



UNIVERSITY OF ALBERTA
FACULTY OF ARTS
Department of Economics

Working Paper No. 2012-24

Exclusionary Vertical Restraints and Antitrust: Experimental Law and Economics Contributions

Claudia Landeo
University of Alberta

October 2012

Copyright to papers in this working paper series rests with the authors and their assignees. Papers may be downloaded for personal use. Downloading of papers for any other activity may not be done without the written consent of the authors.

Short excerpts of these working papers may be quoted without explicit permission provided that full credit is given to the source.

The Department of Economics, The Institute for Public Economics, and the University of Alberta accept no responsibility for the accuracy or point of view represented in this work in progress.

[Forthcoming in Kathryn Zeiler and Joshua Teitelbaum (eds.), *The Research Handbook on Behavioral Law and Economics*. Edward Elgar Publishing.]

Exclusionary Vertical Restraints and Antitrust: Experimental Law and Economics Contributions

CLAUDIA M. LANDEO*

©2012 Claudia M. Landeo. All rights reserved.

Vertical restraints have been subject of lively policy and academic discussions. Scholars associated with the Chicago School challenged early foreclosure doctrines by arguing that vertical restraints primarily reflected efficiency considerations. More recently, industrial organization economists have used the tools of game theory and information economics to show that these business practices might actually serve anticompetitive purposes. The influence of the new economic theories on antitrust policies has been limited by the complexity of the models and the scarcity of empirical evidence. Experimental law and economics might advance the knowledge of the factors that affect the anticompetitive effects of vertical restraints. Hence, it might strengthen the contributions of academic work to the design and implementation of antitrust policies. This chapter is intended to contribute to the discussion of the exclusionary effects of vertical restraints, and the role of experimental law and economics in antitrust law. Special attention is devoted to vertical integration, exclusive dealing contracts, and tying and bundling practices. Although the experimental literature on exclusionary vertical restraints is relatively recent, the findings from these studies provide important insights. First, this research indicates that vertical restraints might indeed be used as market foreclosure mechanisms. Second, this work identifies previously non-modeled factors that might influence the effects of these business practices. My analysis underscores the importance of combining experimental and behavioral observation with theoretical modeling.

*University of Alberta, Economics Department. This research was conducted at Yale Law School and Harvard Law School, where I served as a Visiting Senior Research Scholar in Law. I acknowledge the hospitality of the Yale Law School and the Harvard Law School. I also wish to thank Kathy Spier for her insightful comments. The usual qualifier applies.

KEYWORDS: Vertical Restraints; Experimental Law and Economics; Antitrust; Vertical Integration; Exclusive Dealing Contracts; Bundling; Tying; Stipulated Damages; Contract Renegotiation; Non-Monetary Preferences; Payoff Aspirations; Communication; Intentionality; Fairness; Reciprocity; Discrimination; Endogenous Payoffs; Bargaining Games; Coordination Games; Equilibrium Selection; Stackelberg Equilibrium; Cournot Equilibrium; Bertrand Competition; Fringe Competition.

JEL Categories: K21, K41, C72, C90, L12, L40, C72, C91, D62, D86, K12, K21, K41, L42.

1 Introduction

Vertical restraints involve arrangements between firms at different levels of the vertical chain that restrict the conditions under which these firms may operate. They often serve legitimate and value-enhancing business goals. On the other hand, vertical restraints may be anticompetitive.¹ These business practices have been subject of lively policy and academic discussions. Scholars associated with the Chicago School (Director and Levi, 1956; Posner, 1976; Bork, 1978) challenged early foreclosure doctrines by arguing that vertical restraints primarily reflected efficiency considerations. More recently, industrial organization economists (Aghion and Bolton, 1987; Rasmusen, et al., 1989; Ordover, et al., 1990; Hart and Tirole, 1990; Whinston, 1990; Bolton and Whinston, 1991, 1993; Spier and Whinston, 1995; Segal and Whinston, 2000; Nalebuff, 2004) have used the tools of game theory and information economics to show that these practices might actually serve anticompetitive purposes.²

Legal scholars recognize the important role of economic theory to the design of effective antitrust policies. For instance, Hovenkamp (2011) argues that “[T]he notion that a non-arbitrary antitrust policy can be crafted without a coherent economic model is absolutely untenable. Absent the model, antitrust will fall much too easily to constantly fluctuating interest group politics. Worse yet, there will be a very poor fit between the articulated rule and its success in achieving these goals” (p. 82). However, the influence of the new economic theories on antitrust policies have been limited.³ This might be due to the complexity of the models (Hovenkamp, 2011; Kobayashi, 1997), and to the limited empirical evidence regarding the factors that might affect the anticompetitive effects of vertical restraints (Lafontaine and

¹As Whinston (2006) notes, the economics of antitrust broadly encompasses two main important categories: Exclusion and collusion. Exclusion refers to the firm’s attempt to preserve its market power through the exclusion of rival firms using exclusionary practices. These practices involve market foreclosure through vertical integration, exclusive dealing contracts, and tying and bundling, among other practices. Collusion refers to the firm’s attempt to raise prices through collaboration with rival firms. Examples of these practices are price fixing and horizontal merger. Extensive experimental literature on collusion has been developed. (See surveys by Davis and Holt, 2008; Normann, 2008; Engel, 2007; Holt, 1995). The focus of this chapter is on exclusionary practices.

²Bolton and Whinston (1991) state that the early foreclosure doctrines were not based on solid theoretical foundations. Hence, the Chicago School critics of the foreclosure arguments deserve credit for “pointing out [their] logical flaws” (p. 207).

³Baker (2012) argues that, “Exclusionary conduct is commonly relegated to the periphery in contemporary antitrust discourse, while price-fixing, market division and other forms of collusion are placed at the core of competition policy ... Exclusion is routinely described as having a lesser priority than collusion *even though exclusion is well established as a serious competitive problem in both antitrust law and industrial organization economics*” (pp. 1-3; emphasis added).

Slade, 2008).⁴ In the real world, contract negotiations are typically conducted in private and are not easily observed by researchers. Experimental law and economics might advance the knowledge of the factors that affect the anticompetitive effects of vertical restraints. Hence, it might strengthen the contributions of academic work to the design and implementation of antitrust policies.

This chapter is intended to contribute to the discussion of the exclusionary effects of vertical restraints, and the role of experimental law and economics in antitrust law. Special attention is devoted to vertical integration, exclusive dealing contracts, and tying and bundling practices. Although the experimental literature on exclusionary vertical restraints is relatively recent, the findings from these studies provide important insights. First, this research indicates that vertical restraints might indeed be used as market foreclosure mechanisms. Second, this work identifies previously non-modeled factors that might influence the effects of these business practices. My analysis underscores the importance of combining experimental and behavioral observation with theoretical modeling.

The rest of the chapter is organized as follows. Section 2 outlines the current antitrust policies regarding vertical restraints. Section 3 describes the main elements of the experimental law and economics methods, and discusses the potential contributions of experimental law and economics to the design and implementation of antitrust policies. Section 4 is devoted to the analysis of recent experimental law and economics studies regarding the anticompetitive effects of vertical integration, exclusive dealing contracts, and tying and bundling practices. Section 5 concludes the chapter.

2 Antitrust Law and Vertical Restraints

The Sherman and Clayton Antitrust Acts, and the Federal Trade Commission Act encompass the main U.S. federal antitrust provisions. The Sherman Act, passed in 1890, represents the first attempt to promote healthy competition. Sections 1 and 2 of the Sherman Act contain the main provisions regarding vertical restraints. Specifically, section 1 establishes prohibition on any “contract, combination ... or conspiracy in restraint of trade.” Section 2 condemns “monopolization.” Commentators argue that the Sherman Act makes illegal

⁴Lafontaine and Slade (2008) state that “Empirical evidence [regarding vertical restraints] is somewhat fragmented ... Given the small number of available studies, it is difficult to make definite claims about robust empirical regularities ... In particular, some of the studies yield ... ambiguous effects from restraints” (pp. 13, 14, 21). They conclude “Further empirical work might reveal more systematically the sets of circumstances under which particular restraints tend to be undesirable” (p. 23). See also Lafontaine and Slade (2012, 2007).

certain acts of monopolizing, not monopoly itself. The passage of the Clayton Act in 1914 reflects an attempt to clarify the business practices that might be considered illegal. Section 3 forbids contracts imposing restraints in which customers “shall not use or deal in the goods, supplies, or other commodities of the lessor or seller,” where the effect “may be substantially to lessen competition or tend to create a monopoly.” This section regulates tying, bundling, and exclusive dealing. Section 7 has been used to challenge vertical mergers.

Antitrust laws are enforced by the Federal Trade Commission and the Department of Justice Antitrust Division. The Federal Trade Commission Act, passed in 1914, created the Federal Trade Commission. Section 5 of the Act represents the fundamental enforcing provision. Commentators argue that this section applies not only to the violations included in the Sherman and Clayton Acts, but also to lesser acts that might violate the “spirit of those laws” (Hovenkamp, 2011). The Department of Justice Antitrust Division shares jurisdiction over civil antitrust cases with the Federal Trade Commission. However, the Antitrust Division has also the power to file criminal cases against violations of the antitrust laws.⁵

The vagueness of the Sherman and Clayton Acts explains the important role of courts in interpreting their provisions.⁶ Courts evaluate vertical integration and exclusive dealing contracts using a case by case rule of reason. Under this rule, economic efficiencies are balanced against possible anti-competitive harm (*Continental T.V., Inc. v. GTE Sylvania, Inc.*, 433 US 36, 97 S.Ct. 2549, 53 L. Ed. 2d 568 - Supreme Court, 1977). The current antitrust policies regarding vertical integration are reflected in *Port Dock & Stone Corp. v. Oldcastle Northeast, Inc.* (507 F3d 117, 125, 2d Cir., 2007): “[A] complaint pleading that a defendant expanded vertically and as a result, decided to discontinue doing business with its erstwhile trading partners at the next level down, does not plead an actionable refusal to deal. Such allegations are equally consistent with the idea that the monopolist expected to perform the second level service more efficiently than the old trading partners and thus undertook the vertical integration for a valid business reason, rather than for an anticompetitive one.”

The legal standard in case of exclusive dealing contracts follows *Tampa’s* suggested rule of reason approach (*Tampa Elect. Co. v. Nashville Coal Co.*, 365 U.S. 320, 81 S.Ct. 623, 1961; on remand, 214 F.Supp. 647, M.D.Tenn., 1963). Under this rule, foreclosure on the order

⁵The Hart-Scott Rodino Antitrust Improvements Act, passed in 1976, represents an amendment to the Clayton Act. It requires pre-merger notification to the Department of Justice and to the Federal Trade Commission in case of large mergers.

⁶For instance, even though promotion of healthy competition has become the center of the antitrust policy, the economic meaning of healthy competition is not well-defined in the antitrust law (Whinston, 2006).

of thirty to forty percent is generally necessary to avoid judgment for the defendant. This standard has been especially relevant for cases decided after *Jefferson Parish Hosp. Dist. No. 2 v. Hyde* (466 U.S. 2, 44, 104 S.Ct.).⁷ When shares are sufficiently high, *Tampa's* rule of reason requires courts to examine additional factors, such as contract duration, likelihood of collusion in the industry and the degree to which other firms in the market also use exclusive dealing practices, nature of the distribution system and distribution alternatives remaining available after exclusive dealing, and other pro- and anti-competitive factors.

Tying practices, on the other hand, are assessed using a modified *per se* rule approach. Courts have developed tests for assessing whether tying arrangements are *per se* unlawful. Evidence of coercion, sufficient economic power in the tying market, and anticompetitive effects in the tied market are the main factors considered in these tests. For instance, in *Yentsch v. Texaco, Inc.* (630 F.2d. 46, 56-57, 2d Cir., 1980), the court applied a five-part test (Hovenkamp, 2011; p. 435): 1) There must be separate tying and tied products; 2) there must be “evidence of actual coercion by the seller that in fact forced the buyer to accept the tied product;” 3) the seller must possess “sufficient economic power in the tying product market to coerce purchaser acceptance of the tied product;” 4) there must be “anticompetitive effects in the tied market;” and, 5) there must be “involvement of a ‘not substantial’ amount of interstate commerce in the tied product market.” An exception to the application of the modified *per se* rule in case of tying practices is represented by the D.C. Circuit in *United States v. Microsoft Corp.* case (253 F.3d 34. 90, D.C.Cir.; cert, denied, 534 U.S. 952, 122 S.Ct. 350, 2001). The court concluded that the bundling of software applications into a software computer operating system qualified for a rule of reason treatment. They stated that “applying *per se* analysis ... creates risks of error and of deterring welfare-enhancing innovation” (Hovenkamp, 2011; p. 89-90).

An effective application of these rules requires good knowledge of the factors that affect the anticompetitive effects of vertical restraints. As I discuss in the next section, experimental law and economics might help advance this knowledge.

3 Experimental Law and Economics and Antitrust

Experimental law and economics refers to the application of experimental economics methods to the study of legal institutions and business practices relevant to the design of legal

⁷Note 22, 466 U.S. at 45, 97 S.Ct. at 1575; O'Connor, J., concurring: “Exclusive dealing is an unreasonable restraint on trade only when a significant fraction of buyers or sellers are frozen out of a market by the exclusive deal.” The concurring concluded that thirty percent coverage was inadequate because they could not find evidence of anticompetitive effects (Hovenkamp, 2011).

institutions.⁸ As Falk and Heckman (2009) argue “Causal knowledge requires controlled variation” (p. 537). Controlled laboratory experiments provide an optimal “methodology for advancing causal knowledge” (p. 535). Three basic types of experimental law and economics studies might be applied to antitrust.⁹ First, experimental law and economics studies can test economic theories of antitrust. Second, experimental work can be conducted to assess the effectiveness of specific antitrust policies before these policies are implemented in real-world settings. These studies are called testbed policy experiments.¹⁰ Third, experiments can be used to test economic anomalies (for instance cognitive biases) that might affect the effectiveness of antitrust policies.¹¹

The current experimental law and economics literature on vertical restraints encompasses studies conducted to test theoretical models of antitrust.¹² The main features of the experimental environments used in these studies are as follows. First, the experimental settings must capture the theoretical assumptions. Then, the experimental design should involve a high degree of internal validity. Importantly, these settings should be simple enough to ensure subjects’ understanding of the experimental environment. Second, economic theories encompass economic consequences of choices. The experimental design should involve the alignment of subjects’ payoffs to the theoretical setting. The experimental design should

⁸See Smith (1976), Plott (1982), Roth (1986, 1995), and David and Holt (1993) for seminal discussions about experimental economics methods. See Croson (2005), Croson and Gächter (2010) for more recent excellent discussions of experimental economics methods. See Roth (2008) for a discussion of the contributions of experimental economics methods to market design. See Hoffman and Spitzer (1985), McAdams (2000), Croson (2002, 2009), Camerer and Talley (2007), and Arlen and Talley (2008) for surveys regarding the application of experimental economics methods to law and economics.

⁹This classification follows Roth (1986) and Croson (2002). Roth (1986) presents a general classification of experimental economics studies. Croson (2002) applies Roth’s (1986) classification to experimental law and economics studies.

¹⁰For instance, in their seminal work on testbed policy experiments, Hong and Plott (1982) experimentally assess the effects of a policy change proposed by the Interstate Commerce Commission. (See Plott, 1994, for a general discussion of testbed experiments.) The experimental design used in these types of studies involves a degree of context and subject pool aligned with the environments in which the policies will be implemented. The information provided by these studies might contribute to improve the design of antitrust institutions.

¹¹ “[A]n economic anomaly is a result inconsistent with the present economics paradigm ... An empirical result is anomalous if it is difficult to ‘rationalize,’ or if implausible assumptions are necessary to explain it within the paradigm” (Thaler, 1987; p. 198). In these types of studies, the degree of context and subject pools should be aligned with the real-life settings that trigger these anomalies. See for instance, Babcock et al. (1995) study on self-serving bias and pretrial bargaining, and Landeo (2007) study of cognitive biases and tort reform. See Thaler (1992) for more general applications of these types of experiments.

¹²Although the other two types of experimental work have not been used to study antitrust policies, their contributions might be significant.

also ensure control over the “individual values [associated with the possible choices] ... Such control can be achieved by using a reward structure to induce prescribed monetary value on actions” (Smith, 1976; p. 275).¹³ Third, economic theories encompass abstract representations applicable to different situations and individuals. Then, experimental settings generally involve minimal context. However, the degree of context used in experimental studies should guarantee subjects’ understanding of the experimental environment, tasks, choices, and consequences of these choices.¹⁴ In addition, no specific requirements are imposed to the subject pools. Experiments in economics generally encompass undergraduate students.¹⁵ Fourth, experiments in economics do not involve deception. As Croson (2005) state, this requirement is aligned with the theoretical assumption that agents understand and believe the relationship between their actions and their payoffs.¹⁶

Experimental law and economics studies of vertical restraints might strengthen the contributions of academic work to the design and implementation of antitrust policies. First, experimental law and economics studies might advance the knowledge of the factors that affect the anticompetitive effects of these business practices. Specifically, experimental studies conducted to test the theoretical predictions of economic models of antitrust might provide evidence of the robustness of these theories. If the economic theories do not work in these carefully controlled experimental settings (which replicate the theoretical assumptions and strategic environments), there is little hope that these theories would work in more complex field environment (Plott, 1999). These studies might also reveal previously non-modeled factors (empirical regularities) that influence the impact of vertical restraints, and hence provide useful feedback to theorists.

Second, experimental law and economics studies might facilitate the understanding of the economic theories of antitrust. Hovenkamp (2011) states that the complexity of the industrial organization models “makes it difficult for enforcement agencies and courts to make judgments about whether a particular practice is competitive or anticompetitive. Supreme Court decisions such as *Eastman Kodak Co. v. Image Technical Servs.* (504 U.S. 451,

¹³This concept is referred as induced valuation (Smith, 1976). A common criticism to experimental economics methods is related to the size of subjects’ payments, and the degree of parallelism with the economic consequences of choices in real-life settings. As noted by Faulk and Heckman (2009), “The effects of varying stake size are mixed and seem to depend on concrete experimental contexts” (p. 537). The incorporation of additional experimental treatments that allow for different payoff levels might be recommended to test the robustness of findings under certain research questions. See also Camerer and Hogarth (1999).

¹⁴These features of the experimental design ensure replicability and control.

¹⁵Findings from experimental studies devoted to analyze the effects of subject pools suggest that the behavior of undergraduate students and other populations, in free-context experimental environments, are not significantly different (Fréchette, forthcoming).

¹⁶This element represents a fundamental difference between experiments in psychology and economics.

112 S.Ct. 2072, 1992) ... clearly reflect some of these doubts” (pp. 79). Although the experimental settings are aligned with the theoretical assumptions, they represent simplified (and hence, more understandable) versions of the theory. Finally, experimental findings might increase the likelihood of admissibility of the evidence provided by economic experts in court.¹⁷ Economic testimony based solely on theoretical models (without providing empirical or experimental evidence) might fail the scientific method requirement of the Daubert test for expert evidence admissibility (*Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 1993; see Kobayashi, 1997).¹⁸ In fact, the *Daubert* test has been applied to exclude or limit expert economic testimony (see for instance, *Ohio v. Louis Trauth Dairy, Inc.*, 925 F.Supp. 1247, 1996). Hence, experimental evidence of the robustness of the economic theories of vertical restraints might strengthen the contributions of academic work to the formulation of antitrust policies.

4 Exclusionary Vertical Restraints: Experimental Evidence

This section discusses the experimental law and economics contributions to the understanding of exclusionary vertical restraints.

4.1 Vertical Integration and Market Foreclosure

Vertical integration involves situations in which vertically related activities that could be located in separate businesses are combined and integrated “under one roof” in a single business.¹⁹ Perfectly legitimate purposes might explain vertical integration. Vertical in-

¹⁷See Kirkwood (1988).

¹⁸Under the *Frye* standard (*Frye v. United States*, 293 F. 1013, 1923), the admissibility of expert evidence was based on whether or not the particular opinion of a testifying expert was generally accepted. Referring to economic experts, Kobayashi (1997) argues, “In practical terms, this often meant that the theory has been published in a peer reviewed journal, a standard that game theory easily passes” (p. 414). However, in 1993, the Supreme Court rejected the *Frye* test (*Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 1993). A reliability standard under Rule 702 of the Federal Rules of Evidence was established. This new test requires that (i) the evidence be “scientific knowledge (produced through the scientific method), and (ii) the evidence “will assist the trier of fact to understand or determine a fact in issue.”

¹⁹A wide range of vertical arrangements are alternatives to vertical integration. In these environments, legally enforceable contracts limit the behavior of the parties. These arrangements are termed *vertical restraints*. By giving one party some control over the other party’s actions, these arrangements are a form of partial vertical integration. These practices include exclusive dealing contracts, and tying and bundling, among others, and are discussed next.

tegration might allow firms to exploit technological complementarities, reduce transaction costs (Coase, 1937), gain control over production processes and preclude opportunistic behavior, overcome informational imperfections, and internalize externalities.²⁰ Profit-maximizing goals will determine the firm’s decision regarding “making” (vertically integration) or “buying.” Vertical integration might also serve anticompetitive purposes. It might be used by a firm as a tool to create or maintain market power.

The leverage theory of foreclosure states that vertical integration might be used by firms to extend their market power to other markets. As a result, vertical integration might harm downstream firms by precluding them to access to inputs. Similarly, this business practice might negatively affect upstream firms by removing supply opportunities. The leverage doctrine has been applied in important antitrust cases. For instance, in *Brown Shoe Company vs. United States* (370 U.S. 294, 1962), Brown (a manufacturer of shoes) wanted to integrate with a shoe retailer. The Supreme Court concluded that the merger reduced competition by precluding competitors to access to the share of the market served by the acquired retailer. As a result, this merger was held illegal. The Chicago School (Bork, 1978, and Posner, 1976) criticized this Court ruling by stating that market power in one market could not profitably be extended into other markets. Specifically, Bork (1978) argued that it would not be profitable for Brown to exclude rivals in the downstream market because the benefits from this exclusion to Brown would be offset by the losses to the shoe retailer.

Later, economists have used game theoretic models to show that vertical integration might serve to protect rather than extend market power, and lead to market foreclosure (Ordover et al., 1990; Hart and Tirole, 1990; Bolton and Whinston, 1991, 1993).²¹ In these settings, a monopolist on an upstream market, faced with competition on the downstream market, may not be fully able to exploit its monopoly power because it may not be able to make a credible commitment to downstream firms that it will restrict output. Anticipating this situation, downstream firms will not accept contracts that allow the producer to fully extract monopoly profits. Vertical integration resolves the monopolist’s commitment problem, and hence, enables the upstream monopolist to fully exploit its market power.²²

²⁰Consider, for instance, the case of “double marginalization” (Tirole 1988). See also Riordan (2008).

²¹See also Riordan and Salop (1995) and Riordan (1998). See Rey and Tirole (2001) for more recent work.

²²An important assumption in Hart and Tirole (1990) is that contracts are both bilateral and private.

Experimental Evidence

Martin et al. (2001) experimentally assess the anticompetitive effects of vertical integration.²³ Their experimental environment replicates Rey and Tirole's (2001) simple theoretical model of vertical integration involving an upstream monopoly producer of an essential input, and two downstream firms that compete in the final goods market.

The following experimental treatments are implemented. First, the integration treatments include integration and no-integration settings. The no-integration environment encompasses a single upstream firm that produces an input at constant average and marginal costs and two downstream firms that convert each unit of input into a unit of a homogeneous final good. The upstream monopolist can simultaneously make take-it-or-leave-it contract offers to each of the downstream firms specifying the quantity and fixed payment demanded. In the next stage, downstream firms simultaneously decide whether to accept or reject the offers. The integration environment involves an integrated firm (upstream and downstream units) and a nonintegrated downstream firm. It is expected that the integrated firm will commit to sell the monopoly quantity through its downstream subsidiary and not supply the other downstream firm. Hence, market foreclosure will occur in equilibrium.

Second, the contract type treatments involve public and private contracts. In case of public contracts, the contract offers become publicly known before downstream firms make a decision. Public contracts might serve as a commitment device (the upstream monopolist can earn the monopoly profit by publicly offering half the monopoly output at half the monopoly profit to each downstream firm). If, however, the contracts are negotiated privately (downstream firms do not observe the contract offered to other downstream firms), the theory predicts that the upstream monopolist will not be able to get the monopoly profit without vertical integration.²⁴ Third, the interaction treatments include one-shot and finite repetitions. The authors claim that finite repetitions might act as a commitment device for the monopolist, and hence, generate market foreclosure even in case of private contracts. The interaction treatments are implemented using random and fixed grouping, respectively.²⁵

Martin et al.'s (2001) findings suggest that vertical integration might induce market

²³See Mason and Phillips (2000) for an interesting experimental study regarding the effects of vertical integration on collusion.

²⁴Under secret contracts, there are multiple perfect Bayesian equilibria. The theoretical predictions depend on the out-of-equilibrium beliefs of downstream firms concerning the contract offered to their rivals. Under passive beliefs (if the firm believes that its rival receives the equilibrium offer), output is higher, and the upstream monopolist's profits are lower than in the joint-profit-maximizing outcome.

²⁵All treatments involve 10 rounds. In the random grouping, the groups of three people are randomly chosen every round; in the fixed grouping, grouping is decided at the beginning of the first round, and applied to all rounds.

foreclosure. These results also indicate the presence of a monopolist’s commitment problem, and that vertical integration and public contracts might serve as a commitment device. In fact, the total output and profit are similar and close to the monopoly level in the integrated and non-integrated/public contract environments.

Interestingly, their experimental results differ from the theoretical predictions regarding the division of profits between upstream and downstream firms. Theoretically, it is expected that the upstream firm will have all the bargaining power (by making take-it-leave-it offers), and hence, will get all of the industry profits. However, their findings under the two nonintegrated settings, with public and private contracts, suggest that the upstream monopolist only obtains a fraction of the industry profits. These results are aligned with the presence of nonmonetary preferences observed in previous experimental work on ultimatum environments. In these settings, the strategic anticipation of the receiver’s rejection of inequitable offers (due to nonmonetary preferences) induces the proposer to make nicer offers (Hoffman et al., 1994). These findings are also consistent with recent work on more general bargaining environments, where payoff aspiration considerations influenced by social norms of fairness (among other considerations) might induce more equitable allocations of the pie (Landeo and Spier, 2012a). The unpredicted bargaining effects observed by Normann et al. (2001) provide an additional rationale for the choice of vertical integration by monopolists.

Their experimental design also allows them to indirectly investigate the nature of out-of-equilibrium beliefs under private offers by assessing the downstream acceptance decision as a function of the contract offer. Their findings suggest that the beliefs of non-integrated downstream firms are heterogeneous (between passive and symmetric beliefs). The authors provide an empirically-relevant extension to the theory. Finally, Normann et al. (2001) results do not provide support for reputational effects elicited by finitely-repeated interactions. Extensions might involve the implementation of the reputation conditions under infinitely-repeated interactions.²⁶

Normann (2011) experimentally investigates whether reputational considerations and the vertical integration institution might act as informal commitment devices for the monopolist, and hence, induce market foreclosure. His experimental setting replicates Ordober et al.’s (1990) theoretical environment. This theoretical framework involves four players, two upstream firms and two downstream firms. The sequence of moves encompasses the decision to integrate from the upstream firms, the simultaneous choice of upstream prices by

²⁶The authors argue that Selten and Stoecker’s (1988) findings on prisoners’ dilemma settings suggest that infinitely-repeated interactions do not have a strong impact on subjects’ behavior (compared to finitely-repeated interactions). However, recent studies indicate that infinitely-repeated interactions actually have significant effects (Dal Bó (2007)).

those firms, and the simultaneous choice of downstream prices (after observing the input costs). Vertical integration would be profitable for the upstream firm if it could commit not to compete in the upstream market. This strategy would induce higher input prices, and hence, raise downstream rivals' cost. Given that this strategic setting does not involve formal commitment (in the form of incentives), market foreclosure should not be observed in equilibrium.²⁷

His experimental design focuses on the behavior of the upstream firms. Hence, it abstracts for the downstream market. The following treatments are implemented. The vertical integration treatments encompass vertically integrated and non-vertically integration environments. In both environments, two upstream firms simultaneously decide the upstream price. In the integration treatment, the payoffs for the players include an additional component related to the downstream unit. Following Martin et al. (2001), the reputational treatments involve one-shot and finite repetitions environments. In theory, it is expected that neither the vertical integration institution nor the presence of finitely-repeated interactions will solve the commitment problem of the monopolist. In fact, a Bertrand equilibrium in which each firm charges the minimum price should hold.

Normann's (2011) findings suggest that prices are significantly higher in markets where vertical integration is allowed (compared to non-integrated settings), i.e., the integrated firm's pricing behavior is less competitive than that of a nonintegrated firm. However, integrated firms do not completely foreclose the input market (i.e., firms do not completely refrain from competing in the input market). These results hold in case of one-shot and finitely-repeated environments. The lack of evidence for market foreclosure indicates that the commitment problem of the monopolist (pointed out by Hart and Tirole, 1990, and Reiffen, 1992) cannot be resolved by implementing informal commitment devices such as a vertical integration institution without formal commitment or reputational considerations elicited through finite interactions.²⁸ These findings are aligned with previous experimental studies on commitment (Huck and Müller, 2000; Reynolds, 2000; Cason and Sharma, 2001;

²⁷Ordovery et al. (1990) present this argument. Hart and Tirole (1990) and Reiffen (1992) demonstrate that, even though foreclosure would be a profitable strategy for the integrated firm in Ordovery et al.'s (1990) environment, it is not an optimal strategy. The integrated firm still has an incentive to compete in the input market. Given that Ordovery et al.'s (1990) setting does not endogenously elicit commitment, their claims only hold by imposing the assumption that commitment is present. Hart and Tirole (1990) claim, however, that this assumption is pretty strong: "Commitment is unlikely to be believable" in these environments. Normann (2011) provides a refined analysis of Ordovery et al.'s (1990) theoretical environment.

²⁸See my previous comments on Normann et al. (2001) regarding the elicitation of reputational considerations through finite interactions.

Martin, et al., 2001).²⁹

4.2 Anticompetitive Effects of Exclusive Dealing Contracts

Exclusive dealing contracts encompass arrangements that state that one party to the contract will deal only with the other party for some set of transactions, and include transfers of money for one party to the other in exchange of exclusivity. They might also involve agreements that include clauses that stipulate damages to be paid in the event of breach by one of the parties, i.e., exclusivity clauses. The literature on exclusive dealing contracts includes two main branches. The first branch underscores the use of exclusive contracts as a market foreclosure mechanism. The second branch outlines the use of exclusive contracts with stipulated damages as a rent-extraction tool.

4.2.1 Exclusive Contracts as a Market Foreclosure Mechanism

Beginning in the 1950s, scholars identified with the Chicago School argued that exclusive dealing contracts could not be profitably employed by incumbents to exclude more efficient rivals (Director and Levi, 1956; Posner, 1976; Bork, 1978).³⁰ Hence, exclusive dealing arrangements would be adopted only when they served legitimate business purposes, such as preventing free riding and protecting relationship-specific investment.³¹ Recently, scholars have used the tools of game theory and information economics to show that exclusive contracts may be adopted for purely anticompetitive reasons. In fact, rational firms would, in some circumstances, use such contracts to exclude rivals and reduce competition.³²

Rasmusen, Ramseyer and Wiley (1991) and Segal and Whinston (2000) demonstrate that an incumbent monopolist can use exclusive contracts (modeled as transfers from the

²⁹Although the findings are not aligned with the equilibrium predictions, they are consistent with a quantal-response equilibrium analysis of the game (McKelvey and Palfrey, 1995), a behavioral game-theory concept. Quantal response equilibrium takes decision errors into account, so that players do not choose the best response with probability one but choose better choices more frequently. In the context of this study, quantal-response equilibrium implies that integrated firms do indeed price less competitive than nonintegrated ones. Integrated firms still compete in the input market (that is, there is no market foreclosure).

³⁰Although the incumbent seller would want to discourage the entry of competitors in order to protect market share and profits, buyers would prefer to facilitate entry (since entry would lead to lower prices). Given the amount of money that the monopolist would need to pay to convince the buyers to agree on exclusive deals (their increased consumer surplus from entry), this strategy would be unprofitable for the monopolist.

³¹See Kaplow (1985) for a comprehensive discussion of this literature.

³²An important feature of those models is that some form of externality arises from an exclusive contract, and this externality makes the contract jointly optimal for the contracting parties.

incumbent to a buyer in exchange for the buyer’s promise not to buy from any other seller) to deter efficient entry when there are economies of scale in production.³³ Entry becomes unprofitable when sufficiently many buyers accept the contracts. When the incumbent seller cannot discriminate and must make the same offer to all buyers, both exclusion and entry might occur in equilibrium. Hence, the market is foreclosed only when the buyers fail to coordinate on their preferred equilibrium. When the incumbent monopolist can discriminate and make better offers to some buyers than to others, Segal and Whinston (2000) demonstrate that exclusion can be achieved without relying on coordination failures. Divide-and-conquer strategies allow the incumbent seller to exploit the negative externalities among the buyers and foreclose the market.³⁴

Important antitrust cases involve exclusive dealing practices. For instance, in *re Beer Distribution Antitrust Litigation* (188 F.R.D. 557, 1999), Anheuser-Bush was accused of requiring distributors to exclusively distribute Anheuser-Bush products. More recently, in *Microsoft* case (253 F.3d 34, 2001), Microsoft was accused of requiring computer manufacturers, internet service providers, and software producers to exclude, at least partially, Netscape’s Navigator Web browser in favor of its own Internet Explorer browser.³⁵

Experimental Evidence

Landeo and Spier (2009) experimentally study the factors that affect the anticompetitive effects of exclusive dealing contracts. They replicate Rasmusen, Ramseyer, and Whiley’s (1991) and Segal and Whinston’s (2000) strategic environments in a laboratory setting. Their experimental environment involves a three-player (an incumbent monopolist and two downstream buyers), two-stage game.³⁶ The exclusive dealing setting consists of transfers

³³Kaplow (1985) critiqued the Chicago School using a similar logic.

³⁴See Fumagalli and Motta (2006), Simpson and Wickelgren (2007b), and Innes and Sexton (1994) for additional theoretical models of Naked Exclusion. See also Segal (2003, 1999) for a more general literature on contracting with externalities.

³⁵Additional cases involving exclusive contracts include *United States v. Visa U.S.A.*, 344 F.3d 229 (2003), in which Visa was attacked for its agreements with banks that prohibited them for distributing rival credit cards, including American Express and Discover; *United States v. Dentsply*, 399 F.3d 181 (2001), in which Dentsply, the dominant maker of artificial teeth, was accused of illegally excluding rival manufacturers through exclusive agreements with dental wholesalers; and *Conwood v. United States Tobacco*, 290 F.3d 768 (2002), in which United States Tobacco, the dominant producer of moist snuff, was accused of illegally excluding rivals using exclusive contracts with retailers. See Kwoka and White (2009).

³⁶The theoretical environment involves three main stages: The contracting stage (where the monopolist makes offers to both buyers, and after observing both offers, the buyers simultaneously decide whether to accept their respective offers); the entry stage (where the potential entrant decides whether to enter the market), and the pricing stage (where market prices are determined). Landeo and Spier (2009) focus their

from the monopolist to the buyers in exchange of exclusivity. When the monopolist cannot discriminate and is constrained to propose equal offer to both buyers, the strategic environment resembles a coordination game with endogenous payoffs, in which equilibrium with exclusion, and equilibrium with entry might occur.³⁷

They first study the effects of discriminatory strategies (strategies under which the incumbent monopolist makes different offers to the two buyers in an attempt to induce market foreclosure). Two offer treatments are implemented, no discrimination (where the incumbent is constrained to make equal offers) and discrimination (where the incumbent's offers can be different). Second, building on previous findings from experimental economics and social psychology regarding fairness (Loewenstein et al., 1989),³⁸ (2000 reciprocity (Sobel, 2005) and the role of intentionality on triggering social preferences (Blount, 1995), Landeo and Spier (2009) explore the effect of payoff endogeneity (operationalized through the comparison between contracts designed by other human subjects versus contracts exogenously provided) on exclusion. Two buyer-payoff treatments are implemented, endogenous and exogenous. Under the endogenous conditions, a human seller chooses the offers. The seller gets a payoff equal to zero in case of rejection by both buyers. Under the exogenous-payoffs conditions, the offers are exogenously made by the computer.

Third, they assess the effects of non-binding communication between buyers (Aumann, 1990; Farrell and Rabin, 1996; Duffy and Feltovich, 2002; Cooper et al., 1992; Crawford, 1998; Blume and Ortmann, 2007). Two communication treatments are implemented, no-communication and two-way buyer-buyer communication (where the buyers state their intentions before deciding whether to accept or reject the exclusive deals). The theoretical predictions suggest that divide and conquer strategies will increase the likelihood of market foreclosure. In theory, neither communication nor intentionality will affect the exclusion rate.

Leadeo and Spier's (2009) findings indicate that exclusion may be surprisingly easy for incumbent firms to achieve. Even in the absence of discrimination, when adequate communication channels were not available, subjects failed to coordinate on their preferred equilibria and entry was deterred. Second, coordination was particularly elusive when the incumbent seller had a human identity. The human face of a sales representative (an agent for the seller) might elicit fairness and reciprocity from the agents representing the buyers, and facilitate

experimental design on the contracting stage. This design strategy is aligned with the purpose of the study (to assess the factors that influence the determinants of exclusion), and with the goal of minimizing subjects' cognitive effort. The players' payoffs reflect equilibrium behavior in stages two and three.

³⁷See Ochs, 1995 for a survey on coordination games.

³⁸See Fehr and Schmidt (1999) and Bolton and Ockenfels (2000, 1998) for theoretical studies of social preferences.

the exclusion of faceless rivals (in the event of contracts perceived as fair). These results underscore the importance of the seller’s intentionality. Third, their experimental analysis suggests that, better communication among the buyers induces more generous offers from the seller and a higher likelihood of entry, when discrimination is not allowed. Hence, communication among non-competing buyers might serve the public interest by facilitating entry. Fourth, as predicted by Segal and Whinston (2000), their results indicate that the ability of the incumbent to discriminate in the contract terms offered to the buyers enhances the effectiveness of exclusionary practices, when buyers are allowed to communicate. Finally, their experimental findings suggest that exclusion is less likely when the contract offers are privately observed by the buyers.

Landeo and Spier (2012b) assess the robustness of Landeo and Spier’s (2009) findings regarding the effects of payoff endogeneity to the explicit presence of an entrant, and explore the effects of communication between the potential entrant and the buyers on the incumbent seller’s offers and the likelihood of exclusion.³⁹ Their strategic environment involves a four-player, two-stage game. In addition to the roles of seller and buyers, their experimental environment includes the role of a potential entrant (a fourth passive player). The potential entrant is a captive player because her payoff depends on the decisions of the incumbent monopolist (the contract designer) and the two buyers. The explicit presence of a potential entrant might induce the buyers and the strategic seller to consider this fourth party, and hence it might affect the exclusionary power of exclusive dealing contracts. The entrant gets a payoff greater than zero only in case of rejection by both buyers. Then, the explicit presence of an entrant might act as a focal point device, i.e., “a signal that coordinates [buyers’ mutual] expectations” (Schelling, 1960, p. 54).⁴⁰ Hence, it might induce buyers to choose their preferred equilibrium (the entry equilibrium).

Their experimental design encompasses two buyer-payoff treatments, endogenous payoffs (contract offers decided by a human seller) and exogenous payoffs (contract offers exogenously administered by the computer). They also consider two communication treatments, no-communication and one-way unstructured entrant-buyers communication (where the po-

³⁹See Bohnet and Frey, (1999), and Andreoni and Rao (2011) for evidence of the effects of communication on enhancing social proximity. Although Landeo and Spier’s (2012b) experimental environment is characterized by anonymity, communication might still reduce social distance by allowing buyers to learn more about the potential entrants. Schelling (1968), as cited in Bohnet and Frey (1999, p. 339), states that “the more we know, the more we care.” See also Hoffman et al. (1996) and Charness et al. (2007).

⁴⁰Schelling argues that “[coordination problems] provide some focal point for a concerted choice, some clue to coordination, some rationale for the convergence of the participants’ mutual expectations” (Schelling, 1960, p. 90). He also states that “[a] prime characteristic of ... focal points is some kind of prominence or conspicuousness” (Schelling, 1960, p. 57).

tential entrant sends unstructured messages to both buyers, after the buyers receive the proposal from the seller but before the buyers make their decisions).

Landeo and Spier’s (2012b) results indicate that Landeo and Spier’s (2009) findings regarding the effect of endogeneity are robust to the explicit presence of a potential entrant. In fact, endogeneity significantly increases the likelihood of exclusion. Buyers are more likely to accept exclusive contracts when they are endogenously designed by a human seller (rather than exogenously generated). Second, communication between the entrant and the buyers increases reduces the likelihood of exclusion, and induces more generous sellers’ offers. Third, their findings suggest that the explicit presence of an entrant might act as a focal-point mechanism in exogenous-payoffs environments, facilitating buyers’ coordination on their preferred equilibrium (entry equilibrium).

Smith (2011) and Boone et al. (2012) provide additional experimental test of Rasmusen, Ramseyer, and Wiley’s (1995) and Segal and Whinston’s (2000) environments. Smith’s (2011) experimental design involves a multi-player three-stage game. Specifically, she studies the effects of the number of buyers, size of the minimum efficient scale (percentage of buyers required to exclude), and non-binding communication between buyers in a non-discriminatory offer setting (i.e., in settings in which the incumbent seller is restricted to make the same offers to all buyers). Smith’s (2011) findings suggest that, while the number of buyers is not shown to significantly impact exclusion rates, a higher fraction of signed buyers necessary for exclusion significantly decreases the exclusion rate. These findings might suggest that industries with larger fixed costs, smaller technological advantages of the potential entrant, and larger scale efficiencies would be more likely to elicit foreclosure effects due to exclusive dealing. Consistent with Landeo and Spier’s (2009) findings, her results suggest that exclusion rates are lower when buyers engage in non-binding communication. Boone et al. (2012) study the effects of sequential offers, private contracting, and discrimination, implementing Segal and Whinston’s (2000) environment in the lab. They find that discrimination increases exclusion rates only when offers are both sequential and private. Contrary to the theoretical predictions, their results suggest that exclusion through sequential offers is a costly strategy. Buyers reject more frequently low offers, which induce sellers to be more generous in their offers.

4.2.2 Exclusive Contracts with Stipulated Damages as a Rent-Extraction Mechanism

Contracts with stipulated damages (damage provisions in the event of breach by one of the parties) might serve legitimate business purposes.⁴¹ They can help avoid the uncertainty associated with court proceedings, might reduce the transaction costs following breach, and serve to protect relationship-specific investment. On the other hand, stipulated damage clauses may be anticompetitive.

These business practices have been subject of lively academic discussions. In *United States v. United Shoe Machinery Corporation* (258 U.S. 451, 1922), the court concluded that leasing agreements that required the customers to pay damages for switching to a rival supplier had been used by United as a mechanism to monopolize the shoe machinery manufacturing market (Brodley and Ma, 1993). Hence, these types of agreements violated the Sherman Act. The Chicago School scholars (Posner, 1976) criticized the court decision. They argued that market foreclosure through contracts with stipulated damage clauses would be unprofitable for the monopolist. Hence, these types of contracts, in practice, should reflect efficiency considerations.

More recently, industrial organization economist have demonstrated that contracts with stipulated damage provisions might serve strategic purposes and may generate anticompetitive outcomes. In their seminal work, Aghion and Bolton (1987) show that, when potential entrants will have some market power, it might be profitable for the incumbent seller and buyer to write a contract prior to entry that commits the buyer to pay high stipulated damages in the event of breach. As a result, the buyer's reservation price for the entrant's product is lowered. The entrant is then forced to reduce its price to ensure a sale. Through this mechanism, the entrant's producer surplus might be extracted.⁴² When the entrant's cost is unknown at the time of contracting, contracts with stipulated damages generate ex-post inefficiencies. They effectively act as an entry fee, and hence, might block the entry of firms that are more efficient than the incumbent seller. Aghion and Bolton's (1987) predictions rely on the assumption that contract renegotiation does not occur. Introducing renegotiation weakens the commitment power of the original contract (Masten and Snyder, 1989; Spier and Whinston, 1995).

Regarding the significance of these theoretical findings for antitrust policies, Farrell (2005)

⁴¹As Talley (1994) state, stipulated damage provisions refer to the damages terms included in a contract, regardless of its enforceability. Common law holds that penalty clauses (i.e., damage provisions that allow the non-breaching party to recover more than its reasonably anticipated losses) are not enforceable. However, judicial interpretations often allow these clauses to be enforced (Brodley and Ma, 1992).

⁴²See also Diamond and Maskin (1979).

states, “In practice[,] antitrust often discounts complaints by disappointed rivals such as E [(a potential entrant firm)], especially where they concern E ’s payoff as such and do not clearly proxy for its prowess at making buyers better offers. [...] One cannot helpfully analyze the possibility of inefficient outcomes in a three-party model in which two parties are assumed to negotiate efficiently and the third party’s payoff doesn’t count. One response [...] [similar to Aghion and Bolton’s (1987) approach] is to allow E ’s payoff to count” (p. 473).

Experimental Evidence

Landeo and Spier (2012a) experimentally study the design of stipulated damage clauses by incumbent monopolists to extract the profits of more efficient entrants, and the potential anticompetitive effects of these clauses. They explore whether contract renegotiation weakens the commitment power of stipulated damages and whether complete information about the entrant’s cost restores efficiency.

Their experimental design also allows them to explore new behavioral insights regarding contracting with stipulated damages, and more generally, bargaining in exchange buyer-seller environments. The strategic settings of Aghion and Bolton (1987) and Spier and Whinston (1995) involve three-player exchange (buyer-sellers) bargaining environments. Previously non-modeled behavioral factors might be present in this environment. Specifically, the experimental economics literature on two-player bargaining games suggests that the more equitable off-equilibrium offers observed in these settings might be explained by the presence of non-monetary preferences in the form of inequity aversion, and the proposers’ strategic anticipation of those preferences (Forsythe et al., 1994; Hoffman et al., 1994, 1996; Ochs and Roth, 1995).⁴³ Seminal interdisciplinary experimental work on bargaining also emphasizes the importance of payoff aspirations (Siegel and Fouraker, 1960; Roth and Murnighan, 1983; Thompson, 1990),⁴⁴ and suggests that players’ payoff aspirations might be influenced by social norms of fairness, among other factors (Siegel and Fouraker, 1960). Thus, non-monetary preferences in the form of inequity aversion and/or payoff aspirations, and the strategic anticipation of others’ non-monetary preferences, might affect the design of stipulated damages.

Two information treatments are implemented, incomplete information (where the entrant’s cost is private information) and complete information (where the entrant’s cost is common knowledge). They also consider four contract environment treatments: No-

⁴³Hoffman et al.’s (1994) findings suggest that the bargaining context might influence the elicitation of regards-for-others. Specifically, in buyer-seller exchange environments, it is expected that inequity-aversion will play a less important role in explaining bargaining outcomes.

⁴⁴Payoff aspiration refers to the monetary goal the player strives to achieve (Siegel, 1957; Thompson, 1990).

renegotiation (where renegotiation between the seller and buyer is not allowed); renegotiation (where the buyer and seller can renegotiate their contract after observing the entrant's price); no-renegotiation with a dictator-seller (where the allocation of the surplus is unilaterally decided by the incumbent seller); and, no-renegotiation with communication (where the buyer and the entrant can engage in unstructured communication, after the buyer receives the offer from the incumbent seller, and before she decides whether to accept the contract). The last two treatments allow them to explore the nature of the behavioral factors that might influence the design of contracts with stipulated damages.

Landeo and Spier's (2012a) experimental results suggest that the commitment value of contracts with stipulated damages is weakened by renegotiation. Importantly, their findings also indicate that using these types of contracts as a rent-extraction mechanism may be surprisingly difficult for incumbent firms. Even in the absence of renegotiation, the seller-subjects failed to extract the maximum amount of entrant's profits. Previously non-modeled behavioral factors might explain these significant and interesting deviations from equilibrium behavior. Specifically, the high incidence of equitable divisions of surplus among the players suggests the presence of non-monetary preferences (and the anticipation of the non-monetary preferences of others). Through a novel dictator-seller environment, they establish that inequity aversion plays at most a small role in determining bargaining outcomes.⁴⁵ Instead, their analysis of the bargaining dynamics, together with their analysis of unstructured communication between players, suggest the strong role of payoff aspirations influenced by social norms of fairness.⁴⁶

Finally, their work extends the theoretical literature on contracting with stipulated damages and multi-player ultimatum games by explicitly incorporating non-monetary preferences in the form of payoff aspirations influenced by social norms of fairness (among other exogenous factors). In their theory, players rationally reject lucrative offers and decline to participate when their shares of the surplus fall sufficiently short of their goals. Higher payoff aspirations create higher player reservation values, and generous offers are essential to secure the cooperation of others.

4.3 The Leverage Theory of Tying and Bundling

Tying refers to the practice of selling one product (the tying product) conditional on the purchase of another product (the tied product). Bundling, on the other hand, refers to

⁴⁵See Brooks et al. (2010) for additional evidence of weak inequity-aversion considerations in exchange environments.

⁴⁶More broadly, their analysis implies that payoff aspirations may better explain the more equitable off-equilibrium outcomes observed in other experimental buyer-seller bargaining settings.

the practice of selling two products together. Pure bundling implies that the products are available only as a bundle. The difference between tying and (pure) bundle is that the tied product is available on a stand-alone basis under tying, but not under (pure) bundling. Under mixed bundling, the products are available both on a stand-alone basis and as a bundle. Furthermore, the price of the bundle is smaller than the sum of the two individual prices.

Tying and bundling practices can be used to ensure quality and improve overall performance of a product or a service. These practices might also serve to price discriminate (*Illinois Tool Works Inc. v. Independent Ink, Inc.*, 547 U.S. 28, 2006), to raise prices for the combined package (*Eastman Kodak Co. v. Image Technical Services, Inc.*, 504 U.S. 451, 112 S.Ct. 2072, 1992). Importantly, tying and bundling might be used to raise rivals' costs, and create barriers to entry (*United States v. Microsoft*, 253 F.3d 34, 2001).⁴⁷

Tying practices have been condemned by courts under the leverage theory, which states that a firm with monopoly power in one market can use the leverage provided by tying to monopolize a second market. Chicago School scholars (Director and Levi, 1956; Bowman, 1957; Posner, 1976; Bork, 1978) challenged this view.⁴⁸ They claimed that leveraging could not increase the monopolist's profits. Hence, if a monopolist did employ tying, his motivation could not be leverage. The reasons could be related to efficiency or to price discrimination. Whinston (1990) demonstrates that the Chicago School's criticism of leveraging monopoly power from one market to the tied good market applies only if the competition level in the tied market is not affected. By tying, the monopolist reduces sales of its tied-good market competitor, and hence, lowers the competitor's profits below the level that would justify continued operation. Hence, tying can lead to a monopolization of the tied-good market, and exclusion of the competitor.

More recently, Nalebuff (2004) analyzes the effects of bundling practices in an oligopolistic environment. He shows that bundling might also act as an effective entrant-deterrent mechanism. Specifically, a company that has market power in two goods can, by bundling them together, make it harder for a rival with only one of these goods to enter the market. Bundling allows the incumbent to defend both products without having to price low in each. Bundling continues to be an effective tool even if entry deterrence fails. Since bundling mitigates the impact of competition on the incumbent, an entrant can expect the bundling strategy to persist, even without any commitment. In contrast to Whinston's (1990) model in which tying commits the monopolist to being more aggressive against an entrant, and this commitment discourages entry, Nalebuff's (2004) find that bundling reduces the entrant's

⁴⁷An additional antitrust case involving tying and bundling is *LePage's Inc. v. 3M* (324 F.3d 141, 2003).

⁴⁸See Kaplow (1985) for a criticism to the Chicago School position.

potential profits while mitigating the profit loss to an incumbent if entry occurs. Thus, bundling is credible even without any commitment device.⁴⁹

Experimental Evidence

Hinloopen et al. (2011) examine the market foreclosure effects of product bundling by implementing an experimental environment in which a firm with monopoly power in one market faces competition by a second firm in another unrelated market. This experimental environment replicates the general features of the simple oligopoly model of bundling presented by Martin (1999).⁵⁰ Two bundle treatments are included, pure bundle and no-bundle environments.⁵¹ Two sequence of moves treatments are also included, simultaneous (both firms simultaneously decide their output levels) and sequential moves (a leader makes a first move; after observing the output decision of the leader, the follower makes an output decision). The sequence of moves treatments have the purpose to examine the commitment value of product bundling. Specifically, under a simultaneous-move Cournot competition, the bundling firm trades off reduced sales in its monopoly market to increased output in the duopoly market. The bundling strategy might operate as a commitment device to sell more in the second market. Under a Stackelberg setting, when both markets have identical demand and cost structure, additional commitment is not required as the monopolist is the first mover. Hence, in theory, bundling should not affect optimal quantities. Previous experimental work on Stackelberg settings without bundling, however, suggests that non-monetary preferences such as inequity-aversion considerations (Huck et al., 2001, 2002; Fonseca et al., 2005; Müller, 2006) might preclude Stackelberg leaders to exercise their first-mover advantage. Hence, the sequence of moves treatments might provide evidence that bundling provides additional commitment power to the Stackelberg leader.

Their findings suggest that bundling represents an effective mechanism for transferring market power from one market to another market. Bundling successfully works as a commitment device, across sequence of moves treatments. With simultaneous moves (bundling, no-bundling), the monopolist offers the predicted number of units. Interestingly, when the mo-

⁴⁹Choi and Stefanadis (2001) also rely on a commitment to bundle as a way to deter entry. In their setting, bundling decreases the expected returns for the potential entrant, and therefore, may lead to foreclosure and reduction of the total welfare. See also Carlton and Waldman (2002). See Simpson and Wickelgren (2007a) for more recent work.

⁵⁰Martin's (1999) findings suggest that bundling can allow a firm with a monopoly in one market to leverage the market power to other markets, to strategically disadvantage rivals in those markets, and to reduce social welfare. He shows that bundling by a firm with a monopoly over one product has a strategic effect because it changes the substitution relationships between the goods among which consumers choose.

⁵¹Mixed bundling is not allowed in this environment.

nopolist is the Stackelberg leader, the predicted equilibrium is better attained with bundling: Average outputs are significantly closer to the theoretical predictions. These findings might indicate the presence of non-modeled behavioral factors. Under bundling, the followers might understand that any output reduction of the Stackelberg leader would generate larger costs. Hence, they might infer that the decisions of the leaders do not involve intentionality to hurt the followers.⁵² These results are aligned with Landeo and Spier’s (2009, 2012b) findings regarding the effects of sellers’ intentionality on buyers’ (receivers) acceptance, in the context of exclusive dealing contracts. Importantly bundling negatively affect consumer surplus and total surplus.

Caliskan et al. (2007) experimentally study whether bundling and the addition of fringe competition to an originally monopoly market affect market foreclosure and social welfare, in strategic settings that allow for mixed bundling. Their experimental environments involve posted-offer markets with two sellers in the first market, a dominant seller and a second seller representing the fringe competition. The dominant seller also participates in the second market, where he faces three identical competitors. The role of buyer is performed by the computer.⁵³ In theory, it is profitable for the multiproduct firm to offer a pure bundle, which results in a residual stand-alone demand for the second market too small to support independent sellers in that market. Bundling is an optimal price strategy even in the absence of a competitor in the first market. Hence, in theory, the multiproduct firm bundles, deters entry in the second market, and reduces consumer and total surplus. They implement the following experimental treatments. First, three fringe treatments are considered: Fringe competition with eight percent of the dominant seller’s capacity, fringe competition with five percent of the dominant seller’s capacity, and no-fringe competition. Second, two bundling treatments are studied: Bundling (where pure and mixed bundling practices are allowed) and no-bundling.

Their findings regarding the effects of fringe competition with eight percent of the dominant seller’s capacity suggest that a fringe seller in the first market increases the total consumer surplus realized from the first and second markets, and decreases the total seller

⁵²Specifically, followers might infer that the output choice of the bundling firm simply reflect the leader’s need to maximize profits in the first market. Hence, the intentions of the monopolist might be perceived as less hostile.

⁵³Specifically, their experimental settings involve computer-buyers, with a valuation for the first and second market products. Each session involves several rounds. A posted-offer market is implemented every round as follows. Five seconds long, computer-buyers arrive at the marketplace in random order. A buyer searches for the best price offer (the one that maximizes her surplus). A purchase occurs only the buyer’s surplus from the best offer is non-negative, and the seller providing the offer has available capacity. If two or more sellers make the same best offer, the buyer randomly chooses one of them.

surplus. However, the effects of fringe competition on total welfare (consumer and seller surpluses) are not significant. In this environment, bundling does not induce exclusion, and does not affect consumer surplus or total welfare. Similarly, fringe competition does not change the exclusionary and welfare implications of bundling (even though this competition decreases the bundle transaction price). Their results under fringe competition with five percent of the dominant seller's capacity confirm the theoretical prediction regarding exclusion: Bundling helps the dominant seller exclude his competitors in the second market, generating complete foreclosure in thirty percent of the cases. However, the effects of bundling on consumer surplus or total welfare are not significant. Contrary to the theoretical predictions, their findings suggest that monopolists also use mixed bundling (separate units of first-market products are sold in addition to the bundled products). In this environment, fringe competition increases the total consumer surplus in the first and second markets, decreases the total seller surplus (weaker effects, relative to the original design), and increases total welfare. Similarly, fringe competition does not affect the exclusionary and welfare effects of bundling (despite decreasing the bundle price).

Finally, a variation of the experimental environment under fringe competition with five percent of the dominant seller's capacity is also implemented. The new setting involves higher efficiency in producing first-market products (lower fixed cost of the dominant seller in the first market). Their findings suggest that the higher efficiency of the dominant firm in the first market induces a transfer of the consumer surplus that the fringe seller originally generated back to the dominant firm. Specifically, this higher efficiency in production for the dominant firm decreases the consumer surplus and increases the seller surplus. However, the effect on total welfare is not significant. Although this study provides evidence of the effects of bundling on market foreclosure, Caliskan et al.'s (2007) findings do not suggest that the seller's ability to bundle harm consumers.

5 Summary and Conclusions

This chapter first outlines the current antitrust policies regarding vertical restraints. Second, it describes the experimental law and economics methods, and discusses the potential contributions of experimental law and economics to the design and implementation of antitrust policies. Third, it analyzes recent experimental literature on the exclusionary effects of vertical integration, exclusive dealing contracts, and tying and bundling practices.

Although, the experimental literature on exclusionary vertical restraints is relatively recent, the findings from these studies provide important insights. First, Martin et al. (2001) present conclusive evidence regarding the foreclosure effects of vertical integration. Inter-

estingly, their findings suggest that publicly-observed vertical contracts might also induce market foreclosure by acting as a commitment device for the monopolist. Normann’s (2011) study deepens our understanding of the role of extrinsic incentives associated with vertical integration on solving the monopolist’s commitment problem, and hence, allowing him to foreclosure the market. Although these studies generally support the theoretical predictions, they also suggest the presence of previously non-modeled behavioral regularities, and hence, provide useful feedback for theorists. For instance, Martin et al.’s (2001) experimental results in the non-integrated settings differ from the theoretical predictions regarding the division of profits between upstream and downstream firms. The more equitable allocations are observed in these environments suggest the presence of non-monetary preferences and/or the monopolist’s strategic anticipation of others’ non-monetary preferences. The strategic monopolists might anticipate these behavioral issues, and hence, be even more inclined to adopt vertical integration.

Second, Landeo and Spier (2009) provide strong evidence of the exclusionary power of exclusive dealing contracts. Their findings suggest that divide-and-conquer strategies from monopolists are effective foreclosure mechanisms. Importantly, their results also indicate that market foreclosure may be surprisingly easy for incumbent firms to achieve. Even in the absence of discrimination, when adequate communication channels are not available, buyers might fail to coordinate on their preferred outcome and entry might be deterred. These findings are robust to the presence of an actual potential entrant (Landeo and Spier, 2012b), and to the increase in the number of buyers (Smith, 2011). Smith’s (2011) findings also suggest that industries with larger fixed costs, smaller technological advantages of the potential entrant, and larger scale efficiencies might strengthen the exclusionary power of exclusive dealing contracts.

Although Landeo and Spier’s (2009) findings are aligned with the theoretical predictions, they also reveal the presence of previously non-modeled behavioral factors. For instance, their results indicate that coordination between buyers is particularly elusive when the incumbent seller proposes contract offers that are perceived as fair. In fact, the human face of a sales representative (an agent for the incumbent monopolist) might elicit fairness and reciprocity from the agents representing the buyers, and facilitate the exclusion of faceless rivals. The presence of social preferences (i.e., buyers’ fairness and reciprocity considerations) and the importance of the seller’s intentionality might explain these findings. Landeo and Spier’s (2009) and Smith’s (2011) findings also suggest that better communication among the buyers might lead to more generous offers from the seller and a greater likelihood of entry. Hence, communication among non-competing buyers might serve the public interest by facilitating entry. Finally, Landeo and Spier’s (2012b) findings suggest that communica-

tion between the potential entrant and the buyers reduces the likelihood of exclusion. These findings might be explained by the presence of social preferences (which are elicited by the increase in the social proximity between the buyers and the potential entrant) and/or the role of the explicit presence of an entrant as a focal-point coordination mechanism. Finally, Boone et al.’s (2012) findings regarding costly sequential offers suggest the presence of non-monetary preferences: Buyers reject more frequently low offers, which induce sellers to be more generous in their offers.

Third, Landeo and Spier’s (2012a) findings suggest that renegotiation weakens the incumbent seller’s ability to use contracts with stipulated damages as a rent-extraction device. Importantly, their results indicate that using these types of contracts as a rent-extraction mechanism may be surprisingly difficult for incumbent firms. Even in the absence of renegotiation, the sellers failed to extract the maximum amount of entrant’s profits. Previously non-modeled behavioral factors might explain these significant and interesting deviations from equilibrium behavior. Specifically, the high incidence of equitable divisions of surplus among the players suggests the presence of non-monetary preferences (and the anticipation of the non-monetary preferences of others). Interestingly, this study explores in detail the behavioral factors that explain these more equitable outcomes. Inequity aversion seems to play at most a small role in determining bargaining outcomes. Instead, their analysis suggests the strong role of payoff aspirations influenced by social norms of fairness. These results might also explain the outcomes found in other exchange buyer-seller bargaining environments. Finally, they provide an extension to the theoretical literature on contracting with stipulated damages that explicitly incorporates non-monetary preferences in the form of payoff aspirations influenced by social norms of fairness (among other exogenous factors).

Fourth, Hinlopen et al.’s (2011) findings indicate that bundling represents an effective mechanism for transferring market power from one market to another market. Moreover, Caliskan et al.’s (2007) study suggests that these results are robust to the presence of fringe competition in the upstream market. Lower fringe competition’s market share strengthens the anticompetitive effects of bundling. Although Hinlopen et al. (2011) findings suggest a negative effect on consumer welfare, Caliskan et al.’s (2007) results do not indicate that the seller’s ability to bundle harm consumers. More experimental investigation is therefore necessary. Interestingly, Hinlopen et al.’s (2011) results suggest the importance of intentionality on the outcomes of market interactions in sequential settings.

These studies represent examples of the type of the contributions that experimental law and economics can make to antitrust law and policies. First, experiments can test law and economics theories, assess the robustness of these theories, and identify previously non-modeled empirical regularities. Hence, experimental findings can facilitate the understanding

of economic theory of antitrust, inform policy makers, provide evidence in legal cases, and contribute to the design and implementation of antitrust policies. Second, experimental studies can assess the effectiveness of specific antitrust policies before these policies are implemented in real-world settings (testbed policy experiments). Third, experimental work might be used to study economic anomalies that might affect the effectiveness of antitrust policies. More generally, experimental economics methods, together with theoretical and empirical methods, represent useful tools to improve our understanding of the legal system and the design of legal institutions.

References

- Aghion, P., and Bolton, P. "Contracts as a Barrier to Entry." *American Economic Review*, 1987, 77, pp. 388–401.
- Andreoni, P. and Rao, J. "The Power of Asking: How Communication Affects Selfishness, Empathy, and Altruism." *Journal of Public Economics*, 2011, 95, pp. 513–520.
- Arlen, J., and Talley, E. 2008. *Experimental Law and Economics*. Cheltenham: Edward Elgar.
- Babcock, L, Loewenstein, G., Issacharoff, S., and Camerer, C. "Biased Judgments of Fairness in Bargaining." *American Economic Review*, 1995, 11, pp. 109–126.
- Baker, J.B. "Exclusion as a Core Competition Concern." Mimeo, American University, 2012.
- Bohnet, I. and Frey, B.S. "Social Distance and Other-Regarding Behavior in Dictator Games: Comment," *American Economic Review*, 1999, 89, pp. 335–339.
- Bolton, G. E., and Ockenfels, A. "ERC: A Theory of Equity, Reciprocity, and Competition." *American Economic Review*, 2000, 90, 166–193.
- Bolton, G. E., and Ockenfels, A. "Strategy and Equity; An ERC-Analysis of the Güth-van Damme Game." *Journal of Mathematical Psychology*, 1998, 42, 215–26.
- Bolton, P., and Whinston, M.D. "Incomplete Contracts, Vertical Integration, and Supply Assurance." *Review of Economic Studies*, 1993, 60, 121–148.
- Bolton, P., and Whinston, M.D. "The 'Foreclosure' Effects of Vertical Mergers." *Journal of Institutional and Theoretical Economics*, 1991, 147, 207–226.
- Boone, J., Müller, W., and Suetens, S. "Naked Exclusion in the Lab: The Case of Sequential Contracting." Mimeo, Tilburg University and University of Vienna, 2012.
- Bork, R. H. 1978. *The Antitrust Paradox: A Policy at War by Itself*. New York: Basic Books.
- Brodley, J., and Ma, C.A. "Contract Penalties, Monopolizing Strategies, and Antitrust Policy." *Stanford Law Review*, 1993, 1161-1213.
- Brooks, R., Landeo, C.M. and Spier, K.E. "Trigger Happy or Gun Shy: Dissolving Common-Value Partnerships with Texas Shootouts." *RAND Journal of Economics*, 2010, 41, pp. 649–673.
- Caliskan, A., Porter, D. Rassenti, S., Smith, V.L., and Wilson, B.J. "Exclusionary Bundling and the Effects of a Competitive Fringe." *Journal of Institutional and Theoretical Economics*, 2007, 163, pp. 109-132.
- Camerer, C.F., and Hogarth, J. "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries." *RAND Journal of Economics*, 2002, 33, pp. 194-220.
- Carlton, D.W., and Waldman, M. "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries." *RAND Journal of Economics*, 2002, 33, pp. 194-220.
- Cason, T., and Sharma, T. "Durable Goods, Coasian Dynamics and Uncertainty: Theory and Experiments." *Journal of Political Economy*, 109, 2001, pp. 1311-1354.

- Charness, G., Haruby, E, and Sonsino, D. "Social Distance and Reciprocity: An Internet Experiment," *Journal of Economic Behavior and Organization*, 2007, 63, pp. 88–103.
- Choi, J.P., and Stefanadis, C. "Tying, Investment, and the Dynamic Leverage Theory" *RAND Journal of Economics*, 2001, 32, pp. 52–71.
- Coase, R. "The Nature of the Firm." *Economica*, 1937, 4, pp. 386–405.
- Cooper, Russell W., Douglas V. DeJong, D.V., Robert, Forsythe, and Thomas W. Ross. 1992. "Communication in Coordination Games." *Quarterly Journal of Economics*, 107: 739–771.
- Crawford, V.P. "A Survey of Experiments on Communication via Cheap Talk." *Journal of Economic Theory*, 1998, 78, pp. 286–298.
- Croson, R. "Experimental Law and Economics." *Annual Review of Law and Social Sciences*, 2009, 5, pp. 17.117.20.
- Croson, R. "The Method of Experimental Economics." *International Negotiation*, 2005, 10, pp. 131–148.
- Croson, R. "Why and How to Experiment: Methodologies from Experimental Economics." *University of Illinois Law Review*, 2002, 4, pp. 921–945.
- Croson, R., and Gächter. "The Science of Experimental Economics." *Journal of Economic Behavior and Organization*, 2010, 73, pp. 122–131.
- Davis, D., and Holt, C.A. "The Effects of Collusion in Laboratory Experiments." In C. Plott and V. Smith (eds.), *Handbook of Experimental Economic Results*, pp. 170–176. New York: Elsevier Press, 2008.
- Davis, D., and Holt, C. 1993. *Experimental Economics*. New Jersey: Princeton University Press.
- Diamond, P.A., Maskin, E. "An Equilibrium Analysis of Search and Breach of Contract, I: Steady States." *Bell Journal of Economics*, 1979, 10, pp. 282–316.
- Director, A., and Levi, E. "Law and the Future: Trade Regulation." *Northwestern University Law Review*, 1956, 51, pp. 281–296.
- Duffy, J., and Feltovich, N. "Do Actions Speak Louder than Words? An Experimental Comparison of Observation and Cheap Talk." *Games and Economic Behavior*, 2002, 39, pp. 1–27.
- Engel, C. "How Much Collusion? A Meta-Analysis of Oligopoly Experiments." *Journal of Competition Law and Policy*, 2007, 4, pp. 491–549.
- Falk, A., and Heckman, J.J. "Lab Experiments Are a Major Source of Knowledge in the Social Sciences." *Science*, 2009, 326, pp. 535–538.
- Farrell, J. "Deconstructing Chicago on Exclusive Dealing." *Antitrust Bulletin*, 2005, 50, pp. 465–480.
- Farrell, J. and Rabin, M. "Cheap Talk." *Journal of Economic Perspectives*, 1996, 10, pp. 103–118.
- Fehr, E. and Schmidt, K.M. "A Theory of Fairness, Competition, and Cooperation." *Quarterly Journal of Economics*, 1999, 114, pp. 817–868.

- Fonseca, M. A., Huck, S. and Normann, H.-T. "Playing Cournot although They Shouldnt: Endogenous Timing in Experimental Duopolies with Asymmetric Costs." *Economic Theory*, 2005, 25, pp. 669–677.
- Forsythe, R., Horowitz, J.L., Savin, N.E., and Sefton, M. "Fairness in Simple Bargaining Experiments." *Games and Economic Behavior*, 1994, 6, pp. 347–369.
- Fréchette, G.R. "Laboratory Experiments: Professionals versus Students." In *The Methods of Modern Experimental Economics*, ed. Guillaume Fréchette and Andrew Schotter (Eds). Oxford University Press, forthcoming.
- Fumagalli, C., and Motta, M. "Exclusive Dealing and Entry When Buyers Compete." *American Economic Review*, 2006, 96, pp. 785–795.
- Hart, O., and Tirole, P. "Vertical Integration and Market Foreclosure." *Brookings Papers on Economic Activity: Microeconomics*, 1990, pp. 205–286.
- Hinloopen, J., Müller, W., and Normann, H.-T., "Output Commitment through Product Bundling: Experimental Evidence." Tinberger Institute Discussion Paper No. 170/1, 2011.
- Hoffman, E., McCabe, K., Shachat, K., and Smith, V.L. "Preferences, Property Rights, and Anonymity in Bargaining Games." *Games and Economic Behavior*, 1994, 7, pp. 346–380.
- Hoffman, E., McCabe, K., and Smith, V.L. "On Expectations and the Monetary Stakes in Ultimatum Games." *International Journal of Game Theory*, 1996, 25, pp. 289–301.
- Hoffman, E., and Spitzer, M.L. "Experimental Law and Economics: An Introduction." *Colorado Law Review*, 1985, 85, pp. 991–1024.
- Holt, C.A. "Industrial Organization: A Survey of Laboratory Research." In J. Kagel and A. Roth (eds.), *Handbook of Experimental Economics*, pp. 349–443. Princeton, N.J.: Princeton University Press, 1995.
- Hovenkamp, H. *Federal Antitrust Policy. The Law of Competition and Its Practice*. West Publishing Co., 2011.
- Huck, S., Müller, W., and Normann, H.-T. "To Commit or not to Commit; Endogenous Timing in Experimental Duopoly." *Games and Economic Behavior*, 2002, 38, pp. 240–264.
- Huck, S., Müller, W., and Normann, H.-T. "Stackelberg Beats Cournot: On Collusion and Efficiency in Experimental Markets." *Economic Journal*, 2001, 111, pp. 749–765.
- Innes, R., and Sexton, R.J. "Strategic Buyers and Exclusionary Contracts." *American Economic Review*, 1994, 84, pp. 566–84.
- Kaplow, L. "Extension of Monopoly Power through Leverage." *Columbia Law Review*, 1985, 85, pp. 515–556.
- Kirkwood, J.B. "Antitrust Implications of the Recent Experimental Literature on Collusion." *Journal Reprints Antitrust Law and Economics*, 1988, 18, pp. 605–622.
- Kobayashi, B.H. "Game Theory and Antitrust: A Post-Mortem." *George Mason Law Review*, 1997, 5, pp. 411–421.
- Kwoka, Jr., J.E., and White, L.J. *The Antitrust Revolution*. New York: Oxford University Press, 2009.

- Lafontaine, F., and Slade, M. "Inter-Firm Contracts; Evidence." In: Gibbons, R. and Roberts, J. (Eds.). *The Handbook of Organizational Economics*. Princeton: Princeton University Press, 2012.
- Lafontaine, F., and Slade, M. "Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy." In: Buccirosi, P. (Ed.). *The Handbook of Antitrust Economics*. Cambridge: MIT Press, 2008.
- Lafontaine, F., and Slade, M. "Vertical Integration and Firm Boundaries: The Evidence." *Journal of Economic Literature*, 2007, 65, pp. 629–685.
- Landeo, C.M. "Cognitive Coherence and Tort Reform." *Journal of Economic Psychology*, 2009, 24, pp. 69–89.
- Landeo, C.M. and Spier, K.E. "It Takes Three to Tango: An Experimental Study of Contracts with Stipulated Damages." Harvard University, John M. Olin Center for Law, Economics, and Business, Discussion Paper No. 717, 2012a.
- Landeo, C.M. and Spier, K.E. "Exclusive Dealing and Market Foreclosure: Further Experimental Results." *Journal of Institutional and Theoretical Economics*, 2012b, 168, pp. 150–170.
- Landeo, C.M. and Spier, K.E. "Naked Exclusion: An Experimental Study of Contracts with Externalities." *American Economic Review*, 2009, 99, pp. 1850–1877.
- Loewenstein, G.F., Thompson, L., and Bazerman, M.H.. "Social Utility and Decision Making in Interpersonal Contexts." *Journal of Personality and Social Psychology*, 1989, 57, pp. 426–441.
- Martin, S. "Strategic and Welfare Implications of Bundling." *Economic Letters*, 1999, 62, pp. 371–376.
- Martin, S., Normann, H.-T., and Snyder, C.M. "Vertical Foreclosure in Experimental Markets." *RAND Journal of Economics*, 2001, 32, pp. 466–496.
- Mason, C.F., and Phillips, O.R. "Vertical Integration and Collusive Incentives: An Experimental Analysis." *International Journal of Industrial Organization*, 2000, 18, pp. 471–496.
- Masten, S.E. and Snyder, E.A. "The Design and Duration of Contracts: Strategic and Efficiency Considerations." *Law and Contemporary Problems*, 1989, 52, pp. 63–85.
- McAdams, R.H. "Experimental Law and Economics." In: Bouckaert, B. and DeGeest, G. (Ed.). *Encyclopedia of Law and Economics*. Cheltenham: Edward Elgar, 2000, pp. 539–561.
- Müller, W. "Allowing for Two Production Periods in the Cournot Duopoly: Experimental Evidence." *Journal of Economic Behavior and Organization*, 2006, 60, pp. 100111.
- Nalebuff, B. "Bundling as an Entry Barrier." *Quarterly Journal of Economics*, 2004, 119, pp. 159–187.
- Normann, H.-T. "Vertical Mergers, Foreclosure and Raising Rivals Costs: Experimental Evidence." *Journal of Industrial Economics*, 2011, 59, pp. 506–527.
- Normann, H.-T., "Experimental Economics for Antitrust Law and Policy." In: Collins, W. (Ed.). *Issues in Competition Law and Policy*. Chicago: American Bar Association, 2008.

- Ochs, Jack. 1995. "Coordination Problems." In *The Handbook of Experimental Economics*, ed. John H. Kagel and Alvin E. Roth. New Jersey: Princeton University Press Inc.
- Ochs, J. and Roth, A. "An Experimental Study of Sequential Bargaining." *American Economic Review*, 1989, 79, pp. 355–384.
- Ordover, J., Salop, S., and Saloner, G. "Equilibrium Vertical Foreclosure." *American Economic Review*, 1990, 80, pp. 127–142.
- Plott, C.R. "Policy and the Use of Laboratory Experimental Methodology in Economics." In: Luini, L. (Ed.). *Uncertain Decisions: Bridging Theory and Experiments*. Massachusetts: Kluwer Academic Publishers, 1999, pp. 303–307
- Plott, C.R. "Market Architectures, Institutional Landscapes and Testbed Experiments. " *Economic Theory*, 1994, 1, pp. 3–10.
- Plott, C.R. "Industrial Organization Theory and Experimental Economics. " *Journal of Economic Literature*, 1982, 20, pp. 1485–1527.
- Posner, R.A. *Antitrust Law: An Economic Perspective*. Chicago: University of Chicago Press, 1976.
- Rasmusen, E.B., Ramseyer, J.M., and Wiley, Jr., J.S. "Naked Exclusion." *American Economic Review*, 1991, 81, pp. 1137–45.
- Reiffen, D. "Equilibrium Vertical Foreclosure: Comment." *American Economic Review*, 1992, 82, pp. 694–697.
- Rey, P., and Tirole, J. 2007. "A Primer on Foreclosure." In *The Handbook of Industrial Organization*, ed. Armstrong, M., and Porter, R. North-Holland: Amsterdam
- Rey, P., and Tirole, J. 2001. "A Primer on Foreclosure." Mimeo, University of Toulouse.
- Reynolds, S. "Durable-Goods Monopoly: Laboratory Market and Bargaining Experiments." *RAND Journal of Economics*, 2000, 31, pp. 375–394.
- Riordan, M.H. "Competitive Effects of Vertical Integration." In: Buccirossi, P. (Ed.). *The Handbook of Antitrust Economics*. Cambridge: MIT Press, 2008.
- Riordan, M. H. "Anticompetitive Vertical Integration by a Dominant Firm." *American Economic Review*, 1998, 88, pp. 1232–1248.
- Riordan, M., and Salop, S. "Evaluating Vertical Mergers: A Post-Chicago Approach." *Antitrust Law Journal*, 1995, 63, pp. 513–568.
- Roth, A.E. "What Have We Learned from Market Design." *Economic Journal*, 2008, 118, pp. 285–310.
- Roth, A.E. "Bargaining Experiments." In: Kagel, J.H. and Roth, A.E. (Eds.). *The Handbook of Experimental Economics*. Chicago: The University of Chicago Press, 1995, pp. 253–348.
- Roth, A.E. "Laboratory Experimentation in Economics." *Economics and Philosophy*, 1986, 2, pp. 245–273.
- Roth, A.E. and Murnighan, J. "Information and Aspirations in Two-Person Bargaining." In: Tietz, R. (Ed.). *Aspiration Levels in Bargaining and Economic Decision Making*. Heidelberg: Springer-Verlag, 1982, pp. 91–103.

- Schelling, T. C. "The Life You Save May Be Your Own." In: S. Chase (Ed.). *Problems in Public Expenditure Analysis*, Washington DC: Brookings Institution, 1968, pp.127–162.
- Schelling, T. 1960. *The Strategy of Conflict*, Cambridge, MA: Harvard University Press.
- Segal, I.R. "Coordination and Discrimination in Contracting with Externalities: Divide and Conquer." *Journal of Economic Theory*, 2003, 113, pp. 147–181.
- Segal, I.R. "Contracting with Externalities." *Quarterly Journal of Economics*, 1999, 114, pp. 337–388.
- Segal, I.R. and Whinston, M.D. "Naked Exclusion: Comment." *American Economic Review*, 2000, 90, pp. 296–309.
- Selten, R., and Stoecker, R. "End Behavior in Sequences of Finite Prisoners Dilemma Supergame: A Learning Theory Approach." *Journal of Economic Behavior and Organization*, 1988, 7, pp. 47–70.
- Siegel, S. "Level of Aspiration and Decision Making." *Psychological Review*, 1957, 64, pp. 253–262.
- Siegel, S. and Fouraker, L. *Bargaining and Group Decision*. New York: McGraw-Hill, 1960.
- Simpson, J., Wickelgren, A. "Bundled Discounts, Leverage Theory, and Downstream Competition" *American Economic Review*, 2007a, 9, pp. 1–14.
- Simpson, J., Wickelgren, A. "Naked Exclusion, Efficient Breach, and Downstream Competition." *American Economic Review*, 2007b, 97, pp. 1305–1320.
- Sloof, R., Oosterbeek, H., Riedl, A., and Sonnemans, J. "Breach Remedies, Reliance and Renegotiation." *International Review of Law and Economics*, 2006, 26, pp. 263–296.
- Smith, A.M. "An Experimental Study of Exclusive Contracts." *International Journal of Industrial Organization*, 2011, 29, pp. 4–13.
- Smith, V.L. "Experimental Economics: Induced Value Theory." *American Economic Review*, 1976, 66, pp. 274–279.
- Sobel, J. "Interdependent Preferences and Reciprocity." *Journal of Economic Literature*, 2005, 63, pp. 392–436.
- Spier, K.E. and Whinston, M.D. "On the Efficiency of Privately Stipulated Damages for Breach of Contract: Entry Barriers, Reliance, and Renegotiation." *RAND Journal of Economics*, 1995, 26, pp. 180–202.
- Talley, E.L. "Contract Renegotiation, Mechanism Design, and the Liquidated Damages Rule." *Stanford Law Review*, 1994, 46, pp. 1195–1243.
- Talley, E., and Camerer, C. "Experimental Law and Economics." In: Polinsky, M., and Shavell, S. (Eds.). *The Handbook of Law and Economics*. Amsterdam: Elsevier, 2007, pp. 1619–1650.
- Thaler, R.H. "Anomalies. The January Effect." *Journal of Economic Perspectives*, 1987, 1, pp. 197–201.
- Thaler, R.H., 1992. *The Winners Curse: Paradoxes and Anomalies of Economic Life*. Princeton: Princeton University Press.

Thompson, L. "Negotiation Behavior and Outcomes: Empirical Evidence and Theoretical Issues." *Psychological Bulletin*, 1990, 108, pp. 515–532.

Tirole, J. 1988. *The Theory of Industrial Organization*, Cambridge, MA: MIT Press.

Whinston, M.D. *Lectures on Antitrust Economics*. MA: MIT Press, 2006.

Whinston, M.D. "Tying, Foreclosure, and Exclusion." *American Economic Review*, 1990, 80, pp. 837–859.

Legal Cases

Automatic Radio Manufacturing Co. v. Hazeltine Research Inc., 339 U.S. 827, 834, 1950.

Ayres v. Robinson, 887 F.Supp. 1049, 1995.

Brown Shoe v. United States, 370 U.S. 294, 1962.

Continental T.V., Inc. v. GTE Sylvania, Inc., 433 US 36, 97 S.Ct. 2549, 53 L. Ed. 2d 568 - Supreme Court, 1977.

Conwood v. United States Tobacco, 290 F.3d 768, 2002.

Daubert v. Merrill Dow Pharmaceuticals, Inc., 509 U.S. 579, 1993.

Eastman Kodak Co. v. Image Technical Services, Inc., 504 U.S. 451, 112 S.Ct. 2072, 1992.

Frye v. United States, 293 F. 1013, 1923.

Illinois Tool Works Inc. v. Independent Ink, Inc., 547 U.S. 28, 2006.

Jefferson Parish Hosp. Dist. No. 2 v. Hyde, 466 U.S. 2, 7, 104 S.Ct. 1551, 1556, 1984.

LePage's Inc. v. 3M, 324 F.3d 141, 2003.

Port Dock & Stone Corp. v. Oldcastle Northeast, Inc., 507 F3d 117, 125, 2d Cir., 2007.

Re Beer Distribution Antitrust Litigation, 188 F.R.D. 557, 1999.

Tampa Elect. Co. v. Nashville Coal Co., 365 U.S. 320, 81 S.Ct. 623, 1961); on remand, 214 F.Supp. 64, M.D.Tenn., 1963.

United States v. Visa U.S.A., 344 F.3d 229, 2003.

United States v. Dentsply, 399 F.3d 181, 2001).

United States v. Microsoft Corp., 253 F.3d 34. 90, D.C.Cir., cert, denied, 534 U.S. 952, 122 S.Ct. 350, 2001.

United States v. United Shoe Machinery Corporation, 258 U.S. 451, 1922.

Yentsch v. Texaco, Inc., 630 F2d. 46, 56-57, 2d Cir. 1980.

Department of Economics, University of Alberta

Working Paper Series

<http://www.economics.ualberta.ca/en/WorkingPapers.aspx>

2012-23: Competition Between Sports Leagues: Theory and Evidence on Rival League Formation in North America – Che, X., Humphreys, B.
2012-22: Earnings and Performance in Women's Professional Alpine Skiing – Che, X., Humphreys, B.
2012-21: The Effect of Electricity Retail Competition on Retail Prices – Su, X.
2012-20: Matching Funds in Public Campaign Finance – Klump, T. Mialon, H. Williams, M.
2012-19: File Sharing, Network Architecture, and Copyright Enforcement: An Overview – Klump, T.
2012-18: Money Talks: The Impact of <i>Citizens United</i> on State Elections – Klump, T., Mialon, H., Williams, M.
2012-17: Food for Fuel: The Effect of U.S. Energy Policy on Indian Poverty – Chakravorty, U., Hubert, M., Ural-Marchand, B.
2012-16: New Casinos and Local Labor Markets: Evidence from Canada – Humphreys, B., Marchand, J.
2012-15: Playing against an Apparent Opponent: Incentives for Care, Litigation, and Damage Caps under Self-Serving Bias – Landeo, C., Nikitin, M., Izmalkov, S.
2012-14: It Takes Three to Tango: An Experimental Study of Contracts with Stipulated Damages – Landeo, C., Spier, K.
2012-13: Contest Incentives in European Football – Humphreys, B., Soebbing, B.
2012-12: Who Participates in Risk Transfer Markets? The Role of Transaction Costs and Counterparty Risk – Stephens, E., Thompson, J.
2012-11: The Long Run Impact of Biofuels on Food Prices – Chakravorty, U., Hubert, M., Nøstbakken, L.
2012-10: Exclusive Dealing and Market Foreclosure: Further Experimental Results – Landeo, C., Spier, K.
2012-09: Playing against an Apparent Opponent: Incentives for Care, Litigation, and Damage Caps under Self-Serving Bias – Landeo, C., Nikitin, M., Izmalkov, S.
2012-08: Separation Without Mutual Exclusion in Financial Insurance – Stephens, E., Thompson, J.
2012-07: Outcome Uncertainty, Reference-Dependent Preferences and Live Game Attendance – Coates, D., Humphreys, B., Zhou, L.
2012-06: Patent Protection with a Cooperative R&D Option – Che, X.
2012-05: Do New Sports Facilities Revitalize Urban Neighborhoods? Evidence from Residential Mortgage Applications – Huang, H., Humphreys, B.
2012-04: Commercial Revitalization in Low-Income Urban Communities: General Tax Incentives vs Direct Incentives to Developers – Zhou, L
2012-03: Native Students and the Gains from Exporting Higher Education: Evidence from Australia - Zhou
2012-02: The Overpricing Problem: Moral Hazard and Franchises – Eckert, H, Hannweber, van Egteren
2012-01: Institutional Factors, Sport Policy, and Individual Sport Participation: An International Comparison – Humphreys, Maresova, Ruseski
2011-23: The Supply and Demand Factors Behind the Relative Earnings Increases in Urban China at the Turn of the 21 st Century – Gao, Marchand, Song

Please see above working papers link for earlier papers

www.economics.ualberta.ca