.

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[8] On the relationship between imports and monopolization law, see Table 1, infra. Andrew Guzman has offered one theory of the relationship between trade and competition law, see Andrew T. Guzman, *The Case for International Antitrust*, *in* Competition Laws in Conflict, Antitrust Jurisdiction in the Global Economy 99, 101 (Richard A. Epstein & Michael S. Greve eds.,2004). Guzman's thesis is that net importer states (trade dependent states) will tend to have strict antitrust laws because those laws will apply to foreign firms operating in their markets. States that are net exporters will tend to have less strict antitrust laws because they will not want to hamper the competitive efforts of their dominant firms. He suggests that this is externalizing the costs of anticompetitive conduct to foreign consumers.
[9] This brief overview of Section 2 borrows heavily from Keith N. Hylton, *The Law and Economics of Monopolization Standards*, *in* ANTITRUST LAW AND ECONOMICS 82 (Keith N. Hylton ed., Edward Elgar 2010).

However, even if we accept the observation that statutes are invitations to develop common law, Section 2 of the Sherman Act is an unusually broad invitation.[10] The federal legislature in 1890 invited courts to develop a common law of monopolization. What existed before then as English common law on monopolization was scant and unlikely to be of much use to courts in interpreting the Sherman Act.[11]

The American judges took a conservative approach initially.[12] With virtually no case law other than that based on Section 1 to draw on for guidance, they stayed close to familiar precedents, extending the reach of Section 2 only to conduct that seemed most clearly to violate it in light of earlier decisions.[13] The most comprehensive early effort to interpret Section 2 is the *Standard Oil* decision of 1911.[14]

Although Areeda described it as "remarkable for its cloudy prolixity,"[15] *Standard Oil* delivered some important lessons about the early understanding of Section 2.[16] It adopts the "abuse standard" of monopolization,[17] under which a firm can be found guilty of violating Section 2 if it engages in conduct that would violate Section 1 if engaged in by a combination of firms. The abuse standard requires a finding of specific intent to monopolize.[18] Specific intent to monopolize, in turn, is inferred by conduct that cannot be justified on the basis of legitimate competitive goals, conduct that can be understood only as an effort to destroy competition from rivals. The early opinions suggest that it is an objective inquiry based on facts.[19]

The early cases also established that monopoly status is not unlawful.[20] The statute was interpreted to prohibit efforts to monopolize, for example by destroying competitors. However, the statute was not interpreted to prohibit the mere setting of the monopoly price. This part of the early understanding of Section 2 remains valid law in America today.

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[10] Hylton, *supra* note 9, at 83.

[11] Some scholars have questioned the existence of a pre-Sherman Act common law of monopolization, see WILLIAM LETWIN, LAW AND ECONOMIC POLICY IN AMERICA: THE EVOLUTION OF THE SHERMAN ANTITRUST ACT 19 (1965).

[12] Hylton, *supra* note 9 at 84.

[13] *See, e.g.*, KEITH N. HYLTON, ANTITRUST LAW: ECONOMIC THEORY AND COMMON LAW EVOLUTION 186-188 (2003) (discussing early Section 2 case law).

[14] Standard Oil Co. v. United States, 221 U.S. 1 (1911);

[15] PHILLIP AREEDA, ANTITRUST ANALYSIS: PROBLEMS, TEXT, AND CASES 148 (3d ed. 1981).

[16] Hylton, *supra* note 9 at 84.

[17] *E.g.*, HYLTON, *supra* note 13, 187

[18] *Id*. This is also clear from perusing the early opinions. *See, e.g.*, AREEDA ET AL., *supra* note 1, 369-372 (providing excerpts from *Standard Oil*, 221 U.S. at 58, 61, 67, 75, and United States v. American Tobacco Co., 221 U.S. 106, 181-183 (1911), stating that the defendant was found guilty of violating Section 2 because its conduct indicated an intent to monopolize by excluding or destroying rivals).

[19] *See, e.g.*, Areeda et al., supra note 1, 369-372 (excerpts from *Standard Oil*, 221 U.S. at 61, 62, 75 and *American Tobacco*, 221 U.S. at 181-183).

[20] *See e.g., Standard Oil*, 221 U.S. at 62 ("[T]he statute…*by the omission of any direct prohibition against monopoly* in the concrete…indicates a consciousness that the freedom of the individual right to contract…was the most efficient means for the prevention of monopoly") (emphasis added).

The conservative approach to Section 2 reflected in *Standard Oil* was not without controversy.[21] Proponents of strong antitrust enforcement wanted a more aggressive interpretation and found their position vindicated, in their eyes, by the government's loss in the *United States Steel* case of 1920.[22] On the other hand, the conservative approach discouraged judges from attempting to design and implement their own welfare tests of dominant firm conduct. The specific intent test originally adopted asked courts to determine whether there were plausible efficiency or competitive bases for the defendant's conduct. If so, the specific intent test implied that the defendant should not be found guilty of violating Section 2.

The conservative approach was brought to an end in 1945 with Judge Learned Hand's decision in *Alcoa*.[23] Although *Alcoa* is a marvel in clarity in comparison to *Standard Oil*, its statement of the new monopolization standard seems to invite alternative interpretations.[24] Still, one point is clear: the specific intent test is no longer required under Section 2.[25] Beyond that unambiguous point, Judge Hand's decision suggests that, as a general rule, violations of Section 2 will be determined by a balancing of the procompetitive and anticompetitive effects of the defendant's conduct. Under the *Alcoa* test, the defendant may have a substantial efficiency justification for its conduct, yet it may still be found in violation of Section 2 because the anticompetitive effects were deemed too severe by the court.

As a summary of American monopoly law, Judge Hand's statement of it in *Alcoa* remains valid.[26] Courts continue to refer to it as a starting point in discussions of the monopolization test.[27] But a more detailed look reveals that the standard for monopolization has been altered in practice since *Alcoa*, and largely in a direction that favors dominant firm defendants. The date at which the change in Section 2 law began appears to be 1975, with the publication of the Areeda and Turner article on predatory pricing.[28] Areeda and Turner noted the uncertainty surrounding predation charges and the costs of error, and proposed a cost-based test to screen out predation claims with high error costs. Following their article, courts began to adopt their cost-based screen and to take seriously the costs of false convictions.

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[21] Hylton, *supra* note 9 at 85.

[22] United States v. U.S. Steel Corp., 251 U.S. 417 (1920).

[23] United States v. Alum. Co. of America, 148 F.2d 416 (2d Cir. 1945) [hereinafter *Alcoa*].

[24] *See, e.g.*, Steven C. Salop & R. Craig Romaine, *Preserving Monopoly: Economic Analysis, Legal Standards and Microsoft*, 7 GEO. MASON L. REV. 617 (1999) (interpreting *Alcoa* as a "no fault" or strict liability standard), versus Ronald A. Cass & Keith N. Hylton, *Preserving Competition: Economic Analysis, Legal Standards, and Microsoft*, 8 GEO. MASON L. REV. 1 (1999) (interpreting *Alcoa* as a balancing test).

[25] *Alcoa*, 148 F.2d at 432 ("no monopolist monopolizes unconscious of what he is doing").

[26] Hylton, *supra* note 9 at 86.

[27] *See, e.g.*, F. Hoffman-La Roche Ltd. v. Empagram S.A., 542 U.S. 155, 165 (2004); Eastman Kodak Co. v. Image Tech. Svces., 504 U.S. 451, 483 (1992); Aspen Skiing Co. v. Aspen Highland Skiing Corp., 472 U.S. 585 (1985); United States v. Microsoft Corp., 253 F.3d 34, 44 (D.C. Cir. 2001), *cert. denied*, 534 U.S. 952 (2001).

[28] Phillip Areeda & Donald Turner, *Predatory Pricing and Related Practices under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697 (1975).

The changes in Section 2 case law have not occurred across the board, but in specific pockets.[29] One pocket is predatory pricing. The *Matsushita*[30] and *Brooke Group*[31] cases require, in order to hold a firm guilty of predatory pricing under Section 2, a price below some measure of cost (average variable cost usually) and objective evidence that the defendant is likely to recoup the losses incurred in the predatory (low-price) period.[32] The *Brooke Group* test is equivalent to a specific intent test.[33] The reason is that if the requirements of the *Brooke Group* test are satisfied, then one can conclude that the objective evidence implies that the defendant's intent was predatory.

The type of monopolization test, or how it is framed, may not be important in the end. Whether the monopolization test is framed, as in the pre-1945 period, in terms of specific intent, or, as in the post-1945 period, as a welfare balancing test, the underlying question is the evidentiary burden placed on plaintiffs in a monopolization case. In general, the specific intent test, as historically applied, puts the greatest evidentiary burden on the plaintiff. The consumer welfare test places a much lighter burden on the plaintiff. But if the consumer welfare test were coupled with several additional evidentiary burdens – e.g., standards requiring proof by clear and convincing evidence – it could present roughly the same obstacles to plaintiffs as the specific intent test. The issue at bottom is one of evidentiary burden.[34]

Another pocket of Section 2 case law in which courts have drifted back to the specific intent formulation is that involving "essential facilities".[35] The decision in *Aspen*,[36] which suggested that the defendant lost solely because it failed to provide a credible competitive justification for its conduct, carried the implication that the mere provision of such a justification would immunize a defendant from liability in an essential facilities case. That implication was apparently confirmed with Justice Scalia's opinion in *Trinko*.[37]

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[29] Hylton, *supra* note 9 at 86.

[30] Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574 (1986).

[31] Brooke Group, Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 226 (1993) (evidence of below-cost pricing is not alone sufficient to permit an inference of probable recoupment and injury to competition).

[32] *Id.* at 240-242; Matsushita, 475 U.S. at 595-598.

[33] Salop & Romaine, *supra* note 22, at 17, 24, 35; Cass & Hylton, *supra* note 21, at 639, 671.

[34] *Id*.

[35] *See generally* Philip E. Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 ANTITRUST L.J. 841 (1990); Keith N. Hylton, Economic Rents and Essential Facilities, 1991 Brigham Young Univ. L. Rev. 1243; Abbott B. Lipsky, Jr. & J. Gregory Sidak, *Essential Facilities*, 51 STAN. L. REV. 1187 (1999); Glen O. Robinson, *On Refusing to Deal with Rivals*, 87 CORNELL L. REV. 1177 (2002).

[36] Aspen Skiing Co. v. Aspen Highlands Skiing Corp., 472 U.S. 585 (1985).

[37] Verizon Communications Inc. v. Law Offices of V. Trinko, LLP., 540 U.S. 398 (2004). Scalia's opinion, expressing skepticism toward the essential facilities doctrine, described *Aspen* as a case "at or near the outer boundary of Section 2 liability." *Trinko*, 540 U.S. at 409. Scalia described the defendant's conduct in *Aspen* as refusing, without a competitive justification, to supply a product at retail price to one's competitor, Id., at 408-409, which suggested an intent to harm. The defendant in *Trinko* failed to provide a pro-competitive justification for its actions. However, the Court refused to find an antitrust violation based solely on the defendant's failure to accept a statutory burden to support rivals. Thus, *Trinko* implicitly holds that a sufficient justification for denying access to an essential facility is the desire to avoid providing a benefit to a rival. If that is a sufficient justification for denying liability, then it follows that a plaintiff, in

The most important non-Supreme Court Section 2 case of recent history, *Microsoft*,[38] suggests a broader shift toward the specific intent formulation. The D.C. Circuit's opinion initially states the monopolization test as a consumer welfare balancing test.[39] Then, when it gets around to actually applying the test to Microsoft's conduct, it moves into a specific intent analysis. The court repeatedly condemns Microsoft's conduct because it appeared, to the court, to have no credible pro-efficiency or competitive rationale.[40] As an illustration of the inability of verbal formulations to tightly constrain the decision making of courts, the D.C. Circuit's application of the specific intent test put so little weight on Microsoft's justifications that it was arguably equivalent to a balancing test conducted with a pro-plaintiff bias. For example, in examining the complaints concerning Microsoft's integration of Internet Explorer with its Windows operating system, the court found that two of the three complaints (excluding Internet Explorer from the Add/Remove Programs function and commingling browser and operating system code) were violations of the Sherman Act, because Microsoft offered no credible procompetitive justification, while one (overriding the choice of an alternative default browser in certain circumstances) was not a violation because Microsoft's justification was sufficient.[41] Yet it seems that the technical justifications offered by Microsoft, and accepted by the court, in response to the complaint that was rejected should apply just as well to the other two complaints.[42]

American courts have been conservative in interpreting Section 2, in the sense of showing reluctance to penalize a firm simply because of its monopoly status and of allowing wide scope, at least at the level of pure legal doctrine, for efficiency defenses to be asserted.[43] Of the 120 years that the Sherman Act has been in effect, courts applied a specific intent test under Section 2 for 55 of those years – from 1890 to 1945. *Alcoa* introduced a balancing test in 1945 and scrapped the specific intent test. However, since roughly 1975 we have seen the reemergence of versions of the specific intent approach.

B. Judging Article 82 in light of the American experience

Viewed in light of the American experience, Article 82 reflects a more interventionist approach toward antitrust law. The best illustration of this is the fact that Article 82 has been interpreted to make unlawful, as a form of monopoly abuse, the charging of a monopoly price. The first general application provided in the text of Article 82, referring

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order to prevail in an essential facilities case, has to present evidence indicating that the defendant had an *intent to harm* its rival.

[38] *Microsoft*, 253 F.3d at 34.

[39] *Id.* at 58.

[40] *Id.* at 72, 74, 76, 77.

[41] *Id.* at 66-67.

[42] If Internet Explorer should be allowed to override an alternative browser in order to allow the user to get to Microsoft's "HELP" site, then it would seem to follow that the company would want to prevent the user from removing Internet Explorer from the list of programs integrated into the operating system.

[43] *See* Hylton, *supra* note 9 at 86.

to a type of abuse that violates the treaty provision is "directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;..."[44]

1. America versus Europe: Some Examples

American antitrust courts decided early on not to regulate pricing under Section 2 of the Sherman Act. In the first case interpreting the Sherman Act to reach the Supreme Court, *U.S. v. Trans-Missouri*,[45] the Court majority argued against adopting a reasonableness test on the ground that the court would be required by such a test to determine the reasonableness of prices. The Court viewed this as beyond the capacity of judges.[46]

As an argument against using some notion of reasonableness in interpreting the Sherman Act, *Trans-Missouri* is unpersuasive. Pre-Sherman Act common law decisions on contracts in restraint of trade employed the reasonableness test without being led into an examination of the reasonableness of prices or profits.[47] The reasonableness test applies to the defendant firm's allegedly anticompetitive conduct, not to the prices or profits that result from that conduct.

However, as an argument against using law to establish appropriate guidelines for price or profit levels, *Trans-Missouri*'s argument is no less valid today than it was 100 years ago. American courts have consistently rejected the notion that the Sherman Act calls on judges to take on the functions of regulatory commissions with power over pricing decisions.[48]

Predation is another good illustration of the sizeable differences between European and American courts in applying monopolization law. The *Matsushita* and *Brooke Group* cases in America require from the plaintiff, in order to survive a summary judgment motion, proof that the dominant firm priced below average variable cost and that the firm was likely to recoup its losses from pricing below cost. In contrast, the European Court of Justice, in cases such as *AKZO* and *Tetra Pak II*, has held that pricing below average variable cost violates the law against predation, and prices below average cost also violate the law although the defendant can rebut the presumption of a violation.[49] Moreover, there is no requirement on the part of the plaintiff to prove a high likelihood of recoupment.[50]

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[44] EC Treaty art. 82.

[45] United States v. Trans-Missouri Freight Assn., 166 U.S. 290 (1897).

[46] *Id.* at 331.

[47] HYLTON, *supra* note 13, at 33-34.

[48] *See, e.g., Trinko*, 540 U.S. at 415 ("No court should impose a duty to deal that it cannot explain or adequately and reasonably supervise." (quoting Areeda, *supra* note 34, at 853)); United States v. United Shoe Machinery Corp., 110 F. Supp. 295, 347 (D. Mass. 1953) (refusing to order the defendant's dissolution), *aff'd per curiam*, 347 U.S. 521 (1954).

[49] *See, e.g.*, Case C-62/86, AKZO Chemie BV v. Commission, 1991 E.C.R. I-3359; Case T-83/91 Tetra Pak Int'l SA v. Commission, 1994 E.C.R. II-755, 4 C.M.L.R. 726 (1997), *aff'd* C-333/94, 1996 E.C.R. I-5951, 4 C.M.L.R. 662 (1997).

[50] *See, e.g.*, Vickers, *supra* note 38, at F248.

The "essential facilities" doctrine is a third illustration of the formal differences between European and American monopolization law. *Trinko* implies that the set of cases in which the essential facilities doctrine will be used by a court to force a dominant firm to share access to some input with a competitor is quite narrow. The Court's discussion in *Trinko* suggests that strong evidence of intent to monopolize is required. In contrast, the European Court of Justice has been considerably more receptive to the essential facilities doctrine and has not attempted to limit its application to a narrow set of circumstances.[51]

Microsoft v. Commission[52] provides an example of the difference between the US and EU on the essential facilities question. The European Court of First Instance found that Microsoft abused its dominant position by refusing to license, at a sufficiently low price, interoperability information to rivals in the market for server software. The Court of First Instance deferred to the European Commission's analysis of the effects of Microsoft's refusal, but did not independently examine the record for evidence of a specific intent to monopolize.

2. Predation and Error Costs

It is commonplace by now to note that the differences between European and American law on predatory pricing reflect different views on the costs of error. The American approach puts a great deal of weight on the costs of false convictions. Erroneously holding firms liable for setting prices too low penalizes dominant firms for competing vigorously. This discourages competition, a result opposite to that intended by the Sherman Act. The European approach puts more emphasis on the costs of false acquittals. If false acquittal costs are constrained over time by competition, as Easterbrook argued,[53] the American approach would result in superior law.

One could stop at the observation that the wisdom of the American approach depends on the balance of error costs. This would be a convenient and diplomatic statement because no one has carried out an empirical study of the balance of error costs in predatory pricing cases. Hence, noting that the relative wisdom of the two approaches depends on the balance of error costs leaves us with an invitation to do empirical research and perhaps not much more. Moreover, the prospect of answering the welfare question on the basis of empirical research seems slim, because it is hard to isolate the effects of different predation laws on consumer welfare.

An alternative and less diplomatic perspective is the decision-theoretic approach set out in the Hylton and Salinger article, and in the Evans and Padilla article.[54] Let the fraction

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[51] *See* Damien Geradin, Limiting the Scope of Article 82 of the EC Treaty: What can the EU Learn from the US Supreme Court's Judgment in *Trinko* in the wake of Microsoft, IMS, and Deutsche Telekom, at 5-6, Common Market Law Review, December 2005, available at http://ssrn.com/abstract=617263.
[52] Case T-201/04, *available at* http://curia.europa.eu/jurisp/cgi-bin/gettext.pl?lang=en&num=79929082T19040201&doc=T&ouvert=T&seance=ARRET
[53] Frank H. Easterbrook, *The Limits of Antitrust*, 63 Texas L. Rev. 1 (1984).
[54] See generally Keith N. Hylton & Michael A. Salinger, *Tying Law and Policy: A Decision-Theoretic Approach*, 69 ANTITRUST L.J. 469 (2001); David S. Evans & A. Jorge Padilla, *Antitrust: Designing Antitrust Rules for Assessing Unilateral Practices: A Neo-Chicago Approach*, 72 U. CHI. L. REV. 73 (2005).

of competitive price cuts be given by $P(C)$. Let the fraction of anticompetitive (i.e., predatory) price cuts be given by $P(A)$. Let the likelihood that a competitive price cut is ruled anticompetitive be given by $P(A'|C)$, and $P(A'|A)$ the rate of correct decisions given anticompetitive conduct. Bayes' rule tells us that the fraction of competitive instances within the sample of decisions in which the competition authority has deemed the price cutter's conduct anticompetitive is:

$$P(C|A') = \frac{P(A'|C)P(C)}{P(A'|C)P(C) + P(A'|A)P(A)} .$$

Let us suppose that the vast majority of price cuts are procompetitive, say 95 percent. Suppose that the competition authority makes mistakes in only 5 percent of all cases. It follows that the likelihood that a case that has been deemed anticompetitive by the competition authority is really competitive is ½. In other words, half of the cases in which the court finds the conduct anticompetitive were instances in which the conduct really was competitive.

The decision-theoretic approach focuses on the background rate of competitive instances within a certain class of conduct and on the rate at which competition authorities are likely to err in evaluating the conduct. If we take price cuts as a class of conduct, we are likely to find that the vast majority of them are procompetitive. Moreover, a competition authority is likely to have difficulty, ex post, in distinguishing competitive and anticompetitive price cuts. Suppose, for example, that instead of the 5 percent error rate assumed in the previous example, competition authorities make mistakes in 20 percent of predatory pricing cases. Using the Bayes' rule approach just described, the rate of false positives jumps from 50 percent to 83 percent. Moreover, holding error rates fixed and letting the proportion of competitive price cuts rise toward 100 percent causes the rate of false convictions to approach 100 percent.

One might argue that this discussion merely shows that when the law is working, in the sense of inducing actors to comply with it, there will be a high rate of false convictions.[55] However, the message here is different. It is quite plausible in the pricing context to presume that the vast majority of price cuts would be procompetitive even in the absence of antitrust law. Competition already provides a substantial if not sufficient spur for firms to engage in price cutting. Given this, it is not the law that gives us the 95 percent background rate of competitive price cuts, it is competition. If competition gives us a high rate of competitive price cuts, then we need to worry about the effects of a high rate of false convictions on the incentives already put into place by competition.

In other words, the competitive price cut example in antitrust should be distinguished from that of compliance with tort law rules. In the tort law setting, there are not, as a

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For more recent decision-theory arguments, see also James C. Cooper, Luke M. Froeb, Dan O'Brien, Michael G. Vita, Vertical Antitrust Policy as a Problem of Inference, 23 Intn'l J. Industrial Organization 639 (2005).

[55] *See, e.g.*, Keith N. Hylton, *An Asymmetric Information Model of Litigation*, 22 Int. Rev. Law Econ. 153-75 (2003).

general rule, substantial private-interest motivations that would lead one to take costly precautions in order to avoid harming others. A person who drives does not, in the typical case, have strong private-interest motivations to take care to avoid harming strangers. When we see a high rate of compliance with the law in the torts context, that is quite likely due to the threat of liability. A high rate of false convictions may simply be a reflection that the law is working as intended. In the antitrust setting, in contrast, competition already provides a substantial private-interest motivation for firms to make price cuts. A high rate of false convictions, then, is not necessarily a sign that the law is compelling firms to comply with its provisions. Given this, there is a much greater likelihood in the antitrust than in the torts setting that the law distorts unilateral conduct away from the socially preferable.

This argument is clearly capable of being generalized from the predatory pricing example. In general, when the law imposes penalties on conduct that is typically procompetitive, there is a high risk of false convictions that both discourage procompetitive conduct and encourage wasteful litigation. Legal and evidentiary standards should be adjusted to take these costs into account. The evolution of American predatory pricing law toward the *Brooke Group* standard reflects precisely this sort of adjustment.

III. An Empirical Approach

A. Measuring Dominance Law

Aside from the decision theoretic critique briefly recounted here, the only other basis for telling whether the American or European approach to monopolization law is superior is an empirical examination. Since the European approach is more interventionist, the proper question is whether it leads to superior economic results. This would be a difficult project.[56] Economic outcomes are determined by many factors in addition to monopolization law.

An alternative empirical question is to ask what factors seem to explain the variation in monopolization laws within the EC countries and between the United States and the EC. The chart below (Table 1) shows a *Dominance Law Score* (for the year 2003) for the United States and countries that were members of the European Community before 2004. The *Dominance Law Score* reflects the number of different practices explicitly mentioned in the nation's laws governing the conduct of dominant firms.

The *Dominance Law Score* was tabulated as follows. Each country is given a score of 1 if the part of its competition statute covering dominance (monopolization) prohibits one of the following practices: (1) limiting access (restricting supply), (2) abusive acts, (3) price setting, (4) discriminatory pricing, (5) resale price maintenance, (6) blocking entry, (7) predatory pricing. Thus, 7 is the maximum Dominance Law Score possible, and 0 is

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[56] Keith N. Hylton & Fei Deng, *Antitrust Around the World: An Empirical Analysis of the Scope of Competition Laws and Their Effects*, 74 ANTITRUST L.J. 2 (2007)

the minimum.[57] In Table 1, Luxembourg has the sparsest law of them all, with a dominance score of two. It is followed by Belgium and Ireland with Dominance Law Scores of four.

There appears to be a correlation between the dominance score and the share of imports in Gross Domestic Product (GDP). The country with the lowest dominance score, Luxembourg, also has the highest share of imports in GDP (113 percent). The country with the next lowest dominance score, Belgium, also has a relatively high import share (73 percent). Countries with relatively low import shares have relatively high dominance scores. The strength of a country's laws on monopolization seems to increase as the share of trade in GDP declines. Put another way, as a country becomes more dependent on trade, it tends to relax its laws governing dominant firms. What might explain this pattern?

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[57] The scores were compiled by reading the competition law statutes for each country and, where necessary, supplementing the information from case law or other legal reports. For the underlying data, see Keith N. Hylton et al., Antitrust World Reports, *available at* http://antitrustworldwiki.com. The Dominance Law Score is the sums up the totals for the dominance portion of each country's template, and then adds the score for predatory pricing, see *id*., Predatory Pricing Report, Antitrust World Reports, *available at* http://antitrustworldwiki.com/antitrustwiki/index.php/Predatory_Pricing_Report. An earlier version of the data used in this paper are examined in Keith N. Hylton and Fei Deng, *Antitrust Around the World: An Empirical Analysis of the Scope of Competition Laws and Their Effects*, 74 Antitrust L.J. 2 (2007). The scoring approach used is based on the approach in Michael Nicholson, "Quantifying Antitrust Regimes" (February 5, 2004). FTC Bureau of Economics Working Papers No. 267. Available at SSRN: http://ssrn.com/abstract=531124 or DOI: 10.2139/ssrn.531124. The Dominance Score reported in Table 1 is a broad measure of monopolization law on the books. It makes no attempt to capture enforcement zeal. Of course, enforcement zeal may be positively correlated with the amount of law on the books. It would clearly be desirable to develop a more finely-grained measure of the scope of the law. That is a problem to address in the future.

Country	Dominance Score 2003	Imports/GDP
Austria	5	44.81
Belgium	4	76.60
Germany	6	31.67
Denmark	6	38.97
Spain	6	28.60
Finland	6	30.71
France	5	24.55
Greece	6	29.19
Ireland	4	67.64
Italy	6	24.00
Luxembourg	2	113.31
Netherlands	5	56.32
Portugal	6	34.82
Sweden	5	36.91
United Kingdom	7	28.32
United States	5	14.16

Table 1: Dominance score and trade
dependency

Before offering any hypotheses to explain the correlation in Table 1, we should note that
the laws of the individual EU member countries are to some extent preempted by the
Article 82 of the EC treaty. The relationship between national laws and EC law is as
follows. For those matters that do not involve commerce among the several EC member
states (i.e., intra-state, small business matters) the laws of the individual states govern.[58]
For those matters that involve commerce among the EC member states, Article 82
governs.[59] However, Article 82 provides a floor and not a ceiling on monopolization
laws. Individual member states are permitted to go beyond Article 82 in prohibiting
conduct not prohibited by Article 82 (e.g., price cuts when price is above average cost)
and in specifying penalties.[60] But even in this instance, the individual nation laws may be
of interest as a signal of the individual nation's own priorities with respect to

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[58] *See, e.g.,* Eleanor M. Fox, *The Central European Nations and the EU Waiting Room—Why Must the
Central European Nations Adopt the Competition Law of the European Union?*, 23 BROOKLYN J. INTL L.
351, 354 (1997).
[59] *See, e.g.,* Wouter P.J. Wils, *The Modernization of the Enforcement of Articles 81 and 82 EC: A Legal and
Economic Analysis of the Commission's Proposal for a New Council Regulation Replacing Regulation No.
17*, 24 FORDHAM INT'L L.J. 1655, 1656 (2001).
[60] *See, e.g.,* William M. Hannay, *Transnational Competition Law Aspects of Mergers and Acquisitions*, 20
NW. J. INT'L L. & BUS. 287, 291 (2000).

enforcement. For these reasons it is worthwhile to examine the variation in the
dominance laws of various nations.[61]

B. Demand Versus Supply Side Theories of Dominance Law

The roughly inverse correlation between the strength of dominance law, as reflected in
national statutes, and the share of trade in GDP could reflect pressures from the supply
side or from the demand side of the legislative process. Consider the demand side. The
demand-side victims of monopolization are domestic consumers and domestic producers
operating downstream from a monopolist. In a trade-dependent economy, the potential
victims of monopolization may not find a need for a statute constraining the conduct of
dominant domestic firms, because those firms are already disciplined by the traded goods
sector. If the dominant domestic firms were to attempt to raise their prices to monopoly
levels, they would invite importing firms to invade their customer bases. Given this type
of limit-pricing equilibrium, domestic pressure groups consisting of potential demand-
side victims of monopolization would see little need in pressuring the legislature to enact
a statute constraining dominant firms.

Supply side pressure, or the lack of it, provides an alternative explanation for the inverse
correlation between trade and the strength of dominant firm law. The supply-side victims
of firms that monopolize are direct competitors who are frozen out of markets as a result
of the conduct of dominant firms. These potential victims always have an interest in
some level of protection from competition. Put another way, whether the national
economy is trade dependent or not, every domestic firm that perceives itself to be the
potential victim of exclusionary conduct by a dominant firm has an interest in legislation
that offers protection from such conduct.[62]

However, even if a firm has an interest in legislation that protects it from aggressive
competitive conduct, the costs of securing such legislation may exceed the benefits to the
firm. The pressure group formed of these firms may be unable to overcome opposition or
indifference from other legislative coalitions. This is a plausible scenario in a trade-
dependent state. As a result, the inverse correlation between trade dependency and
monopolization law may reflect a lack of effort on the supply side – i.e., on the part of
domestic firms – in securing protective legislation.

Indeed, the (supply side) relationship between the scope of dominance law and the level
of trade may be nonlinear. Starting from a base level of trade (measured by imports as
percent of the domestic economy), domestic firms may first push for more dominance
law to protect them from competition as trade increases. Suppose, as seems plausible,
that competitive pressure from importers comes initially from dominant foreign firms.

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[61] If we examined Article 82 rather than the national competition laws, there would be no variation in the
dominance laws of the EU. The national laws offer a sample with some variation that still reflects
harmonization pressures created by membership in the EU.
[62] One exception to this might be observed when the domestic firms are roughly equal in ability to inflict
competitive harm on one another and view such harms as live-and-let-live nuisances. However, this is
unlikely to be observed.

That pressure is likely to cause domestic dominant firms to compete more aggressively. During this period of intensifying competition from dominant foreign firms, domestic firms will have a strong incentive to seek protection through the enactment of a dominance law. Over time, trade may reach a level at which the costs of seeking more protection from dominance law exceed the benefits. The reason for this turnaround is that as the market becomes less concentrated and more intensively competitive as a result of trade, seeking a more expansive dominance law would do little to protect a domestic firm from competition. As the market becomes less concentrated, fewer firms operating in the market would be constrained by dominance law.

Under this theory, the relationship between trade and the net benefit to domestic firms from dominance law would have an inverted U shape. Assuming the relationship between trade and the net benefit to domestic firms also applies to dominance law itself, we should observe an inverted U relationship across a sample of firms with different import levels.
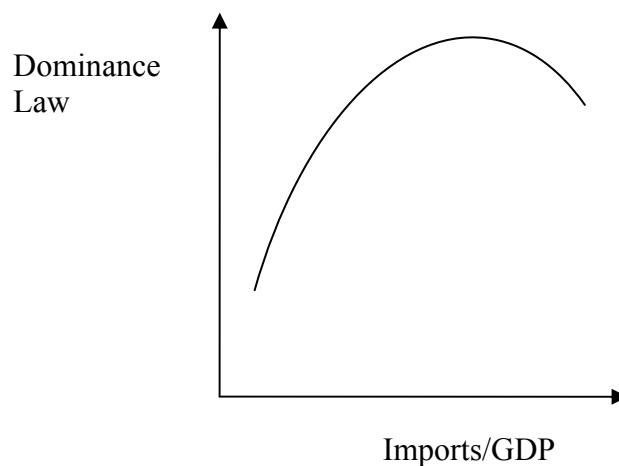
Figure 1: Inverted U Relationship between Dominance Law and Trade

Determining whether the demand-side or supply-side explanation of monopoly legislation is valid is an empirical project. However, legislation is understood today as the product of concentrated rather than diffuse interest groups. The demand-side theory – that the inverse correlation between the strength of monopoly law and trade dependency is due to a lack of demand from consumers – posits the existence of pressure from diffuse interest groups. The supply theory, on the other hand, explains observed legislation as a function of the strength or weakness of concentrated interest groups. The supply-side theory has the advantage of being consistent with modern explanations of legislation.

C. Regression Evidence

In this part we use a regression model to explore the importance of supply and demand side explanations of the determination of dominance law. Treating the Dominance Law Score as the dependent variable, we estimated an equation of the following form:

$$Dominance\ Law = \alpha + \beta_1 GDP + \beta_2 GDPcap + \beta_3 Imports/GDP + \beta_4 Agriculture$$

$$+ \beta_5 Education + \beta_6 Elder + \beta_7 GovSpend + \beta_8 LegalOrigin \quad (1)$$

1. Variables and Hypotheses

GDP is gross domestic product, and *GDPcap* is gross domestic product per capita. The variable *Imports* is a measure of imports as a percent of GDP. *Agriculture* is the percentage of the workforce in the agricultural sector. *Education* is measured as the ratio of secondary school enrollment to the secondary school-aged population. *Elder* is the percentage of the population aged 65 and over.[63] *Govspend* is a measure of government spending as a percentage of GDP. *LegalOrigin* is a dummy variable identifying the legal origin of the country.

The key variable in this analysis is the measure of imports relative to GDP (*Imports/GDP*). As the previous discussion implies, a negative coefficient estimate is consistent with both demand and supply side theories of the production of dominance law. In other words, a negative coefficient is consistent with a regime in which consumers are the major interest group pushing for dominance law (demand side), and also consistent with a regime in which producers are pushing for such laws (supply side), but are unable to enact them because of indifference from other factions.

A positive estimate for the imports variable coefficient would be inconsistent with the demand side theory. As imports increase relative to GDP, consumers should perceive less need to seek legislation protecting them from monopoly abuses. However, a positive estimate for the imports variable would not be inconsistent with the supply side theory. Even if imports are high relative to GDP, some producers will still desire protection from aggressively competitive conduct by dominant firms. Indeed, the desire for such protection may be stronger when import penetration is high, because competition from both foreign and domestic firms would be more intense.

Although *Imports/GDP* is the key variable of concern, some of the other variables could mimic its effect, by having both supply and demand side influences on the production of dominance law. This complicates any effort to predict the signs of the coefficients in the

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[63] All of the explanatory variables used in this paper are from the World Bank data base except for two. First, Imports/GDP is missing for the U.S. in 2004 in the World Bank's data. The number we used is based on the data from the Economic Report of the President, 2005, available at http://www.gpoaccess.gov/eop/tables05.html. Second, for the U.S., the data on Education were taken from the 2007 statistical abstract from the census bureau, available at http://www.census.gov/compendia/statab/labor_force_employment_earnings/labor_force_status/.

regression equation. On the other hand, each estimated coefficient sheds light on the competing theories of the transmission effect of that variable. Rather than attempt to predict the coefficient signs, we will discuss transmission-effect theories here.

We controlled for gross domestic product (*GDP*) on the theory that larger economies will differ in significant respects from smaller ones. There are potentially conflicting effects of economy size on the dominance score. Larger economies will be less dependent on imports to dampen the market power of domestic firms. This suggests that *GDP* will have the same impact as the imports variable, though weaker. On the other hand, sectoral composition affects the scope of monopolization law: antitrust laws were first enacted in industrialized economies.[64] The sectoral composition effect implies the scope of monopolization law will be greater in larger economies.

Per capita GDP (*GDPcap*) is included as an explanatory variable for the obvious reason that wealthier countries should be willing to spend more, other things being equal, on their regulatory preferences. Specifically, if monopolization law is a response to public preferences for protection from monopolistic pricing, then wealthier economies should be willing to spend more on such protection. On the other hand, wealthier economies are associated with larger markets for goods and services, and this suggests that wealth could mimic the effect of the imports variable.

We controlled for the workforce in agriculture (*Agriculture*) on the theory that dominance law is less likely to be observed as that share increases. Historically, the first antitrust laws in the world were enacted in the U.S. and Canada (relatively advanced economies) as a consequence of the power of the railroads and trusts.[65] Agricultural economies are not typically associated with the concerns that led to the first antitrust statutes.

However, our sample consists of the U.S. and European countries, and there are no primarily agricultural economies in this group. The percentage of the workforce in agriculture may capture something other than sectoral composition within our sample. For example, within a sample of wealthy countries, the percentage of the workforce in agriculture could capture the strength of farm lobbies rather than the effect of sectoral structure.

We controlled for education (*Education*) because it should be easier for legislators to persuade a more educated population of the dangers from monopolization. The first antitrust laws in the world were enacted in the U.S. and Canada following widespread press reports critical of the conduct of the railroads and the trusts.[66] This implies that dominance law's scope should be greater in more educated countries.

The variable measuring the percentage of elderly (*Elder*) is an attempt to get at the degree of risk aversion in the population. Older workers and business owners probably would perceive a stronger need to be protected from business losses that might result from

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[64] See, e.g., HYLTON, supra note 13, at 37-39.
[65] HYLTON, supra note 13, at 37-39.
[66] Id.

aggressive competition. This would lead to a greater scope of dominance law as the percentage of elderly increases.

The amount of government spending relative to GDP (*Govspend*) is relevant to the production of dominance law because an economy dominated by the government will probably generate fewer demands for protection from dominant firms. Such firms are likely to be under considerable government regulation already. In addition, the government itself may be less willing to effectively surrender some of its power to consumers directly (as in the case of the Clayton Act, which permits private lawsuits) or to special government agencies.[67] This the scope of dominance law will decline as the share of government spending in the economy increases.

The final set of regressors control for the legal origin of the country.[68] Legal origin is treated as indicator of the inclination toward market regulation, on the assumption that countries with similar legal origins are more likely to take similar approaches to competition law. We control for English, Scandinavian, Socialist, French, and German legal origins.

2. Regression Approaches

In theory, equation (1) would describe the relationship between a continuous dominance law variable and several explanatory variables. In fact, we have a discrete dependent variable that measures categories in which a country's dominance law falls. Technically, ordered probit is the preferred regression method given our data.

The dominance score ranges from 1 to 7. As the difference between the score of 2 and 3 may not be the same as that between 3 an 4 (and so on) due to the coding of the statute, it is important to examine the determinants of dominance law using an ordered probit model. Suppose that latent variable depends on a vector of observable characteristics as we used in the above OLS regressions,

$$y_{it}^* = X_{it}'\beta + \varepsilon_{it} \ ,$$

where ε_{it} follows standard normal distribution. We observe only the dominance score y but not the latent variable y^* where

$$y = 1 \text{ if } y^* \le \mu_1$$
$$y = j \text{ if } \mu_{j-1} < y^* \le \mu_j$$
$$y = J \text{ if } y^* > \mu_{J-1}$$

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[67] See Franz Kronthaler & Johannes Stephan, Factors Accounting for the Enactment of a Competition Law – An Empirical Analysis, 52 ANTITRUST BULLETIN 137, 147 (2007).
[68] La Porta et al, The Quality of Government, 15 J. Law, Econ. & Org. 222 (1999).

We set J equal to 5 in our analysis. Given in our sample, the frequency of having dominance no bigger than 3 is small, we combine and set up $y = 1$ for dominance scores equal to 1 or 2 and $y = 2$ for dominance scores equal to 3 or 4. As a result, we have 5 individual categories with 4 thresholds. The model is estimated using the maximum likelihood estimation procedure. Again because observations of each individual country may be correlated to each other, the estimation is clustered at the country level.

Given the estimation of the parameters and the thresholds, the probability of having a dominance score equal to j could be calculated as follows,

$$\Pr(y = 1 \mid X) = \Pr(y^* \leq \mu_1 \mid X) = \Phi(\mu_1 - X\beta)$$
$$\Pr(y = j \mid X) = \Pr(\mu_{j-1} < y^* \leq \mu_j \mid X) = \Phi(\mu_j - X\beta) - \Phi(\mu_{j-1} - X\beta)$$
$$\Pr(y = J \mid X) = \Pr(y^* > \mu_{J-1} \mid X) = 1 - \Phi(\mu_{J-1} - X\beta)$$

The interpretation of the parameters is not as straightforward as those parameters are of limited interest. To calculate the marginal effect of each variable, we have

$$\frac{\partial \Pr(y = 1 \mid X)}{\partial X_k} = -\beta_k \phi(\mu_1 - X\beta)$$
$$\frac{\partial \Pr(y = j \mid X)}{\partial X_k} = -\beta_k \left[\phi(\mu_j - X\beta) - \phi(\mu_{j-1} - X\beta) \right]$$
$$\frac{\partial \Pr(y = J \mid X)}{\partial X_k} = \beta_k \phi(\mu_{J-1} - X\beta)$$

where $\phi(\cdot)$ is the probability density function for normal. Note here that the marginal effect will change as the underlying values of X changes.

An alternative model to consider is the fixed effects framework

$$y_{it}^* = X_{it}'\beta + \theta_i + \varepsilon_{it} \ ,$$

where θ_i is a time-invariant effect on the scope of dominance law in each country. Although we have attempted to control for time-invariant effects (e.g., *LegalOrigin*), if the variables incorporated in X do not effectively control for such effects the fixed effects estimator would be preferable to the ordinary least squares approach.

The greatest drawback with the fixed effects estimator is that our data are not well suited for it. Estimation in the fixed effects model requires temporal variation in y and X, but our dominance law measure y is relatively stable. The dominance score changes in very few countries over the time period of our sample. Still, we present the fixed effects results later because they are helpful in interpreting the least squares and ordered probit results.

3. Ordered Probit and Least Squares Results

Tables 2 and 3 present the results of ordered probit and ordinary least squares regression of equation (1) for the European Union member countries and the U.S. We have decided to present both ordinary least squares and ordered probit results because the greater ease of interpreting the least squares results.

For the period of the sample (2000 to 2004 inclusive) the EU consisted of 15 members: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom. During this period, ten countries were waiting to join the EU: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. Because of missing observations, Cyprus had to be dropped from the sample.

The first two columns of Tables 2 and 3 present results for the EU15 and the U.S. The last three columns present results for the EU25 (excluding Cyprus) and the U.S. Both GDP and GDP per capita are logged in the regressions.

a. Imports

The imports (relative to GDP) measure is statistically significant in most of the columns in both Tables 2 and 3. In general, the imports estimate suggests that trade dependency is negatively related to the scope of dominance law – put simply, more trade dependent states have less dominance law. But this general impression weakens as more variables controlling for heterogeneity are included in the regression. The imports variable loses statistical significance in the in the EU15 regression that includes the legal origin variables. It also loses significance in the last regression, and changes slope when interacted with a dummy variable representing non-EU countries (i.e., the ten countries waiting to join the EU during the sample period).

The first and third columns, which drop the legal origin variables, permit one to see how much the estimated import effect changes as additional variables controlling for heterogeneity are added. In general, the imports measure doubles in impact when the legal origin variables are excluded.

These results suggest that the apparent negative relationship between imports and the scope of dominance law is not as strong as suggested by Table 1. As more variables controlling for heterogeneity among the countries are included in the regression, the relationship between dominance law and imports weakens substantially.

The last column of Table 2 further undermines the implied negative relationship of Table 1 (comparing dominance law scores and import percentages). Here we include an interaction between imports and non-EU status. The slope of the imports variable is positive in this column for the non-EU countries.

b. Other Variables

The U.S dummy variable is negative and statistically significant in the EU25 sample and not in the EU15 sample. This suggests that the U.S. is not more conservative than the core EU members, if judged on the basis of the scope of statutory law. However, the U.S. is more conservative than the enlarged EU. Thus, even after controlling for variables affecting the scope of the law, dominance law in the U.S. appears to be more conservative (or less interventionist) than that in Europe. In light of our earlier discussion of monopolization doctrine, these results probably understate the degree to which U.S. monopolization law is more conservative than the laws of the EU members. First, the laws of the individual nations, which were used in the regression analysis, are not more expansive and some are less expansive than EU law. It follows that if the U.S. appears to be conservative in comparison to the laws of the individual EU member states, it is even more conservative in comparison to EU law. Second, our coding of monopolization laws fails to incorporate some important details, such as the approach of a given regime toward essential facilities cases.[69] In this special area of dominance law, the U.S. is more conservative than the other nations with competition laws.

Legal origin affects dominance law. The European countries with a socialist legal background have a narrower dominance law than the rest of Europe. Those with a Scandinavian legal background have broader monopolization laws.

There are varying levels of statistical significance observed in the remaining variables. Per capita GDP appears to have the greatest effect overall and has a consistently negative impact. This is inconsistent with a view of monopolization law as responsive to public preferences. It is consistent with the prediction that GDP per capita would mimic the effect of the imports measure – in the sense that wealthier economies are associated with larger more competitively intense economies.

Percent elderly, which we predicted would have a positive impact as a more risk-averse population would demand more protection from competition law, has an insignificant impact for the most part and a negative and significant impact in one regression. This goes against the view that dominance law responds to the risk preferences of the population.

4. Marginal Effects from Ordered Probit Regressions

The ordered probit model permits us to examine marginal effects for each of the explanatory variables and for each category of dominance law. Recall that the ordered probit model assumes 5 categories: category one consists if dominance law scores 1 and 2; category 2 consists of dominance law scores 3 and 4; categories 3, 4, and 5 consist of dominance scores 5, 6, and 7 respectively.

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[69] However, we have incorporate information on predatory pricing laws in the dominance measure used for the regressions. This should limit the degree to which the dominance measure understates the gap between U.S. law and that of EU member states.

Table 4 presents marginal effects from the ordered probit regressions. We used the third regression of Table 3 to calculate marginal effects.

The marginal effects for the U.S. show that an increase *Imports/GDP* increases the likelihood of being in the low dominance score ranges of 1 through 4. Increasing imports reduces the likelihood of being in dominance score range of 5, 6, and 7. For the EU, an increase in imports increases the likelihood of being in the dominance score range of 1 through 5, and reduces the likelihood of being at the highest levels of 6 and 7.

The marginal effects for the both the U.S. and the EU are consistent with the inverted U hypothesis. They suggest that the point at which the benefits provided to domestic firms from monopolization law declines earlier in the U.S. than in Europe.

5. OLS again

The relationship between imports and dominance law is more complicated than the negative correlation observed in Table 1. Table 2 shows that when controlling for heterogeneity both in the sample (column 2 of Table 2) and in the slop of the imports variable (column 5 of Table 2), the negative relationship fails to hold. One explanation for this failure is provided by the marginal effects from the ordered probit model. The marginal effects suggest that the imports variable has an inverted U relationship with the dominance law measure.

In this part, we use ordinary least squares for an alternative test of the inverted U hypothesis. Specifically, Table 5 presents results in which the imports and the square of imports are included as regressors. Moreover, we have divided the variable into two categories depending on the scale of imports. The slope for the imports variable is allowed to differ for countries with imports less than 50 percent of GDP (*Imports/GDP*Small*), and for countries with imports greater than 50 percent of GDP (*Imports/GDP*Big*).

The reason for suspecting a nonlinear relationship is that domestic firms may initially seek additional protection from competition as imports enter the domestic market. However, at some point the marginal benefits of protection fall below the marginal cost, after which imports no longer generate a greater push by domestic firms for legal protection.

We have divided countries according to the level of imports on the theory that the baseline relationship between imports and dominance law should differ between large economies and small dependent economies. In a small dependent economy, the baseline level of imports (measured when dominance law is at a minimal level) will be large as a percentage of GDP. For a large economy, the baseline level of imports will be relatively small. If, as we have hypothesized, an inverted U shape explains the relationship between imports and dominance law within both sets of countries, a regression that failed to separate the two groups would confuse the nonlinear relationships observed in both sets of countries.

The results of Table 5 are consistent with the nonlinear relationship theory. For both small import and trade-dependent economies, one observes a statistically significant, inverted U shaped relationship between imports and dominance law. The cross-over points for the large (small import) economies occur at 36.5 percent and 31.2 percent in the first and second columns respectively. For trade-dependent (big import) economies, the cross-over points occur at 53.5 and 51 percent.

6. Fixed Effects Regressions

Because of the small number of changes in the dominance law variable, our sample is not well suited for the fixed effects framework. We ran the fixed effects model anyway to examine its implications. Table 6 presents fixed effects regressions, both with the EU15 sample and the EU25 sample. The most noticeable difference is that the imports variable has a statistically significant and positive coefficient in the fixed effects regressions.

However, the relatively small number of changes in the dominance law variable over the period of the sample provides a strong reason to discount the fixed effects results. The countries that experienced changes in the dominance law scope are Czech Republic, Ireland, Luxembourg (two changes over the sample period), and Slovak Republic. Each of these countries is a relatively small, trade-dependent economy (imports as a percent of GDP exceeds 50 percent in each country). These results provide additional support to the inverted U hypothesis.

Moreover, since two of the four countries in the group with changes are in the non-EU subsample, the positive estimate in the fixed effects regression confirms the finding of the last regression of Tables 2 and 3, where the imports variable has a positive slope for the non-EU countries.

7. Discussion

We have distinguished supply and demand side theories of dominance law and attempted to find evidence for these theories in the regression results. Under a demand side theory, dominance law is produced in response to demands for protection from monopolistic pricing. Under a supply side theory, dominance law is produced in response to demands by domestic firms for protection from the aggressive competitive conduct of dominant firms.

Both demand and supply-side theories are consistent with the observed negative correlation between the scope of dominance law and the level of import penetration. However, we argue that only the supply-side theory is consistent with a positive relationship between import penetration and the scope of dominance law.

The regression evidence supports neither theory as a general account of the process by which dominance law is generated in the wealthiest economies. The regression evidence is consistent with a third theory advanced here, of an inverted U relationship between

import penetration and the scope of dominance law. Under the nonlinear relationship theory, dominance law and import penetration are positively related initially, as import penetration rises above a baseline initial level. As import penetration increases, a point is reached at which the benefits of legal protection to domestic firms are no longer greater than the costs of seeking protection.

Under the nonlinear relationship theory, slope of the imports variable in the dominance law regression will depend on the type of country and the level of import penetration. Regressions that fail to disaggregate the countries will generate unreliable results. The negative coefficient in the OLS regressions and the positive coefficient in the fixed effects regressions are both incorrect as general descriptions of the relationship between import penetration and dominance law. Indeed, the positive result for the fixed effects regressions probably reflects the disproportionate share of small dependent countries among the countries that experienced changes in the scope of dominance law in the period of the sample.

IV. Conclusion

This paper is both a survey and an empirical assessment of US and EU monopolization law. The empirical results raise questions about the forces that generate monopolization law.

American monopolization law has evolved to be more conservative than European law in its present stage. Roughly since the publication of Areeda and Turner's article on predation, American courts and commentators have shown a concern for potential false conviction costs under monopolization law. This concern has been especially evident in predation law (*Brooke Group*) and the law governing unilateral refusals to deal (*Trinko*).

Our empirical analysis has focused on the factors that explain broad variations in the scope of monopolization law in the U.S. and EU. One factor of special interest is international trade. Monopolization law appears to have an inverted U relationship with import penetration, rising first with import penetration and then falling. This finding is inconsistent with the theory that monopolization law in the most important competition law regimes develops in response to consumer demands for protection from monopoly pricing.

Table 2: OLS

Dependent variable: Dominance Score	Reg. 1 (EU15)	Reg. 2 (EU15)	Reg. 3 (EU25)	Reg. 4 (EU25)	Reg.5 (EU25)
Independent variables:	Coefficient (|t-stat|)				
GDP	-0.204 (0.63)	0.069 (0.39)	-0.112 (0.66)	0.137 (0.91)	0.529** (2.98)
GDP per capita	-1.73 (1.45)	-2.893** (2.58)	-0.528** (2.30)	-1.867** (5.61)	-0.943* (1.97)
Imports/GDP	-0.043** (4.92)	-0.016 (1.41)	-0.043** (5.38)	-0.019** (2.36)	-0.006 (0.74)
Agriculture	-0.15 (1.01)	-0.139 (1.50)	-0.113** (2.81)	-0.085** (2.86)	0.048 (0.95)
Education	-0.008 (1.06)	-0.019 (1.99)	0.000 (0.00)	-0.006 (1.19)	-0.003 (0.67)
Elder	-0.149** (2.73)	-0.051 (0.69)	-0.069 (0.88)	-0.015 (0.13)	0.06 (0.57)
Government Spending	-0.013 (0.29)	0.017 (0.40)	-0.068** (2.52)	-0.06* (1.96)	-0.051* (1.89)
US	-1.399 (1.65)	-1.219* (1.76)	-1.984** (2.97)	-1.741** (2.54)	-2.367** (3.43)
Legal Origin_England		0.713* (1.85)		0.647 (1.27)	0.76 (1.55)
Legal Origin_French		-0.303 (1.45)		-0.065 (0.31)	-0.096 (0.42)

Legal Origin_Scan		0.954[*] (1.95)		1.093[**] (2.56)	1.469[**] (3.17)
Legal Origin_Socialist		.		-1.888[**] (4.59)	-2.517[**] (6.65)
*Imports/GDP*NEU*					0.038[**] (2.89)
Constant	34.393 (1.53)	36.399[**] (2.43)	18.594[**] (3.89)	23.547[**] (6.06)	0.825 (0.09)
Rsquared Adjusted	0.712	0.764	0.468	0.602	0.664
N	80	80	125	125	125

Note: ** p<0.05 and * p<0.1
Table 2: OLS regression, with year dummies, standard errors are clustered at country level

Table 3: Ordered Probit

Dependent variable: Dominance Score	Reg. 1 (EU15)	Reg. 2 (EU15)	Reg. 3 (EU25)	Reg. 4 (EU25)	Reg.5 (EU25)
Independent variables:	Coefficient (|t-stat|)				
GDP	-1.032* (1.73)	-0.491 (0.87)	-0.118 (0.43)	0.392 (1.32)	1.141** (2.93)
GDP per capita	-4.75** (2.35)	-7.204** (2.56)	-0.595* (1.77)	-3.266** (3.83)	-1.842* (1.72)
Imports/GDP	-0.099** (3.78)	-0.048 (1.45)	-0.058** (3.87)	-0.024 (1.42)	-0.001 (0.05)
Agriculture	-0.538** (2.09)	-0.556** (2.46)	-0.171** (2.90)	-0.154** (2.44)	0.079 (0.79)
Education	-0.052** (3.10)	-0.076** (2.93)	-0.009 (0.90)	-0.03** (3.03)	-0.029** (2.98)
Elder	-0.221 (1.54)	0.009 (0.05)	-0.081 (0.62)	0.035 (0.17)	0.174 (0.89)
Government Spending	-0.022 (0.22)	-0.022 (0.22)	-0.122** (2.44)	-0.152** (2.41)	-0.14** (2.18)
US	-1.982 (1.16)	-2.182 (1.28)	-3.488** (3.06)	-4.02** (2.73)	-5.396** (3.15)
Legal Origin_England		2.246* (1.77)		1.712 (1.36)	1.914 (1.52)
Legal Origin_French		0.134 (0.21)		0.432 (0.86)	0.321 (0.57)
Legal Origin_Scan		2.797* (1.77)		3.023** (3.67)	3.853** (4.08)

Legal Origin_Socialist				-3.015**	-4.577**
				(2.53)	(3.89)
*Imports/GDP*NEU*					0.07**
					(2.87)
Log Likelihood	-54.544	-45.871	-117.487	-95.502	-87.897
N	80	80	125	125	125

Note: ** p<0.05 and * p<0.1
Table 3: Ordered Probit regression, with year dummies, standard errors are clustered at country level

Table 4: Marginal Effects of the Explanatory Variables on Dominance Score

United States

Dominance Score	GDP	GDP per capita	Imports/GDP	Government Spending
1,2	0.386%	1.945%	0.191%	0.399%
3,4	3.745%	18.892%	1.851%	3.879%
5	-0.655%	-3.307%	-0.324%	-0.679%
6	-3.448%	-17.393%	-1.704%	-3.571%
7	-0.027%	-0.137%	-0.013%	-0.028%

Europe

Dominance Score	GDP	GDP per capita	Imports/GDP	Government Spending
1,2	0.065%	0.329%	0.032%	0.067%
3,4	2.225%	11.226%	1.100%	2.305%
5	2.399%	12.101%	1.185%	2.484%
6	-4.494%	-22.671%	-2.221%	-4.655%
7	-0.195%	-0.985%	-0.096%	-0.202%

Table 5: OLS

Dependent variable: Dominance Score	Reg. 1	Reg. 2
Independent variables:	Coefficient (|t-stat|)	
Imports/GDP*Big	0.107* (1.98)	0.102* (1.95)
Imports/GDP*Big^2	-0.001* (1.96)	-0.001** (2.03)
Imports/GDP*Small	0.292** (2.45)	0.312** (2.71)
Imports/GDP*Small^2	-0.004** (2.41)	-0.005** (2.86)
GDP	0.186 (1.47)	-0.012 (0.14)
GDP per capita	-0.963** (3.19)	-1.168** (4.08)
Agriculture	-0.044 (1.60)	-0.079** (4.25)
Education	-0.009 (1.31)	-0.006 (1.02)
Elder	0.055 (0.83)	-0.006 (0.11)
Government Spending	-0.05** (2.94)	-0.047** (2.66)
US	-0.091 (0.12)	0.163 (0.22)

NEU	1.332**	
	(2.19)	
Legal Origin_England	0.835**	0.618**
	(2.51)	(1.99)
Legal Origin_French	0.210	0.100
	(0.78)	(0.39)
Legal Origin_Scan	0.994**	0.55*
	(2.25)	(1.66)
Legal Origin_Socialist	-1.54**	-0.872**
	(3.19)	(2.03)
Constant	6.312	14.711**
	(0.99)	(3.40)
Rsquared Adjusted	0.659	0.644
N	125	125

Note: ** $p<0.05$ and * $p<0.1$

Table 5: OLS based on the size of Imports/GDP

Table 6: Fixed Effects

Dependent variable: Dominance Score	Reg. 1 (EU15)	Reg. 2 (EU15)	Reg. 3 (EU25)	Reg. 4 (EU25)
Independent variables:	Coefficient (|t-stat|)			
GDP	7.235 (0.82)	2.952 (0.41)	3.82 (0.63)	6.03 (1.15)
GDP per capita	1.057 (0.13)	3.727 (0.48)	-2.19 (0.43)	-3.921 (0.87)
Imports/GDP	0.069** (2.74)	0.067** (2.67)	0.044** (3.35)	0.045** (3.38)
Agriculture	0.279 (1.58)	0.24 (1.41)	0.083 (0.82)	0.088 (0.87)
Education	0.008 (0.99)	0.01 (1.20)	0.007 (1.02)	0.005 (0.87)
Elder	0.274 (0.84)		-0.159 (0.72)	
Government Spending	0.245* (1.70)	0.182 (1.48)	0.137 (1.45)	0.166* (1.97)
R-squared: Within	0.224	0.214	0.182	0.178
Between	0.159	0.001	0.094	0.124
Overall	0.144	0.000	0.085	0.111
N	80	80	125	125

Note: ** $p<0.05$ and * $p<0.1$
Table 4: Dominance Law, Fixed Effects Regressions with Year Dummies

Appendix

I. Variable Definitions and Sources

Agriculture: Employment in agriculture (% of total employment):

Education: The ratio of secondary school enrollment to the secondary school-aged population.

Elder: Percentage of total population ages 65 and above.

Government spending: The ratio of general government final consumption expended to GDP.

Legal Origin:

Legal Origin	Country
England	Cyprus, Ireland, United Kingdom, United States
French	Belgium, Spain, France, Greece, Italy, Luxembourg, Malta, Netherlands, Portugal
Germany	Austria, Germany
Scan	Denmark, Finland, Sweden
Socialist	Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovak Republic, Slovenia

Sources: All of the explanatory variables used in this paper are from the World Bank - World Development Indicators except for the following cases

1. Imports/GDP is missing for the United States at 2004. This number was calculated based on the data from economic report of the president, 2005. http://www.gpoaccess.gov/eop/tables05.html

2. Employment in Agriculture for France is obtained from the CIA World Factbook. https://www.cia.gov/library/publications/the-world-factbook/geos/fr.html (CIA provides data for the year of 1999.)

II. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Dominance Score	5.29	1.16	1	7
GDP (log)	26.60	1.47	23.70	30.01

GDP per capita (log)	10.05	0.37	9.26	10.83
Imports/GDP	45.05	26.98	13.73	129.01
Agriculture	4.91	3.90	1.30	17.40
Government spending	20.24	3.69	13.96	28.32
Education	110.99	16.86	89.48	160.15
Elder	15.66	2.04	10.93	19.67
N=80				

Variable	Mean	Std. Dev.	Min	Max
Dominance Score	5.21	1.07	1	7
GDP (log)	25.57	1.93	22.06	30.01
GDP per capita (log)	9.53	0.79	8.09	10.83
Imports/GDP	52.20	25.50	13.73	129.01
Agriculture	6.55	5.12	1.30	19.30
Government spending	19.89	3.58	10.19	28.32
Education	105.99	15.45	86.58	160.15
Elder	15.09	2.00	10.93	19.67
N=125				