An Economic Analysis of the Law Surrounding Data Aggregation in Cyberspace

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AN ECONOMIC ANALYSIS OF THE LAW SURROUNDING DATA AGGREGATION IN CYBERSPACE

Jonathan M.H. Short

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AN ECONOMIC ANALYSIS OF THE LAW SURROUNDING DATA AGGREGATION IN CYBERSPACE

Jonathan M.H. Short*

I. INTRODUCTION

The emergence of technological advances has traditionally created new and unique legal problems. The solutions to counter these problems are often drawn from our legal traditions and adapted to an ever-modernizing world. However, as Professor Coase opined at the dawn of the communication technology revolution, "lawyers and economists should not be so overwhelmed by the emergence of new technologies as to change the existing legal and economic system without first making quite certain that this is required."1 Examination and reflection, in other words, is paramount to instituting a sound legal framework to encompass developing legal problems in technology.

This Article seeks to address the developing legal problems associated with commercial data protection and gathering on the Internet. Although these problems were most recently addressed in two federal district cases,2 this Article will not deal with the details of those suits. Instead, this Article will seek to evaluate the rights of data "owners" and data aggregators through an economic analysis of possible legal regimes.

Part II of this Article examines the technical background of market transactions in cyberspace. Specifically, it looks at data aggregation's affect on market properties. Part III takes a more traditional look at cyberspace markets from an efficiency perspective. Part IV addresses the choices of law that may be considered in cases of data aggregation. Part V provides an economic evaluation of those choices of law. The Article closes with a brief conclusion.

While this Article seeks to choose a traditional legal remedy for modern problems of data aggregation, the reality of Internet activity demonstrates that such easy answers are not possible. While it is important from an efficiency standpoint to give potential Internet retailers incentives to enter the online market, such as protecting price information from data aggregation, it is difficult to remedy a new property interest in data with the efficiency that the open transfer of information provides.

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This Article does not propose that smaller-scale, more in-depth pricing and product review operations, such as Consumer Reports, should be prohibited without authorization. Instead, large-scale data aggregation, which by design provides non-real time and often non-homogenous product and pricing comparisons, should be controlled. A new property right is not feasible because it would restrict too much efficient behavior that does not fall under the data aggregation problem. Rather, a legal regime to regulate the manner in which data is aggregated and disseminated is needed. The problem we are faced with is a problem of line drawing; the only way to remedy the problems that data aggregation causes is to institute a legal regime that encourages parties to bargain to the most efficient result.

II. TECHNICAL BACKGROUND

To understand the analysis, it is necessary to first understand the technical aspects of data collection on the Internet. While a more in-depth analysis of these aspects is available elsewhere, a brief overview is proper for the purposes of this Article. Data is most commonly collected via search engines. Search engines employ software entities called “spiders” or “robots” that are periodically sent out to scour the web for information. These software entities create “copies of websites from which the software culls relevant information to use in building a searchable database.”

Certain data aggregators use these software entities to copy the pricing information from commercial sites. From this data, the aggregator creates a digested listing, known as a metasite, of prices for products available online. Typically, these aggregators use software agents, known as “shopbots,” that employ “spiders to amass product and pricing information to allow comparison shopping.”

The conflict arises between the businesses whose information the aggregators are collecting, and the aggregators. Those businesses that do not sanction the collection of their data often argue that the publisher of a website should have control over the manner in which the commercial data is used. The primary rationale is that businesses should be able to create and maintain their commercial websites without the fear that the aggregators will unduly “steal or profit from the


5. Id.

6. Id. at 1970.

fruits of their labor." Many propose a restrictive mechanism in order to protect online data from unauthorized use.

Opponents of this view argue "that the efficient exchange of factual information, unhampered by any legal or technological barrier, unquestionably benefits society and weighs strongly against the enforceability of any restrictive mechanism." They point to self-help measures, such as the technological blocking of robots, as better alternatives to legal regulation.

A. Self-Help

Businesses argue that these self-help measures are not effective against data aggregation. The first measure, which requires the business to "incorporate a robot exclusion header, a text file that indicates that the site does not allow unauthorized robotic activity," is only effective if the aggregator's robot obeys the suggestion. In other words, "compliance with a robot exclusion header is entirely voluntary; a robot must be programmed to read the header and conform to its control directives before searching a website." Robotic observance of these headers is an implicit acknowledgment of non-authorization.

The second measure requires that a website continuously block server inquiries from specific Internet Protocol (IP) addresses, but this is only possible after the online retailer detects the presence of a robot through "repeated and rapid requests generated from a single" IP address. This measure is largely ineffective because even a mildly sophisticated party can affect robot information requests by employing proxy servers, which disguise the originating IP address. Simply put, an aggregator can alter the robot's identification once the website blocks its information request, and this can occur repeatedly. The website, therefore, cannot effectively identify and block the robots because the identity changes too often to make such a task feasible.

The final measure requires a website to restrict access to its information by authorizing only requests from registered password users. Robots, however, can also use passwords, and current password technology is largely unable to distinguish human use from robotic use. Additionally, requiring registration and password identification works as a hindrance to legitimate access by placing a barrier between the individual and the data. Legitimate users are less likely to use a website that utilizes password security for mere browsing than one that does not.

As the examination of all three of these measures demonstrates, currently no technological methods offer effective robot blocking without largely compromising authorized, and desired, public browsing. Additionally, any advancement in

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8. Id.
9. Id.
10. Id. ¶ 3.
11. Id.
12. Id.
13. Id.
14. Id.
15. Id.
16. Id.
17. Id.
18. Id.
data-protection technology is often met by a technological advancement on the part of the aggregators: "the blocked robot will find a way to circumvent the new technological barrier, causing the searched site to become even more restrictive, and resulting in a 'technological arms race.'" Technology, therefore, has not provided an efficient means by which online retailers can protect their commercial data under current law.

B. Efficiency of Legal Restrictions

The argument against the imposition of legal restrictions on data aggregation is based on creating an efficient market: "features of electronic markets and the Internet may reduce the frictions of traditional commerce, which have heretofore prevented an efficient market." Proponents argue that by collecting all of the available data and digesting it on one site for the consumer, these metasites offer "a costless mechanism to determine pricing and product information for any commodity offered for sale by any vendor."

However, proponents of legal restrictions argue that "economic modeling and empirical evidence suggest that a rash transition to consumer reliance on metasites may impede economic efficiency instead of promoting it." The economic modeling and empirical evidence suggest two outcomes. First, there is concern that "unrestrained shopbot implementation may lead to either monopolistic practices or price wars, which would unduly tax" commerce on the Internet. Under this scenario, one metasite could become monopolistic, implementing unfair trade practices to control internet businesses, while simultaneously preventing entry of other metasites into the market. Alternatively, there could be so many metasites that, with shopbots running millions of requests every minute, the Internet infrastructure would become overburdened, slowing down or stopping access by consumers and other authorized users.

Second, in counter to that concern, factors that are unrelated to search costs, such as brand identification, consumer loyalty reward programs, and service quality, could preserve price dispersion and frustrate economic efficiency by allowing established brands to become monopolistic. Attachments to strong branding may severely limit entrance of the multitude of metasites that would likely pop up. Simply put, instead of testing one of the many metasites that may offer incomplete or misleading information on book pricing, consumers may simply go to Amazon.com or the Barnes & Noble website. However, with legal restrictions that force metasites to bargain with the online retailers for information, market controls will ensure that an efficient number of metasites exist (that is, if inclusion within those metasites offers the online retailer a benefit). Therefore, legal restrictions that limit the pervasiveness of shopbots and their free-reign on the Internet may actually improve efficiency by allowing an efficient number of metasites to exist.

19. Id.
20. Id. ¶ 7.
21. Id.
22. Id.
23. Id. ¶ 16.
24. Id.
26. Rosenfeld, supra note 7, ¶ 7.
There is also discussion about the use of mandatory user agreements (MUA) on websites to efficiently restrict or block shopbots. While intuitively it seems that legal enforceability of a boilerplate MUA would too greatly hinder the free movement of every entity on the Internet, some argue that the “enforceability of contracts that restrict shopbots (‘robot restriction contracts’) will aid in achieving economic efficiency, rather than hindering its progress.” It would be difficult to enforce, on contractual grounds, a boilerplate agreement that would seem to be made between a robot and an online retailer.

C. Gray Markets and Entitlements for Data in Cyberspace

If we view commercial data as a product (see discussion of property rights infra), unauthorized data aggregation on the Internet takes the form of a gray market enterprise. A gray market is an unauthorized network for the distribution of a lawful product. Comparatively, while a product in a black market is itself illegal, “in a gray market it is the means of distributing the product that is the source of the problem.” By its nature “Cyberspace is the locus of gray markets in information, . . . mean[ing] that Cyberspace permits the creation of unauthorized distribution channels for information and information products.” Cyberspace, unlike traditional media of distribution—such as a printing press, telephone/fax machine, or photocopier—differs because it “provides sizeable reductions in the costs of producing, distributing, and accessing information.” As Professor Ghosh predicts, whenever the costs of copying and dissemination are low, gray markets and unauthorized distribution channels will arise. This forces content owners, for our purposes online retailers, to look for ways to limit what others can do with the digital information while trying to maintain open and public access to the information.

One prospective limitation might be some sort of intellectual property right in the data. However, there are three background considerations to keep in mind. First, for purposes of this analysis, we are not concerned with traditional digital intellectual property, such as a sound recording or photograph, but instead focus on digital “information.” Certain categories of property are preempted from this discussion, primarily by copyright law. Second, because digital information is nonrivalrous, “one person can make use of information without depriving another of the same use.” Unlike the taking of real property that deprives another of its use altogether, digital information can be copied outside of the owner’s knowledge. Lastly, it is considerably less expensive to copy than to create digital information, “and digital information is often even cheaper to copy than other forms of

27. Id. ¶ 6.
28. Id.
30. Id.
31. Id.
32. Id.
33. Id.
35. Id. at 219.
36. Id. at 219-20.
This makes prohibition and detection of data copying extremely difficult.

**D. Limiting Digital Copying: An Initial Glance at the Possibilities**

The question of how to limit copying "is best answered by looking at the aggregate combination of four factors: 1) entitlement-like protection; 2) contract-like protection; 3) state-of-the-art limitations; and 4) special-purpose technical limitations." 38 Entitlement-like protection is "the wide recognition that informational products have an 'owner' and that this owner has some 'rights' that would be violated by unauthorized copying of the product." 39 These "rights inhere in the product or the owner and are binding on the world in general; they are not a matter of contract." 40 Alternatively, contract-like protection "protects information only because two or more parties have agreed to treat the product as protected." 41 This allows the owner to bind those who are party to the contract. 42 Either the contract is "the means by which an entitlement is used to gain remuneration," or it "creates the owner's rights or clarifies them in the event that an entitlement is ambiguous." 43

Third, state-of-the-art copying limitations are not relevant to this discussion because the digital copying of data is inherently simple. The concerns raised about data aggregation do not involve someone hand writing a list of prices from the Internet. Rather it involves millions of robotic requests for information and the publication of the results of those requests to all that have access to the Internet. Lastly, special-purpose technological restrictions, such as scrambling a signal, can limit copying. 44 While this appears on its face to have potential, it has proven more difficult to execute on the Internet than for cable providers.

It is certainly true that "trends in computer communications point to lower transaction costs overall, and hence favor a property regime for informational works." 45 Professor Hardy argues that "the costs of drawing and monitoring the boundaries of informational works in cyberspace seem no higher than for works outside of cyberspace" and that "[i]n some regards, they may even be cheaper." 46 This factor argues strongly for either a private property regime 47 or an entitlement protected by a property rule.

Cyberspace also, in effect, creates markets by permitting "bargaining over distances and time that never before could have been possible." 48 This, in turn, "lowers the absolute amount of transaction costs relative to the costs of the same transaction undertaken through some other means." 49 The lowering of costs "oc-
curs in three ways: (1) lower cost of communicating between people; (2) lower cost of computer recording of transaction data; and (3) lower communication costs facilitating institutional innovations like rights clearinghouses.\textsuperscript{50} Transaction costs, therefore, drop significantly for many transactions in relation to traditional transactions in the real world.\textsuperscript{51}

However, as Professor Burk argues, "a careful consideration of on-line transactions suggests quite the opposite: not only could transaction costs in cyberspace be at least as high as those in 'real space,' but transaction costs on-line may in some instances be higher."\textsuperscript{52} Furthermore, in response to Professor Hardy's private property arguments, Professor Burk argues that "determining boundaries may be somewhat trickier than simply looking for the last string of binary code in a certain computer file."\textsuperscript{53} That complication results in higher transaction costs than expected.\textsuperscript{54} It therefore appears likely "that formulating any sensible demarcation of intellectual property in cyberspace will be a much higher-cost undertaking than demarcation of intellectual property in physical space—and the latter already can be a fairly high cost proposition."\textsuperscript{55}

As commercial activity in cyberspace pushes onward into the frontier, "all sorts of new and differently valued transactions will be undertaken."\textsuperscript{56} The number and nature "of transactions in cyberspace is thus one of extraordinary dynamism and unpredictability."\textsuperscript{57} Faced with unpredictability in future transactions, "the task is to design an entitlement system in the face of uncertainty."\textsuperscript{58} The choice is between liability rules and property rules, and property rules have the advantage.\textsuperscript{59} As Hardy argues later, "[l]iability rules are appropriate when transaction costs are high, not when those costs are unknown or changing."\textsuperscript{60} Additionally, liability rule protection can "carry a high price tag: the cost of litigation to determine, after the fact, the amount of damages."\textsuperscript{61} While property rule protection certainly does not entirely eliminate the threat of litigation, "it does put parties on notice that bargaining is called for and expected."\textsuperscript{62}

Costs of administering a private property system in cyberspace, while unknowable at this point, may be higher than expected.\textsuperscript{63} It is true that "practical problems exist with policing very long borders of real property, but they seem to pale beside the problem of detecting 'trespass' activities like unauthorized copying or uses of informational works."\textsuperscript{64} If, in fact, the costs of administering and policing "are excessive in cyberspace, they might argue against a private-property regime because such a regime would not be 'worth it.'"\textsuperscript{65}

\textsuperscript{50.} Id.
\textsuperscript{51.} Id. at 240.
\textsuperscript{52.} Dan L. Burk, Muddy Rules for Cyberspace, 21 CARDOZO L. REV. 121, 145 (1999).
\textsuperscript{53.} Id. at 147.
\textsuperscript{54.} See id. at 152-59.
\textsuperscript{55.} Id. at 152.
\textsuperscript{56.} Hardy, supra note 34, at 240.
\textsuperscript{57.} Id.
\textsuperscript{58.} Id.
\textsuperscript{59.} Id.
\textsuperscript{60.} Id. at 241.
\textsuperscript{61.} Id.
\textsuperscript{62.} Id.
\textsuperscript{63.} Consider, for example, the costs of harm and policing that the recording industry has faced over the last decade.
\textsuperscript{64.} Hardy, supra note 34, at 247.
\textsuperscript{65.} Id.
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E. Network-Effect Relationships

As Bill Gates stated, the Internet of the future ""must offer individuals complete control over how and when and what information is delivered to them, and allow them to protect their privacy and security by controlling who has access to their personal information."66 Likewise, the Internet must also offer online retailers complete control over how and when and what data is taken from them, and how that data is used in commerce. The dilemma for the future, i.e., "the need to control competitor access to publicly accessible information—typifies the first relationship between primary and secondary aggregators, the network-effect relationship."67

The network-effect relationship has two primary features.68 The first feature is public openness: "to attract users to its website, the primary aggregator makes at least some information on its site easily accessible and searchable by the public."69 The second feature is exploitation: exploiting the public ability to search the primary's information, the secondary enjoys a positive externality that has no effect on the network relationship between the primary and the consumer.70 Difficulties arise, however, when "the secondary aggregator threatens to undermine a network effect on which the primary aggregator significantly depends for revenue."71 Protecting the network relationship between the primary and the consumer may be necessary to ensure efficiency; allowing the primary a right to exclude may ensure an efficient result (i.e., primary and secondary are able to bargain over the ability to aggregate).

It is difficult to square a denial of the primary's right to exclude with economic efficiency concerns.72 As Professor Warner argues, "[o]ther things being equal, it is efficient to let the primary aggregator decide if and how it will allocate its business resources."73 That is one reason why, "[i]n the brick-and-mortar world, we put such decisions in the hands of individual market participants . . . ."74 Furthermore, "[d]enying primaries the right to exclude secondaries could seriously undermine the incentive to enter into a web business that depends on a positive network effect for revenue."75 The inability to control use of the data in commerce seriously diminishes the incentive to invest in the creation of a publicly accessible website.76 And "[i]f investors as primary aggregators lack sufficient incentive, secondary aggregators will not thrive, and Internet users will not enjoy the benefits of either one."77

67. Id. at 135. For our purposes, the primary aggregators are the online retailer and the secondary aggregators are the metasites.
68. Id.
69. Id.
70. Id.
71. Id.
72. Id. at 136.
73. Id.
74. Id.
75. Id.
76. See id. at 137.
77. Id.
Granting the right to exclude secondaries certainly does not mean "that secondaries will vanish from network-effect relationships; rather, secondaries will have to try to negotiate license agreements with the primaries that allow the latter to search the former's website."\textsuperscript{78} It is reasonable to expect that a primary aggregator would "enter into a license agreement with a secondary aggregator if the compensation from the license outweighed the risk of an undermined network effect."\textsuperscript{79} An assessment of the risk would not hinge solely on critical mass, because that "is not sufficient to undercut a positive network effect."\textsuperscript{80} Instead, the potential use by the "secondary aggregator must undermine the expectation that large numbers of people will use the primary aggregator's website."\textsuperscript{81} A primary aggregator would not worry that a secondary aggregator could destroy its network effect if it was confident about its site's power of attraction.\textsuperscript{82}

Economic efficiency considerations also support the right to exclude. As mentioned, "[i]t is efficient to allow primary aggregators to decide if and how they will allocate their business resources, all other things being equal."\textsuperscript{83} "At the harm end of no-network-effect relationships, there is no worry that the primary will use the right to exclude to achieve short-run gains that undermine the interest in low-cost communication and unimpeded access to information."\textsuperscript{84} Instead, "effective, comprehensive search engines are critical to advancing that interest, and granting search engines the right to exclude meta-search engines allows search engines to protect themselves from the meta-search engine threat."\textsuperscript{85} Negotiating for authorization to use online retailers' commercial data may provide the most efficient means of allowing both online retailers to control their commercial data and metasites to provide consumers with reduced overall search costs.

F. State of the Web

There are "[c]ertain characteristics of electronic markets [that] enhance the possibility that e-commerce will be conducted in an environment that comes closer to attaining the perfectly competitive ideal than that of most conventional markets."\textsuperscript{86} As mentioned earlier, the same essential technology that "users already employ to search the Internet can also enable this retailing revolution by allowing consumers easily to obtain comparative product and pricing information."\textsuperscript{87} Online retailers, however, have recently begun "asserting a variety of legal claims that, if successful, will hamper consumers' abilities to use," what Professor O'Rourke argues, are "the most efficient tools to obtain this information."\textsuperscript{88} Professor O'Rourke further argues that "if courts adjudicating these claims apply existing property law governing tangible items to Internet activities without considering that medium's unique nature, they may inadvertently, but nevertheless effectively,
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confer upon web site owners exclusive rights to their product and pricing information tantamount to ownership." 89

Perfect competition requires, among other things, the costless exchange of information. 90 However, critics argue that if online merchants have the ability to "control the most efficient means of access to and the accompanying dissemination of their product and pricing information, they may impede movement toward the ideal." 91 For a market to be perfectly competitive, it must be "characterized not only by no barriers to entry or exit, but also homogeneous products and perfectly informed buyers and sellers able to meet with each other without incurring search or other transaction costs." 92 Price must equal "marginal cost, keeping supply and demand in equilibrium." 93 Most agree that any "change to a market that brings it closer to perfect competition is generally . . . desirable." 94 Therefore, through "decreasing transaction costs and making information more accessible, search engines help Internet markets to more closely approximate the zero transaction cost and perfect information hallmarks of textbook perfect competition than 'real' world markets." 95 The decrease in user costs for identifying retailers of certain products and finding information about those products "makes Internet markets more likely to approach perfect competition than conventional ones." 96 This should result in "both lower and more uniform prices." 97 As Professor O'Rourke points out, the reality is something very different. 98

Improvements in search engine capabilities will cause transaction costs to decline, but with it will come the potential for diminishing brand power. 99 Some commentators predict that the power of the brand "will inevitably wane as users' trust moves to an intelligent agent personalized for their needs." 100 If these improvements cause trust to shift in this direction, "the only brands with value will be those of the software agent and the manufacturer of the product: [t]he site from whom the agent makes the ultimate purchase and any others employed by it during the purchasing process will be transparent to the user." 101

Online retailers of established brands "are unlikely to be receptive to erosion of their brands' power." 102 The desire on the part of online retailers "to maintain whatever market power the brand confers explains, at least in part, why some sites are seeking to control the flow of their product and pricing information." 103 While "the number of sites objecting to indexing by search engines, particularly metasites, has increased" recently, most sites formerly "welcomed the search engines as tools

89. Id. at 1966-67.
90. Id. at 1967.
91. Id.
92. Id. at 1968.
93. Id. (footnotes omitted).
94. Id.
95. Id. at 1969.
96. Id. at 1971-72.
97. Id. at 1972.
98. Id.
99. Id. at 1974.
100. Id.
101. Id.
102. Id.
103. Id.
making it easier for users to find them." 104 Online retailers’ success in establishing those brand names has consequently, and predictably, led to the decreased need for search engines. 105 Many of “the best-known sites may prefer that users travel directly to them rather than first going to a search engine from which they may choose to go to a competitive site.” 106

Some shopbots have respected the requests of online retailers and “search only sites with whom they have agreements granting permission to index.” 107 The value of an incomplete listing of prices to the consumer is patently lower than the value of a comprehensive one. 108 However, many online retailers argue that even those metasites claiming to be comprehensive deliver misleading information to the consumers. For example, metasites do not complete new searches of prices every time a consumer places a query. Instead, the metasite searches only “against its own database that is comprised of contents drawn from the web at a specific time.” 109 These updates are, by their nature, not in real-time. Therefore, if an online retailer, or especially an auction site, has a price change, “a consumer may receive an old quotation from a shopbot, and be disappointed when he or she tries to make a purchase only to discover that the quoted price is not the actual one.” 110

Vigorous competition presupposes both informed consumers as well as private property rights. 111 The private property rights help retailers control the permissible means by which customers become informed about the products they sell. 112 This control keeps consumers imperfectly informed and keeps their information costs high. 113 However, metasites also provide incomplete or misleading information, not because of restrictions imposed by online retailers, but because it would be impractical for the metasite to search the entire Internet for prices each time a consumer made a query. Likewise, it is inefficient for metasites to provide partial or outdated information because it misinforms the consumer and harms the online retailer’s reputation. Consumers may, and often do, “blame the destination site for the discrepancy rather than the shopbot, eroding the destination site’s goodwill.” 114

The advertising value of an online retailer’s site is also diminished by the use of metasites. Rates for advertising obviously depend on the number of visitors to the site. 115 However, when metasites provide a deep link to a product page, “the chances that the user will travel to the site on which the ad appears may decrease, thereby lowering the destination site’s advertising revenue.” 116 Empirical data also demonstrates “that advertisers are increasingly using their money to place ads on specialized sites tailored to the interests of their target markets.” 117

104. Id. at 1975.
105. See id.
106. Id.
107. Id.
108. Id.
109. Id. at 1978-79.
110. Id. at 1979.
112. Id.
113. Id. at 608.
114. O’Rourke, Shaping Competition, supra note 4, at 1979.
115. Id. at 1982.
116. Id.
117. Id.
As Professor O'Rourke claims, "the law should critically examine claims that unauthorized indexing constitutes impermissible free-riding on the indexed site's information simply because it undercuts a site's source of revenue." Law is typically only "concerned with free-riding when it threatens the incentive to create and market the original product (as in the case of piracy or close similarity) than when it does not (as when the free-rider adds substantial value)." In the case of data aggregation, however, the free-riding causes online retailers to expend resources on the "technological arms race" rather than on creating primary data. Online retailers "argue that this arms race is not the best use of resources." The job of law, therefore, is to weigh the benefits that metasites provide against the costs incurred by the online retailers (and arguably the consumers), and choose an appropriate entitlement/protection.

Online retailers may effectively stop even lawful use of uncopyrightable data because "[i]mpermissible access contaminates any use, even those the copyright law would allow." Online retailers may block unauthorized use by "require[ing] all visitors to agree to a click-wrap contract that enumerates forbidden uses." As mentioned earlier, there are problems with this approach. A spider, by its nature, bypasses much of the superficial information on, for example, the homepage of the website. A spider, therefore, "may never see the contractual terms. Its manner of entry may allow it to avoid clicking on the 'I agree' button that indicates its consent to the terms of the click-wrap." Or if it does click on the button, it would be difficult to prove a meeting of the minds between the spider and the online retailer.

The technological advances provided with the advent of Internet technology have provided a great boon to e-commerce. The control of commercial data is a contentious topic. The preceding section provided a broad overview of the issues. Next, we turn to an examination and application of traditional economic efficiency theories.

III. EFFICIENCY

A. Efficiency v. Equity

Discussions of e-commerce and rights on the Internet often hinge on concepts of efficiency and equity. On the one hand, efficiency refers "to the relationship between the aggregate benefits of a situation and the aggregate costs of the situation." Equity, on the other hand, refers "to the distribution of income among individuals." Simply put, "efficiency corresponds to 'the size of the pie,' while

118. Id. at 1983.
119. Id.
120. Id. at 1985.
121. Id.
122. Id. at 1999 (emphasis omitted).
123. Id.
124. A. MITCHELL POLINSKY, AN INTRODUCTION TO LAW AND ECONOMICS 7 (2d. ed. 1989).
125. Id.
equity has to do with how it is sliced.” 126 For example, from an efficiency perspective, an individual that discovers oil underneath the earth maximizes the size of the pie; an individual who finds one million dollars in paper money does not. This is true because “[f]inding money does not increase the wealth of society; it just enables the finder to have more of society’s goods than someone else.” 127 Alternatively, a decision based on equity would choose how to divide the oil if it were discovered in a common pool by multiple parties.

For the central economic analysis of data aggregation, this Article will, as Professor Polinsky argues, “concentrate on how to maximize the size of the pie, leaving to others—such as legislators—the decision how to divide it.” 128 While fairness is often an important consideration for the legal system, the “conflict between the pursuit of efficiency and the pursuit of equity” is worth mentioning only briefly. 129 If, as Professor Polinsky suggests, “the pie can be sliced in any way desired, then clearly there is no conflict—with a bigger pie, everyone can get a bigger piece.” 130 However, if in the pursuit of creating a bigger pie “its division must be quite unequal, then, depending on what constitutes an equitable division of the pie, there may well be a conflict between efficiency and equity.” 131 Under such circumstances the law or polity may prefer that a party “accept a smaller pie (less efficiency) in return for a fairer division (more equity).” 132 The resolution of the efficiency and equity conflict “depends on how important efficiency is relative to equity.” 133 For purposes of this Article, efficiency trumps equity in importance; but because both issues become intertwined in decisions about legal regimes we will consider both when applicable.

B. Kaldor-Hicks Wealth Maximization

The economic implications of a change in law “is Kaldor-Hicks efficient if the new outcome makes those who benefit sufficiently well off that they would still end up with an increase in utility even if they compensated the losers enough to make the losers indifferent.” 134 However, a major problem with the abstract form of the Kaldor-Hicks criterion “is that it requires a detailed knowledge of the preference functions (i.e., indifference curves) of every member of society.” 135 In response to this difficulty, “some economists, and the law and economics movement in particular, have posited a closely related measure of efficiency, called ‘wealth maximization.’” 136

The trade-off of utility required under Kaldor-Hicks, which is so difficult to determine, is replaced under the wealth maximization model with monetary value or wealth measurements. 137 Using this model, for a legal change to be efficient it

126. Id.
128. POLINSKY, supra note 124, at 7.
129. Id.
130. Id. at 7-8.
131. Id. at 8.
132. Id.
133. Id.
134. MARK SEIDENFELD, MICROECONOMIC PREDICATES TO LAW AND ECONOMICS 54-55 (1996).
135. Id. at 55.
136. Id.
137. Id.
must increase the winner’s wealth more than it decreases the loser’s wealth.\(^{138}\)

While it is certainly “still difficult to account for all the ways in which a change in a legal rule makes members of society better or worse off,” monetary value or wealth is a far more recognizable and tangible determinant for a court than the abstract utility.\(^{139}\) Furthermore, “wealth maximization takes as its measure of efficiency value determined by individuals’ willingness and ability to pay.”\(^{140}\) Wealth maximization, therefore, “justifies outcomes that depend greatly on the initial distribution of wealth with which society starts.”\(^{141}\)

However, by using monetary value as the determinant, wealth maximization does not take into account the value of the dollar to the individual, but rather the value to society as a whole. In other words, “wealth maximization equates the value of a dollar to one person with the value of a dollar to another, regardless of whether the first person needs that dollar to buy food to keep from starving while the second person already has millions of dollars.”\(^{142}\) This compounds distributional problems, and often competitive and market entry difficulties, “by allowing individuals with wealth to determine how legal entitlements are assigned, without these individuals ever having to pay for the entitlement.”\(^{143}\)

This is especially pertinent to issues of e-commerce. With strongly established brands controlling much cyber-wealth,\(^{144}\) market entry becomes more difficult for those wishing to compete. Any legal rule must therefore ensure that while increasing the size of the pie it does not promote inefficient monopolistic control and prohibit healthy competition on the web; this would be accomplished by encouraging bargaining between parties.

**C. Costs of Harm: The Efficiency of Incentive Models of Precaution and Compensation**

In e-commerce, as with all other types of trade, parties and legal institutions are concerned with allocating the costs of harm.\(^{145}\) Specifically, in terms of data aggregation, a metasite undertaking data aggregation can cause harm to the primary site, primarily by using too much bandwidth and slowing down the network, or by disseminating inaccurate or untimely information. Such activity can be characterized as a quasi-nuisance. It is important, therefore, to discuss models of precaution and compensation in relation to data aggregation.

Allocative cost rules are justified by two distinct goals: “the equity goal of compensating victims and the efficiency goal of minimizing costs to society as a whole.”\(^{146}\) Two principles can be derived from these seemingly distinct goals:

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138. Id.
139. Id.
140. Id.
141. Id. at 55-56.
142. Id. at 56.
143. Id.
144. For example, Amazon.com, eBay, Yahoo!, WalMart.com.
“the compensation principle and the marginal principle.”147 First, the compensation principle dictates that the victim “be compensated for harm caused by others.”148 Second, the marginal principle dictates that social costs are “minimized by equating the incremental benefit of each precautionary activity to its incremental cost.”149 Harm, therefore, can be compensated before the fact by adjusting prices to reflect the cost of precaution and/or after the fact by compensating the injured party. The distinction depends on the liability of the parties.

In the examination of costs surrounding data aggregation on the Internet, the direct cost of harm and the cost of precautions against harm are both worthy of analysis.150 Professor Cooter argues that the common law combines the compensation and marginal principles in a harmonious fashion. For example, “there are circumstances in which compensation is required for reasons of justice and [there are] mechanisms that attempt to provide compensation, without undermining incentives for efficient behavior.”151 In other words, these two principles, instead of existing in rivalry, can actually complement each other without causing under-precaution or over-compensation.152

1. Double Responsibility at the Margin

Compensation can influence the victim not to internalize possible externalities, and thus not take efficient precautions to avoid harm. Double responsibility at the margin, or the imposition of full responsibility for harm on both the injurer and the victim, purports to eliminate that problem of under-precaution.153 For instance, in the example of the polluting factory and neighboring laundry, “justice may require the factory not only to pay for harm caused by the smoke, but also to compensate the laundry for that harm.”154 In this example, compensation compromises efficiency by permitting the laundry to externalize its costs instead of taking precautions against the harm.155 A paradox therefore results: “If the factory can pollute with impunity, harm is externalized by the factory; if the factory must pay full compensation, harm is externalized by the laundry; if compensation

147. Id.
148. Id.
149. Id.
150. Id. at 2. As Professor Cooter writes:

The “model of precaution” is my label for an account of the relationship between these two types of costs.

There is justification in terms of economic theory for developing the model of precaution before considering other types of indirect costs. An economic model is built up by mathematical deduction from axioms describing the behavior of individuals and organizations. This axiomatic structure contains an accepted order of simplification, which is dictated by the internal structure of economic reasoning. Following this order, the simplest level of analysis assumes away the costs of risk aversion, the costs of obtaining information about risk, and the transaction costs of dispute resolution. Thus, the model of precaution is basic in terms of the internal structure of economic reasoning. Furthermore, . . . the model of precaution is similar in structure for torts, contracts, and property.

Id. (internal citations omitted).
151. Id. at 1-2.
152. Id. at 1.
153. Id. at 4.
154. Id.
155. Id.
is partial, harm is partly externalized by the factory and partly externalized by the laundry.”\textsuperscript{156} Internalization never occurs for both parties if full responsibility is imposed on only one party or partial responsibility is parceled out.\textsuperscript{157} Therefore, no level of “just” or “non-wasteful” compensation can achieve the efficiency of double responsibility at the margin.\textsuperscript{158}

In situations where efficiency demands bilateral precaution, which perhaps is likely in cyberspace, strict liability (without contributory negligence) in a fractional form is inefficient. Technically, “when efficiency requires bilateral precaution, strict liability for any fraction of the harm, from zero percent to 100 percent, is inefficient.”\textsuperscript{159} Therefore, formulating a legal regime that combines “compensation for harm with incentives for efficient precaution” is patently difficult.\textsuperscript{160} To be efficient, both parties must “balance the cost of further precaution against the consequent reduction in harm and . . . act accordingly.”\textsuperscript{161} Only when each party is individually liable for the cost of harm is there an incentive for the parties to act accordingly.\textsuperscript{162} Efficiency in data aggregation, therefore, may require double responsibility at the margin.\textsuperscript{163}

As mentioned earlier, this is where courts often misbalance equity and efficiency by construing that justice requires the injurer to compensate the victim; the compensation alters the incentives of both parties to act efficiently.\textsuperscript{164} Therefore, by reducing the foreseeable cost of harm, “the victim may be encouraged to take too little precaution and rely instead on compensation to make him whole.”\textsuperscript{165}

As this explains, developing a legal rule that combines the justice of compensation with the efficiency of precautionary incentives is difficult.\textsuperscript{166} In the realm of data aggregation, a legal rule should give the incentive to the victim to develop technology to help prevent the injury and give the incentive to the injurer to get authorization to gather information. The rule should also allow the victim to receive compensation from the injurer if identification is possible or suffer without compensation if identification is not possible. The victim will act without knowing whether compensation will be possible and the injurer will act under the belief that compensation will always be granted. Following these four guidelines a legal rule may be developed to ensure that there is double responsibility at the margin.

2. Party Negotiations and Coercive Orders

If government regulation is necessary, efficiency dictates that regulators “adopt methods that alter incentives and redirect information instead of issuing commands, so that affected parties can work out the best course of action among themselves.”\textsuperscript{167} Under this approach, parties view nuisances, for example, “as a subject for private

\textsuperscript{156. Id.}  
\textsuperscript{157. Id.}  
\textsuperscript{158. Id.}  
\textsuperscript{159. Id.}  
\textsuperscript{160. Id.}  
\textsuperscript{161. Id. at 44.}  
\textsuperscript{162. Id.}  
\textsuperscript{163. Id.}  
\textsuperscript{164. Id.}  
\textsuperscript{165. Id.}  
\textsuperscript{166. Id.}  
\textsuperscript{167. Id. at 26.}
bargaining, a view that has been developed at length in the continuing commentary on the Coase Theorem."\textsuperscript{168} This view works on the theory "that private bargaining among a small number of people with well-defined rights usually has an efficient outcome."\textsuperscript{169} Parties are better able to understand their own situations and work out an efficient solution, especially when the parties may work together in the future. In e-commerce, it is likely that, given the murkiness of the law and unpredictability of the commercial environment, a metasite that is "stealing" information from an online retailer one day may negotiate a licensure or authorization deal the next.

One common legal mechanism that combines efficient precaution incentives with compensatory justice is a coercive court order, such as a nuisance injunction.\textsuperscript{170} While economists remain unenthusiastic about coercive orders, such orders can enable an efficient outcome if "used as a bargaining chip rather than actually exercised."\textsuperscript{171} Although the entrance of a coercive order, which typically signals the breakdown of negotiations, may not result in an efficient outcome, the right to obtain a coercive order may be a bargaining solution and "bargaining solutions have desirable economic properties."\textsuperscript{172} The right of injunction may enable a victim "to achieve adequate compensation by private agreement with the injurer, and the parties to the bargain will desire to make its terms efficient."\textsuperscript{173} This is likely the best route for solving e-commerce disputes given that those involved in the industry will have a better idea of how to bargain to an efficient solution in the cyber-realm than a court would in entering an order.

\section*{D. Reciprocity of Harm and the Coase Theorem}

The Coase Theorem, set forth by Professor Coase in \textit{The Problem of Social Cost}, is important to this examination because "the lessons of Coase's Theorem apply to every possible legal rule which we might economically evaluate."\textsuperscript{174} One of the major theories put forth by Professor Coase that is relevant to this discussion is reciprocity of harm.\textsuperscript{175} As Professor Coase wrote, "[t]he question is commonly thought of as one in which A inflicts harm on B and what has to be decided is: how should we restrain A?"\textsuperscript{176} But restraint of A is not the answer because "[w]e are dealing with a problem of a reciprocal nature."\textsuperscript{177} Restraining the harm A inflicts on B likewise inflicts a harm on A.\textsuperscript{178} The appropriate question, therefore, is "should A be allowed to harm B or should B be allowed to harm A?"\textsuperscript{179} To answer

\begin{itemize}
\item \textsuperscript{168} \textit{Id.}
\item \textsuperscript{169} \textit{Id.} ("Experimental evidence also suggests that breakdowns are rare in two-person bargaining games with clear stakes but are more common when several people must agree."). \textit{Id.}
\item \textsuperscript{170} \textit{Id.} at 28.
\item \textsuperscript{171} \textit{Id.}
\item \textsuperscript{172} \textit{Id.}
\item \textsuperscript{173} \textit{Id.}
\item \textsuperscript{174} \textit{SEIDENFELD, supra note 134, at 91.}
\item \textsuperscript{175} R.H. Coase, \textit{The Problem of Social Cost}, 3 J.L. & ECON. 1, 2 (1960) [hereinafter Coase, \textit{Social Cost}].
\item \textsuperscript{176} \textit{Id.}
\item \textsuperscript{177} \textit{Id.}
\item \textsuperscript{178} \textit{Id.}
\item \textsuperscript{179} \textit{Id.}
\end{itemize}
that question one must determine which harm is less serious.\textsuperscript{180} It therefore "goes almost without saying that this problem has to be looked at in total and at the margin."\textsuperscript{181}

In cases where market transactions are costless, well-defined rights and easily forecastable legal results are all that is needed to ensure efficiency.\textsuperscript{182} One purpose for the legal system's involvement in policing economic activities "is to establish that clear delimitation of rights on the basis of which the transfer and recombination of rights can take place through the market."\textsuperscript{183} As mentioned earlier, legal delimitations of rights have a reciprocal impact: "there is no analytical difference between the right to use a resource without direct harm to others and the right to conduct operations in such a way as to produce direct harm to others."\textsuperscript{184} That is to say that in either instance something granted to one party is being denied to the other.\textsuperscript{185} By suppressing the harm which A inflicts on B, the court inevitably inflicts harm on A.\textsuperscript{186} The court is therefore charged with avoiding the more serious harm in delimiting the rights of the parties.\textsuperscript{187}

It is really only after the parties' legal rights are established that "negotiation is possible to modify the arrangements envisaged in the legal ruling, if the likelihood of being able to do so makes it worthwhile to incur costs involved in negotiation."\textsuperscript{188} As an essential precursor to market transactions, the delimitation of rights settles a primary power dispute and allows parties to bargain.\textsuperscript{189} The ultimate outcome—that value-maximizing transaction—remains "independent of the legal decision."\textsuperscript{190} In the ultimate delimitation of legal rights, the court must understand that "[a]ll property rights interfere with the ability of people to use resources."\textsuperscript{191} Needless to say, the optimum situation is not necessarily "one in which there is no interference."\textsuperscript{192} The optimum solution is, instead, reached when "the gain from interference more than offsets the harm it produces."\textsuperscript{193} This goal is therefore of paramount importance in deciding which choice of law to apply to data aggregation.

For data aggregation, we must first determine which harm is less serious: the harm inflicted by the data aggregation or the harm in allowing the online retailers to block such activity. If the harm of the data aggregation is greater—that is, the gain by the metasite does not offset the harm caused to the online retailer and affected customers—the online retailer must have the right to prohibit such activity without authorization. If, on the other hand, the harm of prohibiting the data aggregation—that is, the gain by the online retailer in blocking the metasite does

\begin{itemize}
  \item \textsuperscript{180} Id.
  \item \textsuperscript{181} Id.
  \item \textsuperscript{182} Id. at 19.
  \item \textsuperscript{183} Coase, FCC, supra note 1, at 25.
  \item \textsuperscript{184} Id. at 26.
  \item \textsuperscript{185} Id.
  \item \textsuperscript{186} Id.
  \item \textsuperscript{187} See id.
  \item \textsuperscript{188} Id. at 26-27.
  \item \textsuperscript{189} See id. at 27.
  \item \textsuperscript{190} Id.
  \item \textsuperscript{191} See id.
  \item \textsuperscript{192} Id.
  \item \textsuperscript{193} Id.
\end{itemize}
not offset the harm such a prohibition causes the metasite and affected customers—the metasite must have the right to aggregate the data. The purpose, as stated earlier, is to create the bigger pie, not to decide on how it should be divided.

IV. CHOICE OF LAW

A. Property Law and Communal Ownership

One possibility to address the data aggregation situation is to use property law. Commercial data, with its intrinsic value as more than just a fact, may (and I stress may) have some intellectual property characteristics. Unlike mere facts, which we rely upon as communal property in everyday life but which exist no matter what we do, commercial data must be produced. Society wants, as in this case, online retailers to create and give public access to this data. Much like copyright we want the data created; like patent law we want it widely disseminated (under controlled circumstances); and like trademark we want it to ease consumers in their search. Under these liberal assumptions of intellectual property, we will examine the possibilities of a property right in commercial data, both communally and individually owned.

One of the primary efficiency tenets of property law is that “legal protection of property rights creates incentives to exploit resources efficiently.” In fact, while a product’s value, “as measured by consumers’ willingness to pay, may have greatly exceeded its cost in labor, materials, and forgone alternative uses . . ., without property rights there is no incentive to incur these costs because there is no reasonably assured reward for incurring them.” Property rights, through the right to exclude, provide the owner with the security and expectations that foster productive use by substantially limiting risk.

For application of property rights to the situation surrounding data aggregation, it is necessary to view property ownership as permitting certain activity. In other words, the owner of the data "possesses the consent of fellowmen to allow him to act in particular ways." That owner also has an expectation that the community will "prevent others from interfering with his actions, provided that these actions are not prohibited in the specifications of his rights." However, it is also important to view current law pertaining to this type of factual data in the public domain. From that point, we may analyze the status of the property right in the factual data as communal.

194. Property is an acceptable analogy for an economic analysis of law surrounding digital data; some economists "use the term property right to describe virtually every device—public or private, common law or regulatory, contractual or governmental, formal or informal—by which divergences between private and social costs or benefits are reduced." POSNER, supra note 127, at 53. Digital data certainly fits into that definition.
195. Id. at 36.
196. Id.
198. Id.
199. While the "copying" of digital data does not have the same effect that communal use of property might because the use is nonrivalrous, the dissemination of time-sensitive information dilutes its value in an analogous manner.
AN ECONOMIC ANALYSIS OF THE LAW

Informational works on the Internet, which data aggregation primarily involves, are communal property: "a type of 'public good,' that is, a good that evidences 'nonrivalrous consumption.'"200 In fact, one person may use the data without physically impeding on another's, simultaneous use.201 As Professor Hardy points out, "once group ownership of an informational work has been determined, the group should not have to experience any transaction costs at all."202 In that circumstance, "[e]ach member of the group can fully exercise all rights to the informational work without fear that other group members are in any way excluded from doing the same."203

1. Right to Exclude

As mentioned, for a property ownership system to ensure the efficient use of property, owners must have the right to exclusive use. For this analysis, I liken information in the public domain (i.e., that data not falling within existing copyright protection) to Judge Posner's example of a pasture owned in common.204

As more cows are brought to pasture on the commonly owned land, "[t]he cows will have to graze more in order to eat the same amount of grass, and this will reduce their weights."205 However, "because none of the farmers pays for the use of the pasture, none will take this cost into account in deciding how many additional cows to pasture, with the result that more cows will be pastured than would be efficient."206 The problem of overuse, which exists because there is no incentive to act otherwise, "would disappear if one person owned the pasture and charged each farmer for its use (for purposes of this analysis, disregard the cost of levying such a charge)."207 The right to exclude allows the owner to levy a charge against each farmer, which "would include the cost he imposes on the other farmers by pasturing additional cows, because that cost reduces the value of the pasture to the other farmers and hence the price they are willing to pay the owner for the right to graze."208 As this example shows, creating "individual (as distinct from collective) ownership rights is a necessary rather than a sufficient condition for the efficient use of resources."209

In the case of data aggregation, overuse has a similar deleterious effect. While the data is not physically occupied by the metasites, the dissemination of the data dilutes its value. The value to the online retailer of the exclusive use of its data, and the value to the consumer, is depleted by metasite dissemination in several ways.

First, the accuracy of the information is not controlled by metasites in real-time. Metasites update information at scheduled intervals rather than at the moment of a user's query. This may translate into the online retailer losing the good-
will it has built up with its customers. If, for example, Metasite Y shows that Site X is selling a product for $10, but, due to a price change not reported by Metasite Y, the consumer clicks through to Site X and discovers the product is for sale for $15, the consumer may think poorly of Site X. This will be detrimental to Site X’s goodwill value. On the other hand, the consumer may lose confidence in Metasite Y, but that will not necessarily send the consumer directly to Site X. What it will do is increase the information costs of the consumer.

Second, the online retailer loses the value of its data to attract advertising revenue. If Site X attracts one million people to its site everyday because it is the exclusive provider of its own data, that attraction of consumers translates directly into the marketability of advertising space on Site X. However, if Metasite Y is able to disseminate the same information, and the information of many of the other competitors, Site X will lose the advertising value as fewer people click through its site.

Third, the online retailer, and arguably the consumer, will lose that value of showing the consumer other products as the consumer navigates through the site. Metasites often utilize deep links, which are hyperlinks that lead directly to the product page, bypassing the entryway and aisles of the site. Much like a grocery store strategically places items for impulse buying, so too do online retailers. The loss of this value to the online retailer is equal to the loss of possible sales from consumer navigation.

Lastly, the online retailer loses the ability to sell or license the data that it produces. Even if the online retailer wishes its information to be included on a particular metasite, because metasites are able to take the data without compensating the online retailers, there is no economic incentive to seek a license. Instead the online retailer loses the value of selling or licensing its data to metasites or other interested parties. A right to exclude would reverse that situation, creating a market for the bargaining between online retailers and metasites for data.

2. Transferability

The ability to transfer property rights is also necessary to ensure the efficient use of property. Returning to the agrarian example, suppose the property owner farms his own land, but is a bad farmer; obviously “his land would be more productive in someone else’s hands.” In such an instance, “[e]fficiency requires a mechanism by which the farmer can be induced to transfer the property to someone who can work it more productively.” The most obvious and efficient example of this type of mechanism is a transferable property right.

While communal property is often able to be transferred, it is more often too inefficient due to exorbitant negotiating costs. Negotiating costs are high because with many owners it is difficult “to reach a mutually satisfactory agreement, especially when each hold-out has the right to work the land as fast as he pleases.” A single owner “will attempt to maximize its present value by taking into account

210. Id.
211. Id.
212. Id.
213. See id.
214. Demsetz, supra note 197, at 355.
alternative future time streams of benefits and costs and selecting that one which he believes will maximize the present value of his privately-owned . . . rights."

Under communal ownership, because of the difficulty in assessing what might happen in the future given the greater variables, "[t]he effects of a person's activities on his neighbors and on subsequent generations will not be taken into account fully." Communal ownership of property therefore results in greater externalities. This is because "[t]he full costs of the activities of an owner of a communal property right are not borne directly by him, nor can they be called to his attention easily by the willingness of others to pay him an appropriate sum.""218

With data aggregation, the body-politic of communal owners of public data is so vast that it is impossible to get everyone's consent to transfer. This is because anyone has the right to holdout or disseminate the information freely. Unlike a plot of land, the boundaries of communally held data are difficult to trace or control. So too are the owners themselves. Therefore, communal ownership of data creates negotiating costs that make controlled transfer impossible.

It is difficult, if not impossible, "to see how the existing communal owners can reach an agreement that takes account of these costs." Furthermore, "because the owner of a communal right cannot exclude others from enjoying the fruits of his efforts and because negotiation costs are too high for all to agree jointly on optimal behavior," the wealth, or in this case value, maximization of the property will disregard those many costs. Alternatively, private rights that permit an "owner to economize on the use of those resources from which he has the right to exclude others" would lead to an efficient use of the data.

3. Use Regulation

To revive one of Professor Coase's examples, "whether we have the right to shoot over another man's land has been thought of as depending on who owns the airspace over the land." Referring to the "allocation" of airwaves, Professors Merrill and Smith described the problem in this way: "What does not seem to have been understood is that what is being allocated . . . is the right to use a piece of equipment to transmit signals in a particular way," not a property right in the airwaves.

Looking at the question in this way reveals that "it is unnecessary to think in terms of ownership of frequencies or the ether." Professor "Coase's preference for defining property rights in terms of permitted uses was . . . revealed in the starkest possible terms" in his 1959 article.

215. Id.
216. Id.
217. Id.
218. Id.
219. Id.
220. Id. at 356.
221. Id.
222. Coase, FCC, supra note 1, at 34 (citing WILLIAM L. PROSSER, LAW OF TORTS 85 (1941); Stuart S. Ball, The Vertical Extent of Ownership in Land, 76 U. PA. L. REV. 631 (1928); Emory H. Niles, The Present Status of the Ownership of Airspace, 5 AIR L. REV. 132 (1934)).
224. Id.
225. Id.
it was unduly complicated to try to describe a landowner’s rights in terms of a general rule about the right of the owner to exclude intrusions by strangers from a delimited space—the traditional in rem approach.” 226 Instead, it was “far better to draw up a list of permissible uses of a gun.” 227

The same is true for data aggregation. It is not necessary that a legal rule create a specific property right in the data created by online retailers and made available for public view. That would very well be preempted by copyright law, and fall under fair use or public domain. Instead, a legal rule could be fashioned to restrict the usage of technologies, such as spiders or bots, to collect and disseminate the data without authorization. 228 In a frontier as vast as cyberspace, this appears to be a more efficient rule than developing a new property right. The problem that it creates, which will not be addressed in this Article, is a problem of jurisdiction.

B. Nuisance Law

A nuisance dispute is, as Professors Merrill and Smith note, “a notoriously murky issue that belongs as much to tort as to property law.” 229 There are two steps involved in resolving a nuisance dispute. 230 The first step involves choosing an entitlement; in other words, deciding who is entitled to prevail. 231 For example, an injurer may be granted an entitlement giving her the right to engage in the harmful activity or the victim may be granted an entitlement giving her the right to be free from the harm. 232

The second step involves deciding how the entitlement will be protected. 233 There are two possibilities in protecting an entitlement. 234 The first possibility “is to grant the holder of the entitlement an injunction.” 235 A victim holding an entitlement protected by an injunction “can prohibit the injurer from causing harm.” 236 Therefore, an injurer is only able to cause damage by buying off the victim. 237 Alternatively, an injurer holding an entitlement protected by an injunction can prohibit the victim from stopping the injury. 238 In this instance, the victim must pay the injurer to reduce the damages the victim suffers. 239

The second possibility “is to give the holder of the entitlement an amount of money—damages—that some governmental body, such as a court, determines.” 240 Under this system, a victim with an entitlement “has the right to be compensated,

226. Id. at 372-73.
227. Id. at 373.
228. The most efficient method would be an entitlement to have the robot exclusion header respected.
229. Merrill & Smith, supra note 223, at 371.
231. Id.
232. Id.
233. Id.
234. Id.
235. Id.
236. Id.
237. Id.
238. See id.
239. Id.
240. Id. at 15-16.
but he cannot prohibit the injurer from causing harm as he could under an injunctive remedy."241 Likewise, if the injurer is the holder of the entitlement, the "damage remedy would mean that the victim could restrict the injurer’s activity but would have to compensate the injurer for the injurer’s ‘damages’ (for example, forgone profits)."242

The profit maximization, or increasing the size of the pie, under “the nuisance law example is equivalent to maximizing the [injurer’s] ... profits net of the ... [victim’s] damages.”243 However, strategic behavior can cause an inefficient outcome to be reached.244 To overcome such strategic behavioral obstacles under an injunctive remedy, the entitlement chosen must correspond to the efficient outcome.245 This could take the form of an absolute or intermediate injunction, depending on the situation.

Information is the key to fashioning an appropriate protection and entitlement that leads to an efficient solution.246 For an injunctive remedy, the court obviously must know what the efficient outcome would be in order “to choose an entitlement corresponding to it.”247 Likewise, “under the damage remedy, the court needs to know the resident’s damages to set liability equal to actual damages.”248 Under a scenario where the liability equals the actual damage suffered, “the damage remedy leads to the efficient outcome if, and only if, the entitlement is at or below the efficient output.”249 Additionally, where “the parties can be expected to bargain cooperatively (and there are no other transaction costs), then every choice of entitlement and remedy will be efficient.”250 However, if the court has adequate information, the efficient outcome can be achieved even where the parties act strategically.251

Under the injunctive remedy, strategic behavior can be thwarted “by choosing the entitlement that corresponds to the efficient outcome, which can be determined only if the court knows the injurer’s benefits from engaging in the harmful activity and the victim’s damages.”252 Likewise, under the damages remedy, “by giving an absolute entitlement to the victim and setting liability equal to actual damages, which obviously requires knowledge of the victim’s damages” strategic behavior can be overcome.253 However, if the court is only able to determine “the victim’s damages, the injunctive remedy generally will fail because the court cannot accurately set the entitlement equal to the efficient outcome, but the damage remedy still can guarantee the efficient outcome.”254 An underestimation by the court as

241. Id. at 16 (citing Boomer v. Atl. Cement Co., 257 N.E.2d 870 (N.Y. 1970)).
242. Id. ("This last combination—entitling the injurer to damages—is very unconventional, but it has been used.").
243. Id.
244. Id. at 18-19.
245. Id.
246. Id. at 21.
247. Id.
248. Id.
249. Id. at 22.
250. Id. at 24.
251. Id.
252. Id.
253. Id.
254. Id.
to the victim's damages, under a damages remedy, can "generally . . . lead to excessive output and may be less desirable than the injunctive remedy." 255

As discussed earlier, because harm is reciprocal the courts must look at the situation as a whole to come to an efficient resolution. Therefore, in order "to attain an optimum allocation of resources" the law should influence both parties to take into account the harmful effect in deciding on their course of action. 256 This lends credence to the earlier discussion of double responsibility at the margin. Parties should, for example, be made to realize that in a smoothly operating pricing system "the fall in the value of production due to harmful effect would be a cost for both parties." 257 This is especially true in the case of data aggregation where the metasites are entirely reliant on the online retailers to produce the primary data, and the online retailers are, to differing extents, reliant on the metasites to lower consumer search costs and provide publicity.

Nuisance law may play an interesting role in the resolution of data aggregation. Without creating a new intellectual property right, the activity of data aggregators may be controlled. The threat of injunctive relief, instead of damages, 258 would spark negotiation between metasites and the online retailers. Problems arise in determining just what constitutes a nuisance, or quasi-nuisance, in this context. How many searches are too many? What type of robotic activity is acceptable? The most likely form of nuisance law would allow online retailers to seek injunctive relief if a metasite ignores a posted robot exclusion header. This, it seems, would avoid the problems produced with the creation of a new property right.

V. ECONOMIC EVALUATION OF CHOICES OF LAW

A. Externalities and Internalization

A harmful or beneficial effect converts into an externality when "the cost of bringing the effect to bear on the decisions of one or more of the interacting persons is too high to make it worthwhile" for the parties to create a market. 259 The internalization of such effects is "a process, usually a change in property rights, that enables these effects to bear (in greater degree) on all interacting persons." 260 From an efficiency perspective, one "primary function of property rights is that of guiding incentives to achieve a greater internalization of externalities." 261 To make costs and benefits externalities, the cost of the transaction "must exceed the gains from internalization." 262

The costs of transacting may "be large relative to gains because of 'natural' difficulties in trading or they can be large because of legal reasons." 263 To illus-

255. Id.
257. Id.
258. Damages would be too difficult to calculate because of the difficulty in determining what data was taken, when it was taken, and to whom it was distributed—balanced against who else might have taken and disseminated it—and determining the actual harm caused.
259. Demsetz, supra note 197, at 348.
260. Id.
261. Id.
262. Id.
263. Id.
trate a legal reason, we will use the example of the right to one’s own labor versus the right to slave ownership. If a law “establishes the right of a person to his freedom,” that law also “necessitate[s] a payment on the part of a firm . . . sufficient to cover the cost of using that person’s labor if his services are to be obtained.” 264 Under this law, management internalizes the costs of labor. 265 On the other hand, if a law gives management title to the labor of another, that law also requires the slaveowner to “take into account the sums that slaves are willing to pay for their freedom.” 266 In both examples, the costs are internalized in the decisions. 267 The only thing that is needed for internalization in either case is ownership, including the right of sale. 268

Private ownership of property internalizes many of the costs related to communal ownership, as discussed earlier, because the owner, “by virtue of his power to exclude others, can generally count on realizing the rewards associated with” increasing the value of the property. 269 Concentrating the benefits and costs upon a single owner will create the incentive to more efficiently utilize the resource. 270 Costs will thereby be greatly reduced for negotiating the remaining externalities. 271

As discussed earlier, because communal ownership of property allows anyone to use the property, communal ownership creates the need for communal agreement; all must reach an agreement on a controlled use. 272 However, not all owners internalize all of the externalities that accompany ownership of the property, which results in inefficient, splintered uses. This is especially true for data aggregation, where metasites are little concerned with the effect of overuse on the value of the data to the online retailer. Through private ownership, however, “[t]he cost of negotiating an internalization of these effects is thereby reduced considerably.” 273 An online retailer having complete control over the dissemination of its data would allow it to internalize all of the externalities because the costs and benefits affect only her business. Only a private owner of data, publicly available on the Internet, can internalize the externality of overuse of that specific type of resource.

With private ownership comes additional externalities for the broader internet community to internalize. Difficulties in deciphering what is protected data and what is in the public domain creates an atmosphere in which parties are unable to internalize because they are unable to recognize the external costs. The cost of precaution skyrockets because the information costs of determining what is fair and what is protected “property” are too high in relation to the benefits. The gains of internalization, in other words, do not outweigh the costs of internalization. A property right, therefore, may not be appropriate in the case of digital data.

264. Id. at 349.
265. Id.
266. Id.
267. Id.
268. Id.
269. Id. at 356.
270. Id.
271. Id.
272. Id.
273. Id. at 356-57.
As Professor Demsetz wrote, "[c]hanges in knowledge result in changes in production functions, market values, and aspirations. New techniques, new ways of doing the same things, and doing new things—all invoke harmful and beneficial effects to which society has not been accustomed."274 Such is the case with many aspects of the Internet and digital technology. However, as Professor Demsetz also noted, "the emergence of new property rights takes place in response to the desires of the interacting persons for adjustment to new benefit-cost possibilities."275 In such new frontiers, "property rights develop to internalize externalities when the gains of internalization become larger than the cost of internalization."276 New forms of property and property rights emerge "in response to changes in technology and relative prices."277

With this in mind, I draw a parallel between the current situation of data aggregation and Professor Demsetz's recount of Eleanor Leacock's memoir, The Montagnes "Hunting Territory" and the Fur Trade.278 In her writing, "Leacock clearly established the fact that a close relationship existed... between the development of private rights in land and the development of the commercial fur trade."279 For European fur traders coming to North America, the abundance of furbearing animals had a new market effect: fur became easier for the hunters to capture. The externality that prompted the adjustment in property rights was the over-hunting of game.280 In this new market situation, "[b]ecause of the lack of control over hunting by others, it [was] in no person's interest to invest in increasing or maintaining the stock of game."281 The anticipated effect, and the normative standard by which to judge a successful hunt, was intensive over-hunting.282 In this situation, "a successful hunt is viewed as imposing external costs on subsequent hunters—costs that are not taken into account fully in the determination of the extent of hunting and of animal husbandry."283

The move from over-hunting communal "ownership," to controlled private ownership, "suggests in this instance that the fur trade made it economic to encourage the husbanding of fur-bearing animals."284 Husbanding was indeed necessary to ensure that there were furbearing animals for years to come, but "[h]usbanding requires the ability to prevent poaching and this, in turn, suggests that socioeconomic changes in property in hunting land will take place."285 Ownership of parcels small enough to control was possible because "[f]orest animals confine their territories to relatively small areas, so that the cost of internalizing

274. Id. at 350.
275. Id.
276. Id.
277. Id.
278. Id. at 351 (citing Eleanor Leacock, The Montagnes "Hunting Territory" and the Fur Trade, 56 AM. ANTHROPOLOGIST 12 (1954)).
279. Id.
280. Id. at 351-52.
281. Id. at 351.
282. Id.
283. Id.
284. Id. at 352.
285. Id.
the effects of husbanding these animals is considerably reduced."\textsuperscript{286} The reduced cost of husbanding, "together with the higher commercial value of fur-bearing forest animals, made it productive to establish private hunting lands."\textsuperscript{287}

The same can be argued for data aggregation. As more metasites come into existence to collect and disseminate more information, the tax on the value of the data to online retailers, and arguably consumers, will become too great. The external costs imposed on online retailers will become so great, either through actual harm or precaution expense, that they may have to close or import technological protections that inhibit the efficient use of the website. Either way, metasites are creating inefficiencies and imposing externalities that appear to be endangering the existence of commercial data on the Internet.

However, it is difficult to extend a property right, as in the Leacock example, from real property to some sort of new intellectual property. Borders are more difficult to demarcate on the Internet than they are on real property.\textsuperscript{288} While the Leacock comparison is a somewhat entertaining exercise, it does not leave us with an obvious conclusion that new property rights are necessary for digital data. It does, however, reinforce the argument that for economic efficiency, data owners must be able to control, to some extent, how their information is aggregated and disseminated.

\textbf{C. Market Forces v. Government Regulation}

Instead of creating, for example, a new property right in data, some type of regulation may be useful. As Professor Coase suggests, one alternative to the institution of a market legal system is a system of direct government regulation: "Instead of instituting a legal system of rights which can be modified by transactions on the market, the government may impose regulations which state what people must or must not do and which have to be obeyed."\textsuperscript{289} Unlike a firm, the government may avoid the market altogether if it wishes.\textsuperscript{290} However, "the governmental administrative machine is not itself costless [and] can, in fact, on occasion be extremely costly."\textsuperscript{291} There is also no reason to believe that "regulations, made by a fallible administration subject to political pressures and operating without any competitive check, will necessarily always be those which increase the efficiency with which the economic system operates."\textsuperscript{292} Additionally, because general regulations must be evenly applied to a wide variety of cases, such regulations "will be enforced in some cases in which they are clearly inappropriate."\textsuperscript{293}

While it "follows that direct governmental regulation will not necessarily give better results than leaving the problem to be solved by the market or the firm[,] . . . there is no reason why, on occasion, such governmental administrative regulation should not lead to an improvement in economic efficiency."\textsuperscript{294} Certainly, the costs

\begin{itemize}
  \item \textsuperscript{286} Id. at 353.
  \item \textsuperscript{287} Id.
  \item \textsuperscript{288} Note, for example, the extreme difficulties that copyright owners have had over the last decade in controlling their "borders" even with express intellectual property rights.
  \item \textsuperscript{289} Coase, \textit{Social Cost}, supra note 175, at 17.
  \item \textsuperscript{290} Id.
  \item \textsuperscript{291} Id. at 18.
  \item \textsuperscript{292} Id.
  \item \textsuperscript{293} Id.
  \item \textsuperscript{294} Id.
\end{itemize}
involved in government regulation will frequently outweigh the gain. However, it is important to recognize that "[a]ll solutions have costs and there is no reason to suppose that government regulation is called for simply because the problem is not well handled by the market or the firm." 

That said, it is important to note that an administrative agency that tries "to perform the function normally carried out by the pricing mechanism operates under two handicaps." First, the agency "lacks the precise monetary measure of benefit and cost provided by the market." Second, the agency is unable to "be in possession of all the relevant information possessed by the managers of every business which uses or might use [the data], to say nothing of the preferences of consumers for the various goods and services in the production of which [the data] could be used." Certainly, a private rights regime would be better in the case of data aggregation because the parties possess much more relevant data and would be more likely to come to an efficient result than an administrative agency. Furthermore, the costs of imposing a governmental regulatory body to address the issues would certainly outweigh the gain.

In reaction to government regulation of the airwaves beginning in the middle of the twentieth century, Professor Coase insisted that a system of property rights in which private parties are able to interact efficiently is essential to private-enterprise. In regard to the Federal Communications Commission, Professor Coase wrote that "[a] private-enterprise system cannot function properly unless property rights are created in resources, and, when this is done, someone wishing to use a resource has to pay the owner to obtain it." Once these rights are created, "[c]haos disappears; and so does the government except that a legal system to define property rights and to arbitrate disputes is, of course, necessary." A property system is essential to ensure that resource allocation is "determined by the forces of the market rather than as a result of government decisions."

While that may be true for the airwaves or even for bandwidth today, it cannot fully justify a new property right in digital data. It is highly unlikely that government regulation over digital data would make any sort of sense from an efficiency standpoint. Instead, some type of private market legal system would be best at ensuring efficient exchange between parties. Professor Coase's arguments do support some sort of control over and transferability of digital data by the online retailer. Therefore, we must take another look at liability and property regimes, this time in comparison.

D. Choosing Between Liability and Property Rules

As mentioned earlier, there are two fundamental ways that the state may pro-

295. Id.
296. Id.
297. Coase, FCC, supra note 1, at 18.
298. Id.
299. Id.
300. The private rights of Copyright holders is a suitable example.
301. Coase, FCC, supra note 1, at 14.
302. Id.
303. Id.
304. Id. at 18.
tect online retailers’ interest in their data: through property rules or liability rules. First, under property rules, the state "guarantees property right assignments against infringement through the threatened use of its police powers." Second, under liability rules, the state "merely discourages violations by requiring transgressors to pay victims for harms suffered." Possessory interests, or interests in things, "are generally protected by property rules, whereas interests in not suffering from harmful externalities are often, though not always, protected only by liability rules."

Judge Posner describes the traditional view of the influence of transaction costs on the decision between liability and property rule protection. In settings of low transaction costs, "the law should require parties to transact in the market; it can do this by making the present property owner's right absolute (or nearly so), so that anyone who thinks the property worth more has to negotiate with the owner." Alternatively, where high transaction costs would be incurred, "people must be allowed to use the courts to shift resources to a more valuable use, because the market is by definition unable to perform this function in those settings." As we shall see, it is not clear that this dichotomy always holds true.

I. Entitlements

When two or more parties present the state with conflicting interests, the state must decide which party to favor. Fundamentally, the law must "decide which of the conflicting parties will be entitled to prevail." Once that decision is made, it is society's responsibility to enforce the choice. It is not enough to simply set the entitlement; the state must provide a minimum of intervention to ensure enforcement.

The state therefore has the responsibility of making secondary decisions concerning enforcement and protection. The secondary "decisions go to the manner in which entitlements are protected and to whether an individual is allowed to sell or trade the entitlement." The state is therefore charged with deciding which party "wins" as well as what type of protection it must provide. In making this latter decision, the state actually "shape[s] the subsequent relationship between the winner and the loser . . . ." In examining this issue of protection, Professors Calabresi and Melamed "consider[ed] three types of entitlements—entitlements protected by property rules, entitlements protected by liability rules, and inalien-
able entitlements."  

For this Article we will consider the first two entitlement protections: property and liability rules.

First, a property rule protects an entitlement "to the extent that someone who wishes to remove the entitlement from its holder must buy it from him in a voluntary transaction in which the value of the entitlement is agreed upon by the seller." Inherent in this structure is a very limited amount of state intervention: "once the original entitlement is decided upon, the state does not try to decide its value." Instead, the state allows "each of the parties to say how much the entitlement is worth to him, and gives the seller a veto if the buyer does not offer enough." While the state makes the collective decision concerning to whom the initial entitlement belongs, there is no collective decision as to the entitlement's value.

Alternatively, under liability rule protection, one party may destroy the entitlement by paying its objectively determined value to the entitlement holder. The value, under liability rule protection, is an approximation of what "the original holder of the entitlement would have sold it for." Once the state has objectively set the determination of the value, the holder is estopped from claiming that she would have demanded a higher payment for the entitlement. Liability rules, in comparison to property rules, "involve an additional stage of state intervention: not only are entitlements protected, but their transfer or destruction is allowed on the basis of a value determined by some organ of the state rather than by the parties themselves."

2. Economic Efficiency

Administrative efficiency often dictates which entitlement should be chosen in each particular case. Frequently "the simplest reason for a particular entitlement is to minimize the administrative costs of enforcement." Administrative efficiency is typically the winning factor "when the reasons accepted [by the state] are indifferent between conflicting entitlements and one entitlement is cheaper to enforce than the others." Alternatively, administrative efficiency may also win-out "when the reasons are not indifferent but lead us only slightly to prefer one over another and the first is considerably more expensive to enforce than the second."

Economic efficiency concerns extend, of course, beyond costs of administration. As Professors Calabresi and Melamed argue, economic efficiency demands the state to select those entitlements "which would lead to that allocation of re-

319. Id.
320. Inalienable rights in terms of data would be wholly inefficient because they would prohibit bargaining between the online retailers and the metasites.
322. Id.
323. Id.
324. Id.
325. Id.
326. Id.
327. Id.
328. Id.
329. Id. at 1093.
330. Id.
331. Id.
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sources which could not be improved in the sense that a further change would not so improve the condition of those who gained by it that they could compensate those who lost from it and still be better off than before." 332 This situation, often called Pareto optimality, "asks for that form of property, private or communal, which leads to the highest product for the effort of producing." 333 The state, therefore, should choose the entitlement that creates a value of production that exceeds even high cost administration.

In the absence of transaction costs, "Pareto optimality or economic efficiency will occur regardless of the initial entitlement." 334 Parties will always bargain to an efficient result. In such circumstances, "Pareto optimality is optimal given a distribution of wealth, but different distributions of wealth imply their own Pareto optimal allocation of resources." 335 In the absence of transaction costs, this suggests that wealth, and not economic efficiency, will affect society’s choice of entitlements. 336

3. Distributional Goals

As difficult as it is to analyze societal wealth distribution preferences, "they play a crucial role in the setting of entitlements." 337 A society’s "placement of entitlements has a fundamental effect on a society’s distribution of wealth." 338 Absolute equality, in monetary terms, cannot merely be achieved by "start[ing] everyone off with the same amount of money." 339 Indeed, in "[a] financially egalitarian society which gives individuals the right to make noise immediately makes the would-be noisemaker richer than the silence loving hermit." 340 It is therefore "very difficult to imagine a society in which there is complete equality of wealth." 341 A society must "choose what entitlement it wishes to have on the basis of criteria other than perfect equality" because "perfect equality is impossible." 342 Society’s determination of which entitlement "to sell, and which . . . to give away, will likely depend in part on which determination promotes the wealth distribution that society favors." 343 Intuitively, an "entitlement to a good or to its converse is essentially inevitable." 344 Society either entitles us to have silence or, conversely, to make noise. 345 Society either entitles us "to our own property or body or the right to share others’ property or bodies." 346 In the case of data aggregation, society either entitles metasites to gather data or entitles online retailers to

332. Id. at 1093-94.
333. Id. at 1094.
334. Id. at 1094-96 ("[N]o transaction costs’ must be understood extremely broadly as involving both perfect knowledge and the absence of any impediments or costs of negotiating.").
335. Id. at 1096.
336. Id.
337. Id. at 1098.
338. Id.
339. Id.
340. Id. at 1098-99.
341. Id. at 1099.
342. Id.
343. Id.
344. Id. at 1100.
345. Id.
346. Id.
own the data. We cannot, of course, allow for either without social costs of precaution (blocking the metasites) or property/liability rules (compensation for or injunction against the taking of the data).

4. The Interplay Between Property and Liability Rules

If society is squeamish about creating a new property right in data, it can create an entitlement that is protected by a property rule. What is typically referred to as "private property can be viewed as an entitlement which is protected by a property rule." The property rule is not, however, always absolute; for example, "a nuisance with sufficient public utility to avoid injunction has, in effect, the right to take property with compensation." In circumstances such as this, a liability rule protects the property interest of the entitlement holder. A liability rule is "an external, objective standard of value [that] is used to facilitate the transfer of the entitlement from the holder to the nuisance."

The question arises as to why we need liability rules in a world of entitlements protected by property rules. One primary consideration is the economic efficiency that such rules afford. In circumstances where liability rules are needed, "the cost of establishing the value of an initial entitlement by negotiation is so great that even though a transfer of the entitlement would benefit all concerned, such a transfer will not occur." Therefore, in order to facilitate such transfers in an efficient manner, a collective determination of the value is required. Furthermore, "there is no reason to believe that a market, a decentralized system of valuing, will cause people to express their true valuations and hence yield results which all would in fact agree are desirable." Whenever there is a hold-out problem, "an argument can readily be made for moving from a property rule to a liability rule." The hold-out problem is solved when society removes the valuation determination from the market, decides it collectively, and imposes an objective valuation.

If a system of entitlements is the efficient way to deal with data aggregation, the state must choose the entitlement that creates a value of production that exceeds even high cost administration. As mentioned, a property rule protects an

347. Id. at 1105.
348. Id.
349. Id.
350. Id. at 1105-06.
351. See id. at 1106.
352. See id.
353. Id.
354. See id.
355. Id. at 1107.
356. Id.
357. Id.
entitlement, causing a party that wishes to remove the entitlement to pay off the holder at an agreed upon amount. A liability rule protecting an entitlement, on the other hand, allows the party to destroy the entitlement by paying to the holder a sum equal to the value objectively determined by an outside party. Of these two entitlement protection rules, the property rule seems the most efficient. First, if society is squeamish about creating a new property right in data, it can create an entitlement that is protected by a property rule. This may help to eliminate many of the costs of developing a new property right regime. Second, a property rule promotes cooperative bargaining between the parties. Where a liability rule would allow a metasite to take data from an online retailer after paying an objectively determined sum, a property rule would ensure that the parties bargained for an efficient result.

E. Nuisance Revisited

Another alternative is for online retailers to utilize current nuisance law to attempt to control the aggregation and dissemination of their data. The following is an examination of the use of nuisance law in cases of data aggregation.

1. Four Model Entitlement and Protection Rules

Nuisance problems can be viewed in terms of four entitlement rules and corresponding protection rules. First, X may not undertake the offending activity unless Y allows it (Y may enjoin X's nuisance). Second, X may undertake the offending activity but must compensate Y "for damages caused (nuisance is found but the remedy is limited to damages)." Third, X may undertake the offending activity at will and can only be stopped by Y if Y pays him to stop (X's offending activity is not held to be a nuisance to Y). Fourth, which Professors Calabresi and Melamed add, Y may stop X, but if he does he must compensate X.

The first two rules "(nuisance with injunction, and with damages only) are entitlements to [Y]." The first entitlement to Y allows Y "to be free from [the offending activity] and is protected by a property rule; the second is also an entitlement to be free from [the offending activity] but is protected only by a liability rule." The third rule, alternatively, "is instead an entitlement to [X] protected by a property rule, for only by buying [X] out at [X's] price can [Y] end the [offending activity]." The fourth rule also represents an entitlement in X to undertake the offending activity, but the entitlement is only protected by a liability rule.

From an economic efficiency approach, rule one would be employed "if we believed that [X] could avoid or reduce the costs of [the offending activity] more cheaply than [Y]." In other words, we would only enjoin X if he were better

358. See id. at 1115-16 (citing Frank I. Michelman, Pollution as a Tort: A Non-Accidental Perspective on Calabresi's Costs, 80 Yale L.J. 647, 670 (1971)).
359. Id.
360. Id.
361. Id.
362. Id.
363. Id.
364. Id.
365. Id.
366. Id.
367. Id. at 1118.
able to balance the costs of undertaking the offending activity against the costs of not undertaking the offending activity. The entitlement under rule two would be employed "simply because we did not know whether [X] desired to [undertake the offending activity] more than [Y] desired to be free from [the offending activity], and the only way we thought we could test out the value of the [offending activity] was by the only liability rule we thought we had. This was rule two, the imposition of nuisance damages on [X]."

Alternatively, rule three should be employed, "again solely from an economic efficiency standpoint, if we made the converse judgment on who could best balance the harm of [the offending activity] against its avoidance costs." Furthermore, "[i]f we were wrong in our judgments and if transactions between [X] and [Y] were costless or even very cheap, the entitlement under rules one or three would be traded and an economically efficient result would occur in either case." The fourth rule, as well, "gives at least the possibility that the opposite entitlement may also lead to economic efficiency in a situation of uncertainty."

An economic analysis of the effects of each rule sheds light on the situations in which the use of each is proper. Enjoining the nuisance, under rule one, might be desirable for economic efficiency purposes, "but it would have disastrous distribution effects." Rule one "would also have undesirable efficiency effects if the initial judgment on costs of avoidance had been wrong and transaction costs were high." However, in the case of data aggregation disputes, the difficulty and costs involved in determining damages and prosecuting the nuisance would lead to an inefficient result. Due to the flux nature of Internet commerce, a determination of damages may be impossible.

No nuisance, under rule three, "would have favorable distributional effects since it might protect the income of the workers [of X]." However, if the harm to Y of the offending activity outweighed the cost to X of avoiding it, "and if transaction costs—holdout problems—were such that [Y] could not . . . pay [X off], rule three would have unsatisfactory efficiency effects." Under rule four, the payment of damages to Y after X compels it to avoid the offending activity

368. Id.
369. Id. at 1120 (emphasis added).
370. Id. at 1118.
371. Id. ("Wherever transactions between [X] and [Y] are easy, and wherever economic efficiency is our goal, we could employ entitlements protected by property rules even though we would not be sure that the entitlement chosen was the right one.").
372. Id. at 1120.
373. Id. at 1121.
374. Id.
375. Id.
376. Id.
377. Id.
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"would be the only one which would accomplish both the distributional and efficiency goals." 378 Neither rules three or four make sense in the case of data aggregation. It is too easy to enter the market and begin aggregating data, thus promoting parties to extort the online retailer even if they have no real interest in creating a legitimate metasite.

2. Injunctive Relief for Nuisance

Injunctive relief is necessary in certain nuisance cases because it strengthens the victim's bargaining position. 379 The "right to an injunction enables victims to bargain from a position of strength." 380 This is economically efficient because victims with the right to enjoin "will not accept an injurer's settlement offer unless it involves a combination of abatement and compensation that the victims prefer to an injunction." 381 This injunctive right "establishes the victims' threat point in bargaining; the injurer cannot induce the victims to settle unless the terms of the cooperative solution benefit the victims more than the advantage they derive from exercising their threat." 382 With "private bargaining, the right to injunctive relief against nuisances offers the potential for combining compensation with efficiency." 383

However, these goals of compensation and efficiency that are promoted by the threat of an injunctive right are usually only realized by the parties upon settlement. The injunctive right is usually only exercised, and an injunction issued, if there has been a breakdown in the bargaining process. 384 If an injunction is issued, efficient behavior will not be induced until a "coercive order prescribes it, which is unlikely given the court's limited information." 385 Therefore, "from an efficiency perspective, injunction is an appropriate remedy for classes of cases in which settlement is usual and trials are rare." 386 In data aggregation disputes, this seems most likely. Metasites and online retailers would more likely want to come to a bargaining resolution than resort to litigation because the law is unsettled. Although giving the right of injunction to the online retailer would settle the law somewhat, it would most likely encourage a quicker and more efficient outcome than litigation.

F. More on Transaction Costs in Cyberspace

There is doubt that property rules are best when transaction costs are low—assertedly because the use of property rules will induce parties to bargain and reach desirable outcomes—whereas liability rules are best when transaction costs are high—supposedly because the use of liability rules will induce injurers to act desirably,

378. Id.
379. Cooter, supra note 145, at 27.
380. Id.
381. Id.
382. Id.
383. Id.
384. Id.
385. Id.
386. Id.
mimicking the outcomes that would otherwise have been reached through bargaining. 387

Professors Kaplow and Shavell argue that this maxim is often contradicted in practice: "when transaction costs are low, parties will tend to bargain under liability rules as well as under property rules and may reach outcomes superior to those reached under property rules; and when transaction costs are high and bargaining is impossible, property rules may lead to better outcomes . . ."388

When harmful externalities arise, the parties are often inhibited from bargaining practically with the other, which allows that "the resolution of difficulties will be determined directly by the choice of legal rules." 389 Scholars commonly view liability rules as superior to property rules, "assuming that courts can accurately determine the extent of harm." 390 Some scholars suggest, however, "that liability rules may be inferior to property rules if courts would have difficulty ascertaining the actual level of harm." 391 These scholars believe that court underestimation of harm may induce a liable firm to undertake the offending activity "even though its prevention cost is less than the true level of harm, whereas under a property rule protecting victims, the firm would not [undertake the offending activity]." 392 Likewise, a court's overestimation of harm may impose an inefficient burden on the offending party and discourage the victim from taking efficient precautions. In the case of aggregation, given the flux nature of Internet commerce, it is likely that the courts would have extreme difficulty in determining actual damages for online retailers.

However, according to Professors Kaplow and Shavell, that latter belief is mistaken. 393 The two argue that "even when courts are uncertain about the magnitude of harm, liability rules are superior to property rules." 394 Even "if a court sets damages equal to its best estimate of harm—the average harm for cases characterized by the facts the court observes—the outcome under the liability rule will be superior, on average, to the outcome under property rules." 395 However, "the superiority of the liability rule might not follow, though, if courts were systematically to underestimate harm in setting damages, rather than to use estimates of harm that are correct on average." 396 Furthermore, in situations where the wealth of the injurers is inadequate to cover the possible liability for the harm, a liability rule will not be able to induce the judgment-proof injurers to prevent the harm. 397

The cost of bargaining under property rules also tends to be higher than under liability rules. 398 This is because "the liability rule tends to produce the efficient result more often than property rules do (assuming that the state's information is imperfect)." 399 That improved likelihood of an efficient result means that "bar-

387. Kaplow & Shavell, supra note 305, at 718 (footnotes omitted).
388. Id. (footnotes omitted).
389. Id. at 719.
390. Id.
391. Id.
392. Id.
393. Id.
394. Id. (emphasis omitted).
395. Id.
396. Id. at 720.
397. Id. at 721.
398. Id. at 742.
399. Id.
gaining to avoid a suboptimal result will occur less often under the liability rule.\footnote{400} However, in a situation where parties can bargain with each other costlessly, “the choice between property and liability rules should diminish in importance because, if the rule chosen would lead to a suboptimal result, the parties could in principle make a mutually desirable agreement incorporating the optimal result, harm or no harm, as the case may be.”\footnote{401} For data aggregation disputes, bargaining between the parties appears to be the only means to an efficient outcome.

In a world where “the court has perfect information about the values of a thing both to the owner and to the taker, then (as in the case of externalities) it makes no difference whether a property or liability rule is employed.”\footnote{402} The court will award an entitlement “to the owner if he values a thing more highly than the taker; otherwise the entitlement will be awarded to the taker.”\footnote{403} This is true because with liability rule protection, “the taker will take the thing if and only if he values it more highly than the owner, because damages will equal the true value to the owner.”\footnote{404} Therefore, regardless of the type of rule, “the thing will be, or come to be, possessed by the party who values it more highly.”\footnote{405}

Professors Kaplow and Shavell point to “an idea that property rule protection of things is good because it forces someone who wants something to bargain for it, and presumably he will tend to obtain it if and only if he values it more highly than does the owner.”\footnote{406} This reasoning is misleading because “under a liability rule, a potential taker will also tend to obtain a thing if and only if he values it more highly than does the owner.”\footnote{407} For example, in cases where “damages do not equal owners’ valuations, bargaining may be necessary, as under property rule protection.”\footnote{408} More specifically, “if, under a liability rule, a taker would decide to take a thing, and the owner wished to pay him not to do so because the owner places a higher value on the thing, the taker will very much have reason to bargain for a payment from the owner.”\footnote{409} The aspect that is most advantageous for the possessor under the property rule “is not that it encourages prospective takers to bargain,” but rather that it “gives owners an incentive to bargain that they would not have under the liability rule, because under the liability rule, an owner’s payment to a taker to step aside would be wasted on account of other prospective takers waiting in the wings.”\footnote{410} As this examination has shown, given the specific nature of data aggregation disputes and the difficulty in courts determining actual damages (or even a near guess), it is most likely that an efficient outcome will be reached by the parties bargaining. A property rule protecting an entitlement is therefore the better legal regime for data aggregation disputes.

\footnote{400} Id.
\footnote{401} Id. at 732. “This observation is an application of the Coase Theorem.” Id.
\footnote{402} Id. at 759.
\footnote{403} Id.
\footnote{404} Id.
\footnote{405} Id.
\footnote{406} Id. at 764.
\footnote{407} Id. at 764–65.
\footnote{408} Id. at 765.
\footnote{409} Id.
\footnote{410} Id. at 767 (emphasis omitted).
VI. CONCLUSION

As this Article demonstrates, the reality of Internet activity does not allow for the easy molding of a traditional legal remedy to the modern problem of data aggregation. Weighing the efficiency interests of online retailers against metasites has proven to be a difficult task. New technology’s ability to affect new social, economic, and legal systems creates uncertainty across the board. One primary feature that does hold-over from “old” to “new economies” is the efficiency produced by bargaining parties. Any new legal regime designed to address data aggregation must encourage parties to bargain to ensure efficiency.

As discussed earlier, smaller-scale, more in-depth pricing and product review operations, such as Consumer Reports, should not be prohibited from reporting on data without authorization. Instead, large-scale data aggregation, which by design provides non-real time and often non-homogenous product and pricing comparisons, should be controlled. Creating a new property right in data, while generating certain efficiency benefits, creates inefficient prohibitions on use. The proper legal regime, alternatively, must control how data are aggregated and collected. The most likely source for this is an entitlement forcing metasite robots to respect robot exclusion headers or other requirements, such as homogeneity of products compared or real-time price quoting. The entitlement, protected by a property rule, would encourage parties to bargain because the rights of each would be clearer. Such bargaining would lead to the most efficient result.