Columbia Law School

Scholarship Archive

Faculty Scholarship

Faculty Publications

1997

Legal Design and the Evolution of Commercial Norms

Jody S. Kraus

Columbia Law School, jkraus1@law.columbia.edu

Follow this and additional works at: https://scholarship.law.columbia.edu/faculty_scholarship

Part of the [Commercial Law Commons](#)

Recommended Citation

Jody S. Kraus, *Legal Design and the Evolution of Commercial Norms*, 26 J. LEGAL STUD. 377 (1997).

Available at: https://scholarship.law.columbia.edu/faculty_scholarship/2611

This Article is brought to you for free and open access by the Faculty Publications at Scholarship Archive. It has been accepted for inclusion in Faculty Scholarship by an authorized administrator of Scholarship Archive. For more information, please contact scholarshiparchive@law.columbia.edu, rwitt@law.columbia.edu.

LEGAL DESIGN AND THE EVOLUTION OF COMMERCIAL NORMS

JODY S. KRAUS*

ABSTRACT

The Uniform Commercial Code determines the content of most commercial law default rules by incorporating common merchant practices. The success of this incorporation strategy depends on the likely efficiency of evolved commercial practices. In this Article, I use the best available theory of cultural evolution to analyze how and why commercial practices evolve. This analysis confirms that the incorporation strategy is far superior to a system in which lawmakers rely predominantly on individual analysis and experimentation to design commercial law. But the analysis also demonstrates that common commercial practices, and the laws incorporating them, are unlikely to be optimal, in the sense that they cannot be improved at any cost. There is good reason, then, to explore supplemental strategies for enhancing the efficiency of individual commercial practices on a selected basis. The viability of such strategies will depend on their costs and likely success in improving on commercial practice.

I. INTRODUCTION

ARTICLE 2 of the Uniform Commercial Code virtually ended the debate over how contract default rules should be made. In designing Article 2, Karl Llewellyn created a sales law that incorporates the norms instinct in common commercial practice.¹ The substantive content of the vast bulk of sales law is therefore provided by giving legal effect to the ordinary practices of merchants, without subjecting these practices to critical scrutiny. Llewel-

* I am grateful for very helpful comments from Barry Adler, Ian Ayres, Lisa Bernstein, Robert Boyd, Clayton Gillette, Michael Klausner, Lewis Kornhauser, Saul Levmore, Eric Posner, Alan Schwartz, Robert Scott, David Skeel, Steven Walt, and participants in the Legal Theory Workshops at the Georgetown University Law Center and University of Virginia Law School.

¹ The term "norm" throughout this article is used to refer to a "statistical norm" or common pattern of commercial behavior, rather than a "moral norm" that purports to distinguish between good and bad behavior. Article 2 incorporates the statistical norms of commercial practice into law through its directive to interpret the substantive meaning of most of its core terms by adverting to usage of trade. See UCC §§ 1-201 and 1-205(4).

[*Journal of Legal Studies*, vol. XXVI (June 1997)]

© 1997 by The University of Chicago. All rights reserved. 0047-2530/97/2602-0004\$01.50

lyn's "incorporation strategy"² thus relieves lawmakers of the analytical and experimental burdens they might otherwise bear in attempting to design the most efficient sales law possible. It may be possible, however, for lawmakers to design commercial laws that are more efficient than those determined by the incorporation strategy. Whether they can depends on the efficiency of evolved commercial practices. Unfortunately, few have gone beyond the mere invocation of a market or evolutionary metaphor to assess their likely efficiency.³ In this article, I use the best available theory of cultural evolution to provide an analysis of how and why commercial norms evolve. That analysis reveals that commercial norms will develop only if they provide merchants with a more cost-effective method of adopting commercial practices on average than the alternative of each merchant starting from scratch. Given the high costs of developing a complete set of commercial practices solely on the basis of individual experimentation, commercial norms could develop even if the practices they prescribe were on average less efficient than practices developed by individual merchant experimentation. The chief advantage of relying on commercial norms, instead of individual experimentation, is not that the practices they prescribe are necessarily more efficient, but that the cost of their adoption is on average dramatically lower: merchants may be better-off adopting even potentially less efficient practices recommended by commercial norms than developing even more efficient practices independently, so long as the relatively lower costs of adopting the former outweigh the superior efficiency of the latter. The theory of cultural evolution demonstrates that commercial norms are likely to provide a more cost-effective means of adopting a complete set of commercial practices than the alternative of individually designing each and every practice. But the theory also demonstrates that the practices recommended by those norms are unlikely to be even nearly optimal.⁴

² The incorporation strategy is implicit in much of the history of contract law but reached its zenith in Article 2 of the Uniform Commercial Code. It can be traced at least as far back as the 17th century. See L. S. Sutherland, *The Law Merchant in England in the 17th and 18th Centuries*, 17 149–76 (Transactions Royal Hist Socy Series No 4, 1934); and W. Mitchell, *An Essay on the History of the Law Merchant* (1904).

³ For two recent articles that do go beyond the market-evolutionary metaphor to analyze how evolution might affect the likely efficiency of commercial practice, see Robert D. Cooter, *Structural Adjudication and the New Law Merchant: A Model of Decentralized Law*, 14 Intl Rev L & Econ 215 (1994) (using game theory to argue that social norms in a free business community will be efficient in the absence of nonconvexities or spillovers to other communities); and Mark J. Roe, *Chaos and Evolution in Law and Economics*, 109 Harv L Rev 641 (1996) (using chaos theory and the ideas of path-dependence and evolutionary accidents to argue against the efficiency of commercial norms).

⁴ For purposes of this article, an "optimal" practice is one that cannot be improved at any cost. This usage of "optimal" is at odds with another common economic usage. Some economists define a practice as "optimal" if it produces the best possible result taking into ac-

Thus, by distinguishing between the costs of adopting a practice and the efficiency of a practice once adopted, the theory of cultural evolution confirms the view that commercial norms provide the most cost-effective means for merchants to select a system of commercial practices. The theory of cultural evolution explains why a merchant would find it rational to rely in general on a system of commercial norms instead of attempting to design every contracting practice on her own. Similarly, it explains why lawmakers would find it rational to rely in general on the incorporation strategy to determine a system of contract default rules. But the theory of cultural evolution also predicts that the commercial practices recommended by commercial norms are not likely to be even nearly optimal.⁵ Thus, although the theory of cultural evolution makes clear that the system of commercial norms is itself a more efficient means of producing a complete set of commercial practices than a system in which all practices are individually designed, it also gives us good reason to believe that the practices recommended by commercial norms would leave significant room for improve-

count not only the gains to those who follow the practice but also the costs of the process that yields the practice. Therefore, in comparing two practices, the first might produce greater net wealth once established but the second might be optimal because it costs significantly less to establish. I argue that because commercial practices are not likely to be optimal, in the sense I have defined, it is an open question whether they are optimal in the other economic sense. My claim is that the theory of cultural evolution demonstrates that evolved commercial practices could be improved in principle, and in that sense, are not optimal. Whether alternative legal design strategies are optimal in the other economic sense will depend on whether they are capable of improving on evolved practices at a cost that makes such alternatives superior to the incorporation strategy.

⁵ My central claim is that the legal rules produced by the incorporation strategy are likely to be suboptimal. That claim has been previously supported in the contracts literature on two independent grounds. Goetz and Scott have argued that the process of incorporation itself is likely to lead to inefficient contract default rules, even if the commercial practices it incorporates are efficient to begin with. See Charles Goetz and Robert E. Scott, *The Limits of Expanded Choice: An Analysis of the Interactions between Express and Implied Contract Terms*, 73 Cal L Rev 261 (1985). Michael Klausner has argued that commercial norms may be suboptimal because network externalities could undermine parties' incentives to develop superior practices. See Michael Klausner, *Corporations, Corporate Law, and Network Externalities*, 81 Va L Rev 757 (1995); Marcel Kahan and Michael Klausner, *Standardization and Innovation in Corporate Contracting ('or the Economics of Boilerplate')*, 83 Va L Rev (May 1997, in press). The argument I provide, unlike arguments made by Goetz and Scott and Klausner, is based on an analysis of the process underlying the evolution of commercial norms. Even if (1) the process of incorporation costlessly and accurately incorporated existing commercial practices into legal contract default rules and (2) contracting practices were not subject to network externalities, my argument purports to demonstrate that the practices recommended by commercial norms would be inefficient, and sometimes significantly so. See also Lisa Bernstein, *Merchant Law in a Merchant Court: Rethinking the Code's Search for Immanent Business Norms*, 144 U Pa L Rev 1765 (1996) (arguing that the Uniform Commercial Code's legalization of otherwise efficient business norms may undermine their efficiency); and Eric A. Posner, *Law, Economics, and Efficient Norms*, 144 U Pa L Rev 1697 (1996) (arguing that social norms are unlikely to evolve efficiently because of, inter alia, information costs, strategic behavior, and negative externalities).

ment. Given that there is likely to be room to improve commercial practices, there may be room to improve on the incorporation strategy. Although there is no reason to seek a wholesale alternative to the incorporation strategy, there is nonetheless good reason to explore supplemental strategies for enhancing the efficiency of individual commercial practices on a selected basis.

The case for exclusively relying on the incorporation strategy to determine the substantive content of the majority of contract default rules cannot rest on claims for the near optimality of the practices selected by commercial norms. Likewise, the case against using legal design to improve on selected, particular commercial practices cannot rest on the claim that such practices are unlikely to leave room for improvement. According to the theory of cultural evolution, it is at least possible that merchants and lawmakers alike might be able to improve on an isolated commercial practice, should they decide to incur the costs of analyzing and experimenting with alternative practices. Therefore, skepticism directed at individualized legal design must be premised solely on shortcomings in the legal design process, such as public choice, psychological, and informational problems.⁶ Though these obstacles to legal design cannot be easily dismissed, the fact that evolved commercial practice is likely to be suboptimal suggests it may be worthwhile to attempt to overcome them.

This article proceeds in two parts. In Section II, I present the theory of cultural evolution and use it to explain how and why commercial norms evolve. I argue that once all the forces affecting the evolution of commercial norms are understood, the only claim that can be sustained on behalf of their efficiency is that commercial actors would, on average, be better-off following those norms than attempting to determine for themselves the best commercial practice to adopt by using trial and error or some rational cognition process. Having demonstrated that evolved commercial practices are unlikely to be optimal, I argue in Section III that this demonstration should bolster the case for seeking to improve on commercial practice by supplementing the incorporation strategy with alternative legal design strategies. Although the theory of cultural evolution does not itself suggest any particular alternative design strategies, it does demonstrate that there are significant efficiency gains to be had if such strategies could be developed.⁷ In Section IV, I conclude.

⁶ See notes 79 and 80 below.

⁷ Alternative legal design strategies would likely utilize theoretical and empirical methodology. For an example of the former, see Jody S. Kraus, *Decoupling Sales Law from the*

II. EVOLUTIONARY THEORY AND COMMERCIAL NORMS

The standard justification of the incorporation strategy is premised on the assumption that commercial practices are likely to be efficient. Defense of this claim typically takes the form of a perfunctory allusion to evolutionary forces acting on commercial parties.⁸ The instinct to comprehend commercial practices within an evolutionary framework derives in part from the legal-evolutionary tradition dating back to the eighteenth century.⁹ The idea that law "is not an autonomous system, but an integral part of the social life of a community"¹⁰ extends as far back as the nineteenth-century German scholar Friedrich Karl von Savigny,¹¹ whose thesis was taken up in turn by Sir Henry James Sumner Maine¹² and John Henry Wigmore.¹³ The more refined thesis that evolution takes place "at the level of specific legal

Acceptance-Rejection Fulcrum, 104 Yale L J 129 (1994) (utilizing theoretical analysis to identify and correct inefficiencies in sales law). For examples of the latter, see Klausner (cited in note 5) (suggesting empirical tests to determine the presence of network externalities) and Kahan and Klausner (cited in note 5) (providing an empirical analysis of event risk covenants in bond indentures to test for evidence of learning and network externalities).

⁸ Robert Ellickson has recently proposed a theory according to which nonlegal norms might effectively and often efficiently regulate behavior instead of, or in spite of, legal norms. See Robert C. Ellickson, *Order without Law: How Neighbors Settle Disputes* (1991). Although he uses commercial practice as one of his examples, he does not purport to explain why human beings came to rely on such norms and how such norms are transmitted and developed in society. His central claim is that "members of a close-knit group develop and maintain [nonlegal] norms whose content serves to maximize the aggregate welfare that members obtain in the workaday affairs with one another" (id at 167). He sets out to confirm this hypothesis with empirical evidence, rather than to explain whether and how the truth of this hypothesis could be explained by the current theory of cultural evolution. Ellickson argues that "lawmakers interested in the resolution of . . . disputes that arise within a group are unlikely to improve upon the group's customary rules. . . . This conclusion supports . . . Karl Llewellyn's efforts to incorporate merchant practices into the Uniform Commercial Code" (id at 283). For criticism of Ellickson's efficiency claim on behalf of informal norms, see Lewis A. Kornhauser, *Are There Cracks in the Foundations of Spontaneous Order?* 67 NYU L Rev 647 (1992).

⁹ See generally Peter Stein, *Legal Evolution: The Story of an Idea* (1980). See also E. Donald Elliott, *The Evolutionary Tradition in Jurisprudence*, 85 Colum L Rev 38 (1985) (classifying legal evolutionary theories as social, doctrinal, economic, or sociobiological); and Herbert Hovenkamp, *Evolutionary Models in Jurisprudence*, 64 Tex L Rev 645 (1985) (categorizing American evolutionary jurisprudential theories as versions of either social or reform Darwinism and criticizing Elliott's categories in *The Evolutionary Tradition in Jurisprudence* for failing to distinguish between theories that incorporate natural selection and those that do not).

¹⁰ Elliott, at 40 (cited in note 9).

¹¹ Id at 40 n7, citing J. Burrow, *Evolution and Society: A Study in Victorian Social Theory* 142-43 (1966); and Stein, at 65-68 (cited in note 9).

¹² Elliott, at 43 (cited in note 9).

¹³ Id at 46.

doctrines within a legal system''¹⁴ was advanced by Oliver Wendell Holmes, Jr.,¹⁵ Arthur Linton Corbin,¹⁶ and Robert Charles Clark.¹⁷

This early literature provided the foundation for more economically and biologically sophisticated applications of evolutionary theory to the law. Perhaps the most well-known and recent application of evolutionary theory to the law is presented in the law-and-economics literature addressing the question of whether the common law evolves efficiently.¹⁸ There is also a literature exploring the extent to which the existence of law, as well as its content, can be explained by sociobiological, evolutionary processes.¹⁹ The central challenge facing each of these theories is to explain why and how the law's development is subject to *evolutionary* forces. For contemporary purposes,²⁰ the question is why and how legal change is subjected to forces like natural selection that cause law to develop, in some sense, adaptively. All of the traditional legal-evolutionary theories have difficulty demonstrating the existence, much less dynamics, of an evolutionary force.²¹ In contrast, there is an obvious candidate for the evolutionary force acting on the development of commercial practices: the competitive market.

While one might doubt that the legal system, or particular laws within it, are subject to evolutionary forces, it is difficult to argue that commercial practices are not. All other things being equal, commercial actors with effi-

¹⁴ Id. at 50.

¹⁵ Id.

¹⁶ Arthur Linton Corbin, in *The Law and the Judges*, 3 Yale L Rev 234, 249 (1914), argued that "the growth of the law is an evolutionary process."

¹⁷ Clark argues that the corporate culture develops in a "cumulative, evolutionary way." See Charles Clark, *The Morphogenesis of Subchapter C: An Essay in Statutory Evolution and Reform*, 87 Yale L J 90, 92 (1977). Clark's claim is that corporate and commercial law evolve according to patterns of change that act to increase the law's effect in reducing costs of corporate business transactions. See Charles Clark, *The Interdisciplinary Study of Legal Evolution*, 90 Yale L J 1238 (1981); and Elliott, at 60-62 (cited in note 9) (discussing Clark's *Interdisciplinary Study of Legal Evolution*).

¹⁸ See, for example, the citations in nn 2, 3, 4 in Gillian K Hadfield, *Bias in the Evolution of Legal Rules*, 80 Georgetown L J 583 (1992).

¹⁹ See Elliott, at 71-90 (cited in note 9) (discussing the theories of A. G. Keller, Jack Hirshleifer, Richard Epstein, and William H. Rodgers, Jr.).

²⁰ The pre-Darwinian legal-evolutionists did not understand natural selection and even some post-Darwinian legal-evolutionists did not recognize the distinction between evolutionary and nonevolutionary development. See, for example, Elliott, at 41-43 (cited in note 9); and Hovenkamp, at 648-49 (cited in note 9).

²¹ Although the literature on the efficiency of the common law identifies the incentives of litigants to bring suit as a force affecting its development, it falls short of explaining how that or other forces cause the common law to become more efficient (the criterion of success for the common law that is analogous to the criterion of adaptivity in biology). Thus, the incentives of litigants to bring suit is a force that has yet to be shown to be an *evolutionary* force.

cient practices are more likely to succeed, stay in business, and continue those practices than actors with inefficient practices. In short, this "market-based evolutionary" account holds that efficient practices will be favored in the marketplace. Indeed, this is precisely the reasoning routinely used by many commercial law scholars who endorse an evolutionary account of commercial practices.²² As straightforward and compelling as this reasoning appears to be, it is nonetheless insufficient to establish the claim that commercial practices are likely to be nearly optimal and thus unlikely to leave room for improvement by alternative legal design strategies. Application of contemporary evolutionary theory to the development of commercial practice demonstrates that the market-based evolutionary account isolates only one of a number of evolutionary forces, none of which are likely to produce even nearly optimal practices on average. Although the market does constitute a strong evolutionary force that tends to increase the efficiency of commercial practices, the explanation of why and how commercial practices evolve provides no grounds for believing that evolved commercial practices will be nearly optimal. Moreover, analysis of other nonmarket forces acting on the evolution of commercial norms suggests that some evolved commercial practices will be significantly suboptimal. Thus, there is room, in principle, to improve on evolved commercial practices and the legal rules the incorporation strategy derives from them. In this section, I introduce and use the fundamental tenets of the most advanced contemporary theory of cultural evolution available to explain why and how commercial norms evolve.

A. *The Evolution of Cultural Norms*

The most sophisticated and comprehensive theory of the evolution of cultural norms available is provided by Robert Boyd and Peter J. Richerson in *Culture and the Evolutionary Process*.²³ Boyd and Richerson present a for-

²² See, for example, Thomas H. Jackson, *The Fresh-Start Policy in Bankruptcy Law*, 98 Harv L Rev 1393, 1417 (1985) ("[F]irms that systematically act impulsively or underestimate the risks of investments will, in theory at least, be weeded out and replaced by firms that calculate risks more carefully."); and Clayton P. Gillette, *Commercial Relationships and the Selection of Default Rules for Remote Risks*, 19 J Legal Stud 535, 576-77 (1990) ("[O]ne may argue for an evolutionary or natural selection model of commercial practice. In unregulated markets, those best suited to handle risk will survive in open market competition. . . . Those actors who make decisions in a manner more consistent with expected utility theory (more "rationally") will approach optimality, and successful actors may signal the proper route to others. Even if they prosper by luck, they will serve a useful social function so long as others, seeing their success, can mimic their behavior in the future.").

²³ Robert Boyd and Peter J. Richerson, *Culture and the Evolutionary Process* (1985). See also L. L. Cavalli-Sforza, *Cultural Transmission and Evolution: A Quantitative Approach* (1981); L. L. Cavalli-Sforza and M. W. Feldman, *Cultural versus Genetic Adaptation*, 80

mal theory²⁴ of the evolution of cultural norms in which norms evolve through processes partly analogous to those that produce genetic evolution. They defend what they call the "dual inheritance theory" in which genetic and cultural inheritance systems coexist and interact.²⁵ Their theory explains how genetic evolution can plausibly be thought to have generated a system of cultural evolution that in turn advances genetic fitness. But they also explain how the mechanisms of cultural evolution can lead to maladaptive dispositions that undermine genetic fitness.²⁶ Ultimately, the system of cultural evolution identified by Boyd and Richerson would be produced by genetic evolution because, on the whole, it maximizes genetic fitness compared to a purely genetic system of evolution. A system of cultural inheritance produces adaptive advantages increasing genetic fitness that outweigh the disadvantages caused by maladaptive cultural norms that reduce genetic fitness. The distinction between individual and social learning is central to

Proceedings Natl Academy Science 4993 (1983); and L. L. Cavalli-Sforza et al, *Theory and Observation in Cultural Transmission*, 218 Science 19 (1982).

²⁴ Boyd and Richerson present mathematical models of the evolutionary forces they identify and mathematical proofs for the propositions they assert. Throughout my presentation of their theory, I make no attempt to present or assess their formal models and proofs. Instead, I assume their theory's formal validity and present a nonmathematical summary of its central features and main results. Thus, this article is concerned solely with the application of Boyd and Richerson's theory to the question of whether and how commercial norms evolve, and not with the independent merits of their theory.

²⁵ Although Boyd and Richerson's theory holds that genetic and cultural inheritance systems are in many ways analogous, they claim that cultural evolution is subject to significantly different processes as well. The sharpest distinction between cultural and genetic transmission structures is that the transmission of acquired behaviors, or mature phenotypes, from one individual to another is not possible in genetic transmission. The view that behavioral characteristics acquired after birth could be biologically inherited, a view advanced by the pre-Darwinian evolutionist Jean Baptiste Lamarck (*Zoological Philosophy* 106–27 [1914]), cannot be reconciled with the modern theory of genetic transmission. Boyd and Richerson (cited in note 23) agree: "One of the fundamental tenets of evolutionary theory has been that developmental events in an individual's life do not affect its germ cells and thus cannot affect the genetic material that the individual transmits to the next generation" (id at 118, citing A. Weismann, *The Germ Plasm: A Theory of Heredity* [1893]). A system of cultural transmission, however, can transmit acquired behaviors nongenetically. Boyd and Richerson's theory of cultural evolution explains how this nonbiological "Lamarckian" inheritance process itself has evolved through genetic evolution. The theory also shows how a Darwinian selection process can act on the transmission of cultural norms just as it acts on the transmission of genetic characteristics.

²⁶ Although natural selection acting on cultural transmission typically favors genetically adaptive traits, it sometimes does not. Both genetic and cultural transmission can take place "vertically," from genetic parents to genetic offspring. But unlike genetic transmission, cultural transmission can also take place "obliquely," from a nongenetic parent to a child, and "horizontally," from one peer to another. When both transmission processes are vertical, and therefore symmetric, cultural variation always favors genetic fitness. But when the transmission processes are asymmetric, and cultural transmission is thus oblique or horizontal, natural selection acting on cultural transmission can produce genetically maladaptive traits. See Boyd and Richerson at 173–74, 198, 285–86 (cited in note 23).

Boyd and Richerson's explanation of the genetic evolution of cultural inheritance, and it is therefore central to understanding the cultural evolution of commercial norms.

1. *Individual versus Social Learning.* In Boyd and Richerson's model, the biological and behavioral characteristics of all organisms can in principle be explained and predicted by the interaction between genes, environment, and culture. They restrict the definition of "environment" to "those processes in the physical and biological realm that affect the population of interest but that are somehow external to the population itself."²⁷ Given this definition of environment, their definition of culture makes environment and culture mutually exclusive categories.²⁸ They define "culture" in general as "the transmission from one generation to the next, via teaching and imitation, of knowledge, values, and other factors that influence behavior."²⁹ More specifically, they define culture as "information capable of affecting individuals' phenotypes which they acquire from other conspecifics by teaching or imitation."³⁰ Although they refer to the "knowledge, values, and other factors that influence behavior" as beliefs and desires, they identify these notions with behavioral dispositions.³¹

However, only those behavioral dispositions whose particular variations are capable of transmission count as culture. Thus, behavioral traits whose acquisition by offspring require the presence of a parent are not culture unless there are particular parental variants of the disposition that can be transmitted to the offspring by the parents. Behavioral dispositions acquired through habitat imprinting are not culture since that process cannot transmit variants in behavioral disposition.³² Similarly, behavioral dispositions acquired through "guided learning" are not culture. Guided learning takes place when individuals physically follow a model, typically their parents,

²⁷ Id at 5.

²⁸ Id.

²⁹ Id at 2.

³⁰ Id at 33. An individual's "phenotype" is "its body and behavior as we observe them; this is distinct from its genotype, which is its set of genes." See Mark Ridley, *Evolution* 28–29 (1993). An individual's genotype controls its possible phenotypes, but the actual phenotype it manifests can be influenced by the environmental conditions to which the individual is subjected. A "conspecific" is a member of the same species as another individual.

³¹ Boyd and Richerson (cited in note 23) share with most social scientists skepticism of the claim that either subjective or third-party reports of the propositional attitudes, like beliefs and desires, of any given subjects provide accurate descriptions of the actual behavioral dispositions that account for the subjects' observed behavior (id at 38).

³² "Habitat imprinting" occurs when, for example, young individuals form an attachment to the area in which they are born and thus acquire behaviors specific to that locality. "The homing behavior of Pacific Salmon and many migratory birds are well-known examples" (id at 35).

through the environment and thereby acquire behavioral traits similar to their parents by virtue of similar environmental exposure. These dispositions are not culture because the process of their acquisition does not transmit variations from the parent, or more generally the "model" or "cultural parent,"³³ to the individual acquiring the disposition, whom Boyd and Richerson term the "naive individual."

The behavioral dispositions that constitute culture are acquired by *social learning*. These dispositions are transmitted to naive individuals either because they are imitated by them or taught to them by models. Variant behavioral dispositions that are acquired through social learning, therefore, are transmitted from one individual to another through imitation or teaching.³⁴ Although a given behavioral disposition might be transmitted by social learning, it might instead be acquired purely through *individual learning*. Behavioral dispositions acquired exclusively through individual learning result from trial and error or rational calculation rather than imitation or teaching. By definition, they are not explained by cultural evolution because they are not the result of cultural transmission.³⁵ The system of cultural inheritance that Boyd and Richerson present essentially consists of a system of social learning, although some of its distinctive features result from the effects of combined social and individual learning on cultural transmission.

2. *The Comparative Advantage of Social Learning.* Boyd and Richerson argue that although individual learning will be superior to social learning in certain circumstances, the reverse is far more often the case. Their analysis is based on the familiar premise that individual learning is costly relative to social learning. Individual learning requires trial and error or rational calculation, both of which potentially occasion significant costs. Boyd and Richerson observe that trial and error learning

can be costly and error prone. Learning trials occupy time and energy that could be allocated to other components of fitness, and may entail a considerable risk to the individual as well. Because of these costs, the investment of individuals in de-

³³ "Cultural parent" and "model" are synonyms: both describe "the set of individuals who enculturate a given person" (id at 35). Cultural parents are not necessarily biological parents and vice versa (id at 7).

³⁴ Boyd and Richerson's analysis omits consideration of the effects of teaching on cultural transmission and thus only takes into account social learning through imitation. They argue that these effects are sufficiently similar to those of imitation, and that including them in their formal model would gratuitously complicate the analysis (id at 144-45). My discussion will therefore omit consideration of this mode of social learning as well.

³⁵ But individual learning does interact with social learning and therefore plays an important role in cultural evolution. In particular, the transmission process of "guided variation" (see Section IIB) demonstrates how individual learning can change an inherited disposition after an individual has inherited it.

termining the locally favored behavior must be limited, and individual learning can lead to errors. Individuals may fail to discover an adaptive behavior, or a maladaptive one may be retained because it was reinforced by chance. When these costs are important, selection ought to favor shortcuts to learning—ways that an organism can achieve phenotypic flexibility without paying the full costs of learning.³⁶

Similarly, the rational calculation method of individual learning is costly and error prone. Boyd and Richerson consider the problem of the “Bayesian horticulturalist,” in which an individual must calculate his expected crop yield and decide how much insurance to purchase for protection against underproduction.³⁷ In order to solve the problem, the horticulturalist would have to (1) assign a utility value to different outcomes, (2) update his estimate of the average yield of his plot by determining the relationship between the present year’s yield and the long-run mean, and (3) determine the prior probability distribution of outcomes in his environment.³⁸ Boyd and Richerson argue that this rational decision-making process requires the individual to specify “an unrealistically large amount of information about the environment . . . and then perform computations that are too difficult

³⁶ Boyd and Richerson, at 14 (cited in note 23).

³⁷ In their example, the insurance takes the form of an informal contract between the individual and his farmer-neighbor, according to which the individual is entitled to a share of his neighbor’s crops in return for the individual contributing labor to his neighbor’s farm. The individual’s problem is to determine how much labor to contribute to his neighbor’s farm. That, in turn, requires him to estimate his long-run average crop yield and the variance from year to year (id at 87–92).

³⁸ In order to solve the problem of the Bayesian horticulturalist, a Bayesian must use a continuous version of Bayes Theorem requiring calculations most individuals cannot understand, much less compute in their heads (id). But even applying a discrete version of Bayes Theorem to a straightforward problem requires rather complex calculations. To understand the complexity of using even a discrete version of Bayes Theorem, consider the Bayesian solution to the following problem: (1) scientists have discovered that symptom *S* provides an imperfect screening device for detecting disease *D*; (2) if an individual has the disease, there is an 80% chance that he will have symptom *S*; (3) if an individual does not have the disease, there is still a 20% chance he will have symptom *S*; (4) 33% of the population has the disease; (5) Smith has been drawn randomly from the population and has symptom *S*. What is the probability that Smith has disease *X*? The Bayesian formula for calculating the posterior probability that Smith has the disease is

$$p(D|S) = \frac{p(D)p(S|D)}{p(D)p(S|D) + p(-D)p(S|-D)},$$

where *D* = has disease *D* and *S* = has symptom *S*. To solve the equation, assign $p(D) = 0.33$, $p(S|D) = 0.80$, and $p(S|-D) = 0.20$. Thus,

$$p(D|S) = \frac{0.33 \times 0.80}{(0.33 \times 0.80) + (0.67 \times 0.20)} = 0.67.$$

This example is adapted from Gerd Gigerenzer, *Why the Distinction between Single-Event Probabilities and Frequencies Is Important for Psychology (and vice versa)*, in G. Wright and P. Ayton, eds, *Subjective Probability*, at 129, 145, 150 (1994).

for anyone but mathematicians. . . . Even modern corporations that can afford to expend enormous resources in gathering and analyzing data are unable to conform to the canons of Bayesian rationality.”³⁹

Given the difficulty human beings confront in using Bayesian decision procedure effectively for most decisions, rational calculation must be undertaken in some other way. Boyd and Richerson turn to behavioral decision theory to determine how individuals actually make decisions and whether their decision-making processes are likely to be effective.⁴⁰ In particular, they rely on the well-known research of cognitive psychologists Daniel Kahneman and Amos Tversky⁴¹ and Richard Nisbett and Lee Ross⁴² to establish the claim that human beings use “rules of thumb,” or what Kahneman and Tversky call “heuristics,” as a method of rational calculation, and that these heuristics sometimes lead to systematic, cognitive biases that cause human decision-making to fall far short of the standard for ideal, rational decision-making set by Bayesian decision theory. Although these heuristics “often work well, . . . [they] occasionally . . . lead to behavior that is irrational according to the canons of Bayesian rationality.”⁴³ Kahneman and Tversky’s work indicates that while heuristics provide a viable and sometimes effective alternative to Bayesian decision theory, human beings nevertheless “ordinarily make quite poor judgments, particularly when problems are novel or require statistical evaluation. . . . [Heuristics] cause individuals to form confident opinions based on inadequate or badly biased information and then hold to these opinions in the face of substantial disconfirming data.”⁴⁴

³⁹ Boyd and Richerson, at 92–93 (cited in note 23) (citation omitted).

⁴⁰ Id at 93–94.

⁴¹ See, for example, D. Kahneman, P. Slovic, and Amos Tversky, eds, *Judgment under Uncertainty: Heuristics and Biases* (1982).

⁴² See, for example, R. Nisbett and L. Ross, *Human Inference: Strategies and Shortcomings of Social Judgment* (1980); and R. E. Nisbett and R. D. Wilson, *Telling More Than We Can Know: Verbal Reports of Mental Process*, 84 Psych Rev 231 (1977).

⁴³ Boyd and Richerson, at 93 (cited in note 23).

⁴⁴ Id at 168. For a summary of the data demonstrating how Kahneman and Tversky’s “judgment heuristics” of representativeness, availability, and anchoring lead to systematic cognitive error, see id at 168–69. See generally, Kahneman, Slovic, and Tversky, eds (cited in note 41). Among the most well-known cognitive errors alleged by Kahneman and Tversky are (1) the tendency to have confidence in judgments greater than the justification provided by relative frequencies of successful performance (“overconfidence bias”), (2) the tendency, under particular circumstances, to assign a higher probability to the possibility of two events occurring than the possibility of one of those events occurring alone (“the conjunction fallacy”), and (3) the tendency to ignore underlying base rates, or relative frequencies, when calculating single-event probabilities, “the base-rate fallacy.” For summary and application of Kahneman and Tversky’s “heuristics and bias” program to the law, see Robert E. Scott, *Error and Rationality in Individual Decisionmaking: An Essay on the Relationship between Cognitive Illusions and the Management of Choices*, 59 Cal L Rev 329 (1986); Ward Ed-

Since Boyd and Richerson published their theory, recent work in cognitive psychology has called into question the methodology and conclusions of the "heuristics and biases" program associated with Kahneman and Tversky. For example, recent research indicates that some of the cognitive errors identified by Kahneman and Tversky can be eliminated by changing the description of the problems their subjects were asked to solve from single-event probability descriptions to frequency descriptions.⁴⁵ Thus, because Kahneman and Tversky postulate that humans use heuristics in order to explain cognitive bias, the research arguing that Kahneman and Tversky overestimate cognitive bias also calls into question the heuristics they claim humans use when making judgments under uncertainty. In addition, that research also questions the premise that rational decision making should be measured by Bayesian standards.⁴⁶ Although the status of the heuristics and

wards and Detlof von Winterfeldt, *Cognitive Illusions and Their Implications for the Law*, 59 S Cal L Rev 225 (1986).

⁴⁵ For example, Gigerenzer redescribed the problem, in note 38, using "natural sampling," which gives subjects frequencies directly: "Your tribe has been afflicted for one year by a previously unknown and fatal disease. Everyone suspected of having the new disease is sent to you. You were lucky to discover one symptom that seems to signal the outbreak of the disease. . . . So far you have seen 30 people suspected of having the disease. Ten of these turned out to have the disease, 20 did not. Of the 10 persons afflicted by the disease, 8 showed the symptom; of the 20 persons not affected, only 4 had the symptom. Now they bring in number 31. She has the symptom" (id at 149–50). Gigerenzer argues that when the problem is rephrased in this way, subjects no longer commit the base-rate fallacy. The reason is that the solution to the problem now only requires "two absolute frequencies: the number *a* of people with symptom and disease, and the number *b* of people with symptom and no disease. These frequencies are *a* = 8 and *b* = 4, respectively. The algorithm to calculate the relative frequency $f(D|S)$ of people with disease *D* among those who have the symptom *S* is

$$f(D|S) = \frac{a}{a + b} = \frac{8}{8 + 4}.$$

If you are a Bayesian and want to calculate from the frequencies monitored so far the posterior probability $p(D|S)$ that patient number 31 has the disease, your mental algorithm is just as simple:

$$p(D|S) = \frac{8}{8 + 4}.$$

Compare now this algorithm to the algorithm [in note 38]. . . . The general point . . . is that the way information is represented in an experiment, or encountered in a natural environment, can require reasoning of different complexity. Even if these algorithms are mathematically equivalent, as they are in the thought experiment just presented, they can be computationally and psychologically different" (id at 150–51). For a similar point, see Leda Cosmides and James Tooby, *Are Humans Good Intuitive Statisticians after All? Rethinking Some Conclusions from the Literature on Judgment under Uncertainty*, 58 Cognition 1 (1996).

⁴⁶ See, for example, Gerd Gigerenzer, *How to Make Cognitive Illusions Disappear: Beyond "Heuristics and Biases,"* in Wolfgang Stroebe and Miles Hewstone, eds, *European Review of Social Psychology* (1991); Gerd Gigerenzer and David J. Murray, *Thinking: From Insight to Intuitive Statistics*, in *Cognition as Intuitive Statistics* 137 (1987); Gerd Gigerenzer,

bias research is now unclear,⁴⁷ few would dispute the claim that the vast majority of the everyday problems human beings confront are not amenable to decision procedures that are both optimal and cost-effective. Whatever their source, individuals are likely to commit substantial errors, by any reasonable measure of rationality, when they attempt to solve problems using rational cognition.⁴⁸ Thus, the methods human beings actually use for rational calculation are almost certain to be less costly to use than a rationally ideal decision procedure or the trial and error method, yet they will often be unreliable.

In sum, individual learning is a relatively poor device for acquiring adaptive behavioral dispositions. Yet human decisions and behaviors, for the

Rationality: Why Social Context Matters, in P. B. Baltes and U. Staudinger, eds, *Interactive Minds: Life-Span Perspectives on the Social Foundation of Cognition* (1996); Gerd Gigerenzer, *The Bounded Rationality of Probabilistic Mental Models*, in K. I. Manktelow and D. E. Over, eds, *Rationality*, at 284 (1993); Gerd Gigerenzer, *The Superego, the Ego, and the Id in Statistical Reasoning*, in Gideon Keren and Charles Lewis, eds, *A Handbook for Data Analysis in the Behavioral Sciences*, at 311 (1993); Gerd Gigerenzer, *From Tools to Theories: A Heuristics of Discovery in Cognitive Psychology*, 98 *Psych Rev* 254 (1991); Gerd Gigerenzer and Ulrich Hoffrage, *How to Make the Mind Reason the Bayesian Way* (unpublished manuscript on file with author, 1993); and Gigerenzer (cited in note 38).

⁴⁷ Gerd Gigerenzer has been the leading critic of Kahneman and Tversky's work. See citations in note 46 above. Kahneman and Tversky have recently responded to Gigerenzer's criticisms, see Daniel Kahneman and Amos Tversky, *On the Reality of Cognitive Illusions: A Reply to Gigerenzer's Critique*, 103 *Psych Rev* 582-91 (1996). Gigerenzer has replied to their response, see Gerd Gigerenzer, *On Narrow Norms and Vague Heuristics: A Rebuttal to Kahneman and Tversky*, 103 *Psych Rev* 592-96 (1996).

⁴⁸ Gerd Gigerenzer's work is illustrative in this regard. He demonstrates, for example, that Kahneman and Tversky's "overconfidence bias" can be eliminated by asking parties to estimate the frequency of their errors, rather than asking them the static probability that they answered any particular question correctly (a question that Gigerenzer correctly observes would be incoherent to a statistician who regards probabilities as identical to frequencies, as most statisticians do). But such an experiment does not make the overconfidence bias disappear. Instead, it demonstrates that human decision making depends on what questions humans ask themselves in order to determine the course of action they should take. Kahneman and Tversky's work demonstrates that individuals will (through the use of a subjective probability assignment) express a level of confidence in their performance on any discrete task that exceeds the level of confidence that, intuitively, would be warranted by the frequency of their errors, even though they can accurately estimate that frequency value when asked to do so. Thus, if human beings make decisions based on subjective probabilities, as is reasonable to suppose they sometimes do, then the fact that they can accurately estimate their performance rate over a set of similar events provides no basis for claiming their decisions will be "rational," on any reasonable theory of what rationality requires in individual decision making. If individuals either fail to undertake to estimate the error rate of their performance over time or simply ignore that estimate when making decisions, the likely accuracy of their potential frequency estimates is irrelevant to determining the rationality of their decisions. Since the subjective probabilities indicate their actual level of confidence in any given case, it seems likely that these probabilities will play a strong role in decision making, and it is these probabilities that are, intuitively, inconsistent with individuals' performance error rates.

most part, have the “semblance of rationality.”⁴⁹ Boyd and Richerson reconcile these claims by showing how a system in which adaptive norms evolve through social learning could have been, and in fact was, produced by genetic evolution. Thus, they argue that natural selection acting on genetic transmission would produce a system of cultural inheritance that strongly favors social learning over individual learning, so strongly in fact, that individuals will often “ignore the dictates of individual learning.”⁵⁰ This is the natural consequence of biological evolution given the fact that individual learning is typically a poor method of acquiring adaptive behavioral dispositions in most human environments. Although individual learning will be favored when it has relatively low cost and high accuracy, Boyd and Richerson argue that this is seldom the case:

When it is easy to determine the locally best behavior, we expect learning to be quite accurate, but when it is difficult, individual learning should be inaccurate.

Given that learning is imperfect, . . . natural selection will favor an increased reliance on culturally inherited beliefs whenever (1) the error rate of individual learning is substantially greater than that for social learning and (2) the environment is reasonably predictable. . . . It is our intuition that it is often difficult for individuals to determine the locally optimal behavior. Consider, for example, the problem of the Bayesian horticulturalist. . . . We believe that many human decisions have this character. Because they have many effects that are spread out over a long period of time, it is difficult for individuals to determine the best choice by trial and error; because the consequences of alternative choices depend on a complex, variable, hard-to-understand environment, it is difficult for individuals to deduce the optimal behavior. The result is that a reliance on individual learning will lead to frequent errors. If this intuition is correct, and if the social learning theorists . . . are also correct that information can be acquired easily and accurately by social learning, then the models [we] analyzed here suggest that a strong dependence on cultural transmission usually provides a better way to acquire beliefs about the environment than a strong dependence on individual learning.⁵¹

The claim that social learning often will be superior to individual learning, and thus the claim that a system of cultural inheritance could result from genetic evolution, must be supported by an account of the forces that transform cultural inheritance from a nonevolutionary system, in which the frequency of cultural variants in the population remains the same, to an evolutionary system, in which the relative frequency of adaptive cultural variants increases over time. In the next section, I present Boyd and Richer-

⁴⁹ Boyd and Richerson, at 93 (cited in note 23).

⁵⁰ *Id.* at 130.

⁵¹ *Id.* at 116–17.

son's account of these forces and describe how they would affect the cultural evolution of commercial norms.

B. The Evolution of Commercial Norms

In order to apply Boyd and Richerson's theory to the problem of understanding the evolution of commercial norms, I begin by assuming that all commercial actors are exclusively motivated to maximize profit. Given this motivation, individuals must acquire business practices, some of which become so regular and widespread that they constitute a statistical norm. For cultural evolution to play a significant role in generating such business norms, social learning must have significant advantages over individual learning in many commercial environments. This proposition is quite plausible. In order to determine the optimal trade practices even for relatively common transactions, commercial parties would have to engage in analyses at least as complex as those Boyd and Richerson's Bayesian horticulturalist must undertake. Consider, for example, the problem of structuring a long-term supply transaction between an oil and gas company and a public utility. In order to provide the optimal price and quantity terms, the parties would have to (1) assign a monetary value to the various contingencies that might arise throughout the course of the relationship, (2) assign a prior probability distribution over these contingencies, and (3) update their estimates of these probabilities throughout the course of their relationship. Among other things, they would have to decide what constitutes a conforming grade of oil; how much time should be allowed for transportation; under what conditions the seller has the right to inspect, reject, and return delivered oil; what conditions excuse each party's performance; and what remedies are available for breach. The Bayesian decision procedure for deciding these questions would present a formidable, if not impossible, task. In order to be meaningful, it would require access to statistical information ordinarily unavailable to typical parties. Nor do heuristics provide a promising avenue for solving these problems. Indeed, it is difficult to imagine what heuristic could be used to decide, for example, how much time the seller should be given to inspect or what deviations from a specified or estimated quantity promised should be tolerated. Moreover, to the extent Kahneman and Tversky's research is accurate, the heuristics that humans tend to use often lead to irrational results.⁵² Finally, the trial and error method would require considerable experience before any result could be inferred and, even then, it would be difficult to draw conclusions from experience be-

⁵² But see Scott (cited in note 44), arguing that much of the evidence offered in support of cognitive error can instead be explained as the result of a rational precommitment strategy.

cause it would be difficult to determine which practices had which effects. Thus, if Boyd and Richerson are right that human beings would be genetically predisposed to rely principally on social learning rather than individual learning when attempting to solve a problem in a complex environment, it is plausible to suppose that commercial actors would be predisposed to rely predominantly on social learning to acquire many of their commercial practices.⁵³

All cultural transmission requires that the naive individual acquire behavioral dispositions at least in part by imitating a "model." Individuals choose as their models others whom they believe have succeeded in achieving the goal the naive individual desires to achieve. For example, an automobile manufacturer would use as models other automobile manufacturers he believes have been profitable. Thus, the cultural transmission contemplated by Boyd and Richerson's theory does not hypothesize that a naive individual acquires a behavioral disposition by unselectively imitating members of the general population. Rather, a naive individual first uses his underlying goal to select a subset of individuals from the general population whose members the naive individual believes have been successful at achieving the naive individual's goal. The process naive individuals use to select their models may be either conscious or unconscious. Boyd and Richerson's theory requires only that individuals somehow identify a subset of the general population whose members in fact, even if not by conscious intention, serve as models for purposes of acquiring certain behavioral dispositions. According to Boyd and Richerson, humans are genetically predisposed both to select models, consciously or not, and to acquire behavioral dispositions at least in part by imitating models.

The first evolutionary force acting on cultural transmission is natural selection, the only such force affecting genetic transmission. Applied to cultural transmission, natural selection will favor those dispositions most common among models. The process of natural selection takes place independently of any intentional selection of behavioral traits, simply by virtue of the statistical probability that individuals randomly imitating models will themselves become models whose dispositions will be imitated and thus reproduced (just as natural selection acting on genetic transmission de-

⁵³ This insight has been recognized in legal scholarship. For example, Goetz and Scott (cited in note 5) argue that there is an evolutionary process beginning with the development of customary business practice and leading to legal norms through incorporation by reference. They claim that these customary formulations "are not only *cheaper*, but they are also *better* than do-it-yourself ones. . . . [T]he process of contractual formulation is subject to inherent endogenous hazards that emerge and undergo correction only over time. Accumulated experiences are therefore very important in shaping customary contractual prototypes" (id at 278). They even refer to this process as "quasi-Darwinian" (id).

depends on differential probabilities of genetic traits being reproduced). Those traits most common among models are likely to be those that increase the likelihood of an individual becoming a model; because they are the most common, they are likely to be imitated more often than others in a system in which individuals randomly imitate models. And just as the strength of natural selection acting on genetic transmission is directly proportional to the extent of genetic variation among parents,⁵⁴ the strength of natural selection acting on cultural transmission is directly proportional to the extent of cultural variation among cultural parents or models. Natural selection would therefore become weaker as it reduces variation. This natural decrease in the strength of natural selection is counteracted by the force of random cultural variation. Such variation can occur as a result of individuals who (1) imperfectly imitate a properly modeled behavioral disposition, (2) forget or misremember accurately imitated behavioral dispositions, or (3) accurately imitated and acquired a behavioral disposition that was incompletely or erroneously performed by the model.⁵⁵

Natural selection would act on the cultural transmission of commercial practices just as it acts on cultural transmission generally. Individuals would choose, consciously or not, as their models commercial actors who appear to have succeeded in the market. For example, an automobile retailer might decide to offer a 5-year warranty on all cars he sells because he is predisposed randomly to imitate some models (dealers he believes to be successful), and these models offer such a warranty. If the retailer had instead investigated the advantages and disadvantages of offering different length warranties, rather than simply imitating the warranty practice of others, his decision to offer a 5-year warranty would not have been the result of cultural transmission. But because he decided to offer that warranty solely by virtue of his disposition (conscious or not) to imitate successful dealers, his decision qualifies as the product of cultural transmission. Thus, instead of

⁵⁴ Natural selection can occur only if the population from which characteristics are inherited exhibits some variation. For example, if all parents had precisely the same genes, no children could inherit different genes. Therefore, there would be no difference among the survival/reproduction rates of genes. If the population exhibits variation, however, natural selection favors those characteristics that reproduce at a higher rate than others. For example, given that different parents have different genes, the gene distribution in a subsequent generation will differ from that of its previous generation depending on which members of the previous generation successfully reproduced. The greater the extent of variation in the previous generation, the more genes there are to be subject to different reproduction rates. Thus, the more genetic variation in the previous generation, the more dramatic the effect differential reproduction rates will have on the distribution of genes in the subsequent generation. Thus, the strength of natural selection acting on genetic transmission is directly proportional to the amount of variation among parents.

⁵⁵ See Boyd and Richerson, at 67–68 (cited in note 23).

making a rational choice among possible behaviors, natural selection takes place when individuals follow their predisposition to acquire a behavior simply by randomly mimicking the commercial practices of models. Those practices that tend to be correlated with market success will gradually be favored by natural selection. The more efficient an individual's commercial practices, the more likely he is to succeed in the market and thus become a model for others. Thus, if the practice of offering a 5-year warranty contributes to market success, those dealers who engage in that practice will be, all things equal, more likely to succeed, remain in business, and become models for other dealers who acquire business practices by imitating models. And just as efficient practices will be favored by natural selection, inefficient practices will be "selected against" by the market, and, in turn, selected against by natural selection acting on the cultural transmission of commercial norms.

Although this process might quickly drive the mean variants of commercial practices toward the optimum, we would expect that the process of natural selection acting on the transmission of contracting practices, as opposed to other commercial practices, will be relatively slow. This is because the correlation between the contracting practices, which give rise to legal obligation, and market success is quite indirect. In general, success in the market is likely to be influenced far more heavily by product demand, production costs, marketing, internal management, product competition, and noncontractual commercial practices, than the contracting practices to be given legal effect through contract law. To be sure, some of these practices will be quite important, but many of them will contribute only a small fraction even to the success of a single contract, much less an entire business. Nonetheless, natural selection will be a force acting to increase the frequency of efficient variants of both contractual and noncontractual commercial practices.

Natural selection is the only force acting on cultural transmission that relies exclusively on imitation. However, there are other forces acting on cultural transmission that combine imitation with individual learning. One of these forces is called "guided variation." When individuals acquire their initial variants of behavioral dispositions, or "initial phenotypes," by imitating a model, and then modify those initial phenotypes through individual learning, the resulting "mature" phenotypes will typically differ from the initial ones: "Variants favored by learning will be more common, and those that are not favored will be less common. Finally, suppose that mature individuals then serve as models for young individuals in the next generation. This will cause the distribution of initial phenotypes in the next generation to be different from the distribution in this generation. Thus, cultural transmission of the initial phenotype and its subsequent modification by learning

combine to produce a force increasing the frequency of the variants favored by learning, even in the absence of natural selection. This effect is the essence of guided variation."⁵⁶ As in the force of natural selection, the force of guided variation requires an individual initially to acquire a behavioral disposition by imitating a model. But unlike natural selection, when guided variation takes place, individuals consciously assess whether a variant they acquired by imitation is successful or needs to be modified and whether any modifications they make are successful. Natural selection operates without individuals engaging in any individual learning. Thus, unlike natural selection, guided variation requires naive individuals to have criteria to guide them in their individual learning.⁵⁷ As long as the criteria guiding individual learning are adaptive, guided variation will act to push the mean variants of dispositions in the population toward the optimum. Both natural selection and guided variation are evolutionary forces (forces that improve fitness from one generation to the next). But natural selection increases the frequency of successful traits from one generation to the next solely by virtue of the fact that those randomly acquired behaviors most conducive to individuals becoming models will be more likely to be imitated by others who are acquiring their dispositions by randomly imitating models. In contrast, guided variation increases the frequency of successful traits even if the initially acquired behavior would not have been conducive to individuals becoming models. In guided variation, the increased frequency of successful traits in succeeding generations results purely from the success of the individual learning that leads individuals to modify initially acquired behaviors, rather than the success of the initially acquired behavior itself.

In the commercial context, guided variation would occur after an individual had acquired a practice by imitating a successful commercial actor. The transmission of that commercial practice is influenced by guided variation when the individual discovers through trial and error or rational calculation that the practice is inefficient and modifies it in an attempt to improve efficiency. For example, suppose that the automobile dealer above, who adopted the practice of offering a 5-year warranty on his cars, subsequently evaluated the successfulness of offering such warranties and modified the warranty as a result. The cultural transmission of the modified practice, from that dealer to another, would be subject to the force of guided variation.

Given that it is typically difficult to isolate the effects of individual commercial practices, and that any one inefficient practice is unlikely to cause

⁵⁶ *Id.* at 95.

⁵⁷ Note, however, that *all* evolutionary forces, including natural selection, require naive individuals to have criteria to guide them, consciously or not, in identifying models.

significant overall losses in any single transaction, guided variation is likely to play a significant role in eliminating only those inefficient commercial practices whose effects are not only economically significant but also can be easily determined to have been caused by a particular practice. Guided variation is therefore likely to act principally as a stopgap force preventing the evolution of exceedingly and obviously inefficient practices, but it will not be a strong force either in culling out moderately inefficient practices or in creating new practices that moderately increase efficiency.

The third force acting on cultural transmission is called "biased transmission."⁵⁸ Although some transmission is random,⁵⁹ the transmission of culture might be systematically biased. Boyd and Richerson identify three varieties of potential bias in the transmission of culture. They illustrate with the example of a naive individual choosing between use of a "pencil grip" or a "racquet grip" for ping pong in a population with a given distribution of different models using each type of grip. If the naive individual limits his choices to those modeled for him, he forgoes acquisition through pure individual learning. If he then chooses by directly assessing the suitability of each grip modeled, for example, by practicing with each, the acquisition of the disposition to use one type of grip rather than the other is "directly biased." Like guided variation, direct bias requires the use of individual learning. As long as criteria guiding direct bias are adaptive, direct bias will always act as a force pushing the mean practice in a population toward the optimum. But unlike guided variation, which uses individual learning to modify a practice after its adoption by imitation, direct bias uses individual learning—in this example, the trial and error procedure—to *select* the behavior to be imitated from among the variations of behavioral dispositions modeled.⁶⁰ Thus, in directly biased transmission, the genetic predisposition of naive individuals leads them to restrict the behavioral dispositions they might adopt to those modeled for them. Although their choice to so restrict their set of alternatives is not itself subject to rational deliberation, their de-

⁵⁸ Boyd and Richerson, at 9 (cited in note 23); see generally chs 5–8.

⁵⁹ We have already seen how random variation is possible in the case of transmission by imitation (see text accompanying note 55 above). Boyd and Richerson, at 144–45 (cited in note 23) consider how teaching might contribute to biased transmission but do not consider how random variation could result from teaching. It is plausible that such random variation would result from either inadvertent or poor teaching.

⁶⁰ Thus, unlike guided variation, the force of directly biased transmission is dependent on the extent of variation among models. Like natural selection, the strength of direct bias is proportional to the amount of cultural variation. Guided variation, however, can occur even when only one variation is modeled. If the initially acquired variation is subsequently modified through individual learning, the mature variation will be modeled for others, rather than the initial one, and the effects of individual learning will be culturally transmitted.

cision of which modeled disposition to imitate is subject to rational deliberation.

Directly biased transmission of commercial norms is unlikely to have a major effect on the evolution of commercial norms. An individual deciding, for example, what risk-of-loss practice to adopt would look to those risk-of-loss norms evidenced by the models of successful business people in his trade. He would then use trial and error or rational calculation to choose among them. These individual learning methods are likely to be costly and inaccurate for the same reasons they would be when used in conjunction with guided variation. Thus, directly biased transmission would act as a force to prevent the cultural transmission of obviously inefficient practices but would be unlikely to act as a force refining the efficiency of the evolution of commercial norms on the margin.

The second type of biased transmission is "frequency-dependent bias." As in all types of cultural transmission, when the cultural transmission of a behavioral disposition is subject to the force of frequency-dependent bias, individuals follow their genetic predisposition to acquire a behavior by imitating the behavior of models. But in frequency-dependent biased transmission, individuals adopt, consciously or not, the behavior that occurs most frequently in the model population. If selection were unbiased, the probability that individuals would acquire a trait by random imitation of models would be proportional to the frequency of the trait among models. In this sense, all selection is frequency-dependent. But Boyd and Richerson use "frequency-dependent bias" to describe acquisition of a trait when "naive individuals use the commonness of a variant among their models as an indirect measure of its merit. This will result in an increase in the probability of acquiring the more common variant *relative to unbiased transmission*."⁶¹ Returning again to the ping pong example, if an individual chooses a grip by imitating the one used by the largest number of his models, the transmission of the grip is subject to frequency-dependent bias. Boyd and Richerson argue that frequency-dependent bias in favor of acquiring the more frequent variant, or what they call "conformist transmission,"⁶² "is adaptive in spa-

⁶¹ Boyd and Richerson, at 206 (cited in note 23).

⁶² Frequency-dependent bias is "conformist" if the tendency to imitate the trait increases as the trait's frequency increases (id at 205). Boyd and Richerson also distinguish frequency-dependent bias from direct bias in which the frequency of a given trait is relevant in directly evaluating its attractiveness. For example, the attractiveness of choosing a career may depend on how many others have chosen it as well. The crucial difference between "frequency-dependent *direct* bias" and "frequency-dependent bias" is that "in frequency-dependent bias the naive individual does not directly evaluate the merit of the variants to which he is exposed; rather he simply uses the frequency of a variant among his models (not the population) as an indirect measure of its merit" (id at 207).

tially varying habitats because it provides a simple and generally applicable rule that increases the chance of acquiring locally adaptive behaviors.”⁶³

If the transmission of commercial norms is subject to frequency-dependent bias, individuals will acquire the variant of a particular practice that is exhibited by the greatest number of models. Assuming that natural selection, perhaps together with the effects of guided variation and directly biased transmission, acts over the course of cultural generations to move the mean efficiency of the practices of the population of models toward the optimum, the variants of practices that occur most frequently in a population of models will be likely to be more efficient than any other variants modeled. Frequency-dependent bias combines with natural selection acting on cultural transmission to provide an effective “shortcut” to individual learning. We have seen that directly biased transmission is not likely to be a significant force in the cultural transmission of commercial norms because it requires naive individuals to determine the relative effectiveness of the behaviors modeled in the population of models. In contrast, frequency-dependent bias requires naive individuals to determine only the frequency of a given behavior among a population of models, not its relative effectiveness. Thus, it is likely to be a significant force leading to the evolution of efficient commercial norms. Of course, even when the most frequent traits occurring in models are correlated with success, frequency-dependent bias is only as reliable as individuals’ estimates of which traits have the highest frequency. For example, it may be difficult to estimate the frequency of contracting and other commercial practices, especially for new market entrants with limited exposure to multiple contracting partners.⁶⁴

The third type of biased transmission is “indirect bias.” “Transmission is indirectly biased if naive individuals prefer some models over others based on . . . [one] trait and use such preferences to determine the attractiveness of that model for other characters (the indirectly biased traits).”⁶⁵

⁶³ Id at 223. Like natural selection and direct bias, the force of frequency-dependent bias increases as the variance of the trait in the population of models increases. Boyd and Richerson’s other central argument is that frequency-dependent bias can explain “the otherwise puzzling fact that humans engage in self-sacrificial cooperation in large groups [among genetically unrelated individuals]” (id at 227). They demonstrate how frequency-dependent bias can provide an explanation for “cultural group selection.”

⁶⁴ However, the contractual inexperience of new market entrants might be reduced through their use of law firms that have experience drafting contracts in the relevant industry. See generally Klausner, at 782–84, 786–89 (cited in note 5).

⁶⁵ Boyd and Richerson, at 243 (cited in note 23). This is an abbreviated version of Boyd and Richerson’s definition of indirectly biased transmission. Their precise definition of indirect bias distinguishes between “three classes of characters”: indicator traits, indirectly biased traits, and preference traits. *Indicator traits* are characters that “affect the importance of individuals as models. For example, suppose that naive individuals are more inclined to imitate successful individuals and that an individual’s success is measured by observing a

To return to the ping pong example, if the naive individual chooses among the possible grips by imitating the grip used by the most successful ping pong player, the transmission of the disposition is "indirectly biased." The model is chosen because he is successful at ping pong. The racquet grip is chosen because the model uses it. Like natural selection and direct bias, the strength of indirect bias depends on the amount of variation of the indirectly biased trait among models.⁶⁶ Unlike directly biased transmission, no individual learning occurs in indirectly biased transmission. The acquisition of a trait through indirectly biased transmission is neither the result of the naive individual using and testing the trait nor the result of his rational calculation of the trait's merits; rather, it reflects the naive individual's tendency to acquire traits simply because they are possessed by a model.

Boyd and Richerson explain that indirect bias has adaptive advantages over processes like guided variation and direct bias, both of which require individual learning:

Rather than attempt to determine which variants of each trait lead to success, an alternative approach is simply to imitate the successful. . . . If adopting a particular variant causes individuals to have higher fitness than the average individual, then it follows that the adaptive variant should occur in higher frequency among individuals with high fitness. Thus, it seems plausible that the strategy of imitating the successful, a form of indirect bias, might provide an alternative to direct bias, one that increases an individual's chances of acquiring locally adaptive cultural variants, is applicable in a wide range of environments, and does not require costly evaluation of the different variants. . . . Essentially, with indirect bias the individual uses the lives of others as experiments to evaluate different cultural variants. Because of this, indirect bias may be much cheaper than direct bias.⁶⁷

However, although indirect bias typically favors genetically adaptive cultural variations, it may also produce maladaptive cultural variants in much

particular character—number of cows, number of children, or number of publications. We call this the 'indicator trait.' " *Indirectly biased traits* are characters whose cultural transmission is affected by naive individuals' values of the indicator trait. "For example, individuals might tend to acquire the clothing styles, pronunciation, and beliefs about the world that characterize the most successful individuals among potential models." *Preference traits* provide the "criterion by which [naive individuals] determine the values of the indicator trait that are preferable. In the case of traits such as wealth, the criterion probably would be 'more is better,' but in other cases there might be some intermediate value that is admired. For example, contemporary Americans tend to admire people whose families are of intermediate size, not the childless or the prolific. We will call this trait the 'preference trait.' " Thus, according to Boyd and Richerson's definition, "transmission is indirectly biased if naive individuals prefer some models over others based on an indicator trait and use such preferences to determine the attractiveness of that model for other characters (the indirectly biased traits)" (id).

⁶⁶ Id at 254.

⁶⁷ Id at 258.

the same way sexual selection operates in genetic evolution to produce the phenomena known as genetic drift and the genetic runaway process. The genetic runaway process, for example, is thought to have produced maladaptive features like the tails on peacocks and birds of paradise. Evolutionists conjecture that perhaps exceptional tail length was once correlated with genetic fitness and therefore natural selection favored peahens predisposed to prefer males with tails of greater than average length. The female offspring of such parents were likely to be predisposed to favor exceptional tail length and the male offspring would have exceptionally long tails. As the average length of peacock tails grew, the peahen's predisposition to seek out mates with tails of above average length led to even longer tails. Once the tail length exceeded the optimally adaptive length for genetic fitness, natural selection might have selected against larger tails. But by this point, the entire peahen population was predisposed to mate with peacocks with longer than average tails. The force of sexual selection was more powerful than that of natural selection, resulting in a genetically maladaptive tail.⁶⁸

This same process can take place in cultural evolution. Boyd and Richerson illustrate with the cultural practice, on the Micronesian island of Pohnape, of associating a man's prestige with the size of yams he contributes to periodic feasts. The practice cannot be rationalized as encouraging large and significant contributions to the feasts because other important foods necessary for the feast are not correlated with prestige. It seems clear that the practice of growing these yams is genetically maladaptive:

[T]hese yams are truly huge; they sometimes exceed 9 feet in length and 3 feet in diameter, and up to twelve men must carry them. The yams used by families in their everyday diet are much smaller. Individual farmers go to great effort to raise large yams. . . . "[T]he labor expended in growing prize yams is far greater than would be necessary to produce the same quantity of foodstuff from a larger number of smaller yams of the same variety." . . . [And] "not infrequently families go hungry at home when they have large yams in their farms ready for harvest."⁶⁹

Boyd and Richerson show how this maladaptive process might have resulted from a cultural runaway process:

⁶⁸ Whether the genetic runaway process leads to a stable, maladaptive equilibrium or eventually corrects itself automatically is the subject of current debate. For example, see Andrew Pomiankowski, *The Evolution of Female Mate Preferences for Male Genetic Quality*, Oxford Surveys Evolutionary Biology 5, at 136–84 (1988); Andrew Pomiankowski, Yho Iwasa, and Sean Nee, *The Evolution of Costly Mate Preferences. I. Fisher and Biased Mutation*, 45 J Evolution 1422–30 (1991); and Yho Iwasa and Andrew Pomiankowski, *Continual Change in Mate Preferences*, 377 Nature 420–22 (1995).

⁶⁹ Boyd and Richerson, at 269 (cited in note 23) (quoting William Bascom, *Pohnape Prestige Economy*, 4 Sw J Anthropology 211–21 [1948]).

Suppose that at some earlier time Ponapaens did not devote any special effort to growing large yams. It seems reasonable that under such conditions more skillful or industrious farmers might have tended to bring larger yams to feasts, and thus that the size of a man's yams would provide a useful indicator trait for all kinds of skills and beliefs associated with farming. By imitating the people who grew large yams, naive individuals could increase the chance that they would acquire the cultural variants they needed to be successful farmers. Once the size of yams became an indicator trait, beliefs or practices that lead to larger yams would increase. Individuals with a stronger tendency to admire large yams will be more likely to acquire these beliefs. This will cause the two traits to be correlated—and therefore, when the practices that lead to larger yams increase, so too will the admiration for the ability to grow large yams.⁷⁰

Indirectly biased transmission might also be a strong evolutionary force in the cultural inheritance of commercial practices. For example, suppose that an individual starting out in the automobile manufacturing business believes that profitability in the business can be measured by the number of cars sold per year, and that the greater that number is, the greater the company's profitability is likely to be. Such an individual would then use existing car manufacturers as his set of models and perhaps identify the one model with the greatest number of cars sold per year. Then the individual might investigate, for example, whether that manufacturer provides its dealers with the option of ordering particular model cars with specific options or instead requires them to take a standard array of models with various options to be delivered at fixed dates throughout the year. If the individual adopts the model manufacturer's practice of, for example, requiring dealers to accept standard shipment packages and not accommodating custom orders, solely because it is that manufacturer's practice, that practice would be described as an indirectly biased trait of the model manufacturer that the naive individual acquired through indirectly biased transmission. If the criterion for selecting among models accurately predicts profitability, then

⁷⁰ *Id.* at 269–70. Notice that indirect bias and the corresponding cultural runaway process is not strictly analogous to indirect bias in genetic transmission of phenotypes and the corresponding genetic runaway process. The peahen genetic runaway process, for example, requires that there is an initial population of peahens with genetic dispositions to favor greater than average tail length in their mates and that such tail length is initially correlated with fitness. The Ponapaean runaway process, however, requires that there be an initial population of farmers who use, consciously or not, yam size as a criterion of success in selecting models. Thus, while the genetic runaway process is based entirely on genetic predispositions, and requires the postulation only of peahen predispositions for mate selection, the cultural runaway process, like all processes of cultural transmission, requires that individuals be genetically predisposed to form beliefs, consciously or not, that guide them in selecting a set of models from which they will acquire behavioral dispositions. Indirectly biased transmission then requires that individuals imitate some of the behaviors of their models other than those that formed the basis for the naive individuals' selection of them as models.

indirectly biased transmission may be a significant force increasing the efficient evolution of commercial norms.

In general, since most practices of successful models are likely to be more efficient than other practices, the strategy of imitating the practices of a very successful model may prove effective. However, unlike frequency-dependent bias, there is no assurance that this practice tends to work for all successful automobile manufacturers. It is possible that the trait is profit-maximizing only for the model manufacturer, but it would be inefficient for the naive individual. We might think of such a trait as "idiosyncratic" or "model specific." For example, perhaps a custom-order procedure is not cost-effective for large, established manufacturers, but accommodating custom orders would be cost-effective for a small, start-up manufacturer because it would enhance sales to reluctant consumers unfamiliar with the new manufacturer. Moreover, there is no assurance that the model's practice contributes even to the model's success. While it is unlikely that the majority of successful models would share a practice that is less efficient than other modeled practices, it would be less uncommon to find practices peculiar to a single model that are maladaptive even for that model. Although "nothing succeeds like success," not everything about a successful model is itself successful.

Despite the dangers inherent in indirectly biased transmission, it might well be a strong evolutionary force in the cultural transmission of commercial norms. But even if it is, it might also lead on some occasions to maladaptive runaway processes analogous to the peacock's tail and the Ponapaens' yam-growing practices. For example, imagine the automobile industry as a whole is in its infancy, and that instead of measuring a potential model's success by the number of cars its sells, naive individuals equate the duration of a company's engine warranty with its profitability. Suppose, as might seem plausible, that companies making engines that don't last long will be unable to offer long-lasting warranties at prices competitive with the price of the equivalent length warranty provided by other companies that make a more long-lasting engine. In that case, length of warranty might initially provide a reasonable indicator of a company's current or likely success. Naive companies therefore might use this, consciously or not, as a criterion of success in selecting their set of models. Through indirectly biased transmission, new car companies therefore begin to imitate the other business practices of the car company that offers the greater than average length engine warranty. For example, they might deal with their suppliers, employees, or dealers (as above) on the same terms that the model car company deals with its suppliers and employees. There is no assurance, however, that the practice of providing greater than average length engine war-

warranties is, or will remain, correlated with success in the automobile industry.

Nonetheless, because start-up companies acquire the indirectly biased traits of the model, like the model's practices in dealing with its suppliers, employees, and dealers, the start-up companies might also acquire, through indirect bias, the model's preference for offering greater than average length engine warranties. If we assume that the other indirectly biased traits of the model are correlated with success, those start-up companies that acquire those indirectly biased traits are, all else being equal, more likely to succeed than those that do not. The frequency of the preference for offering greater than average length warranties among the new generation of successful automobile companies will therefore be greater than in the previous generation. It is possible that successive generations of start-up and successful companies will continue to identify successful, model companies with the length of their warranties and acquire the other indirectly biased traits of the model companies as well. As a result, the population of successful automobile companies may come almost universally to consist in companies that aspire to offer greater than average length warranty coverage. Even if the preference for and practice of offering such warranties initially was profit-maximizing for quality car companies, once the length of warranties passes a certain threshold, such warranties may come to be no longer cost-effective for the company to offer and consumers to buy. Nonetheless, if nearly all companies have internalized the norm that greater than average length warranties are associated with profitability, the practice of competing by attempting to offer warranties that exceed the length of the current industry average may continue. Even if the car companies price the warranties efficiently, they may be requiring consumers to overpurchase warranty protection in order to buy a car.

To be sure, as in all cases of runaway processes, the counterbalancing forces of natural selection, guided variation, and direct bias might arrest, if not reverse, this process. The most obvious corrective in this case is the market itself, which, in turn, results in natural selection acting on cultural transmission favoring shorter warranties. If consumers are better-off with less warranty protection, some consumers who otherwise could have afforded a car will not be purchasing cars, and others will be purchasing lesser quality cars than they would otherwise purchase. Thus, demand for cars will be inefficiently low in a market in which cars can be purchased only with lengthy warranties (or perhaps with the option of no warranty at all). As both consumers and manufacturers come to realize this fact, the manufacturers have a profit incentive to offer the shorter length warranty to exploit suppressed demand. If competition starts favoring companies offer-

ing shorter warranties, and such companies come into existence, then start-up companies may begin to identify successful models with those that offer shorter warranties and the cultural transmission process will begin to reverse itself away from lengthy warranties.

However, if the practice of offering lengthy warranties continues to be regarded among successful car manufacturers as an important trait of a successful company, the practice may persist in the face of suppressed demand. Ultimately, the process is likely to be at least arrested by the force of the market, but the end-state equilibrium of this process may still be one in which automobile manufacturers only offer warranties that are longer than would be optimal. The value of offering lengthy warranties would be ingrained in almost all successful automobile manufacturers and might well be resistant to market correction. This is likely to be the case if virtually all manufacturers share the strong preference for lengthy warranties because there will be little effective competition through which the market process could correct the practice. In addition, because indirectly biased transmission is possible only when individuals are predisposed at least initially to favor social learning over individual learning, manufacturers will often be disinclined to engage in, or attend to the results of, individual learning. Thus, guided variation and direct bias may take some time before they add to the force of natural selection to arrest, if not correct, the runaway warranty process.

C. The Efficient Evolution of Commercial Norms

Natural selection, guided variation, and biased transmission together constitute the forces that transform the system of cultural transmission into an evolutionary system of cultural inheritance.⁷¹ They explain why a system of cultural inheritance would typically produce genetically adaptive behavioral dispositions that could not be produced as effectively by direct genetic transmission of behavioral dispositions. Dual inheritance theory reconciles

⁷¹ Among the three versions of biased transmission, directly biased transmission is likely to lead to the most adaptive dispositions, but it is also likely to be the most costly. Indirect bias saves the costs of learning attending directly biased transmission, but it is more error-prone because its success depends on whether (1) the behavioral disposition of the model is correlated with the model's success and (2) the disposition will be correlated with success in the naive individual as well. Frequency-dependent bias strikes an apparently reasonable compromise between costly experimentation and risky sampling. But unlike indirect bias, there is no directly observed correlation between the behavioral trait and success. Thus, its effectiveness will depend on whether some force, like guided variation or natural selection, causes the majority behavioral variation to be adaptive.

genetic evolution with a robust system of cultural evolution that enhances overall genetic fitness. Nonetheless, the cultural norms that result from the various forces acting on cultural transmission are likely to be far from perfectly adaptive. First, in order for the system of cultural transmission to result from genetic evolution, the norms it produces need only result in behavioral dispositions that are on average more adaptive than the dispositions individuals would acquire exclusively through individual learning. Given that individual learning is relatively poor as an exclusive method of acquiring behavioral dispositions, genetic evolution could produce a system of cultural inheritance even if cultural transmission produced norms that were only moderately adaptive on average. Second, as in the case of indirect bias, cultural evolution has autonomous dynamics that can lead to genetically maladaptive cultural variations as well. For these reasons, cultural norms are likely to fall far short of the optimum. This prediction is further confirmed by empirical data. There is considerable evidence of the existence of "cultural inertia," the cultural analogue to phylogenetic inertia.⁷² As a result of cultural inertia, "cultural traditions . . . [do] not change instantly in response to changing environmental conditions. Rather, history . . . explain[s] a significant fraction of present behavior and a common past . . . cause[s] significant similarities between societies."⁷³

The analysis of the acquisition of commercial practices demonstrates that they are likely to be culturally transmitted because social learning is likely to be more cost-effective than individual learning as a general strategy for acquiring them. Further, the cultural transmission of these practices is almost certain to be evolutionary in character, producing norms that increase in efficiency from one cultural generation to the next. Yet, while these norms will generally increase in efficiency over time, there is no reason to believe they will ever, much less always, be optimal. First, the evolution of

⁷² Boyd and Richerson, at 171 (cited in note 23). Boyd and Richerson rely on social scientific evidence to demonstrate "that many important cultural traits exhibit substantial cultural inertia in the face of substantial environmental change" (id).

⁷³ Id at 56. The existence of cultural inertia supports Boyd and Richerson's argument that cultural inheritance is a significant component in human evolution. They note that "[i]f the forces of [direct] bias and guided variation are strong, then there will be little heritable cultural variation and therefore cultural transmission will be of little importance." In order to support their contention that cultural inheritance is very important in explaining human behavior, they point first, as we have seen, to the literature on cognitive error that provides evidence "that native human decision-making inclinations and abilities, unaided by culturally inherited problem-solving techniques, are quite modest." Boyd and Richerson, at 171 (cited in note 23). Their argument is that evidence of cultural inertia is "hard to reconcile with the action of strong direct bias and guided variation" (id). The fact that changes in human behavior lag considerably behind changes in environment is difficult to explain without positing strong forces of cultural inheritance.

commercial norms will be subject to cultural inertia. Like cultural norms generally, they will fail to respond promptly and thus optimally to changed environmental conditions.⁷⁴ Second, even if all the forces acting on the cultural inheritance of these norms move the mean variant of commercial practices toward the optimum, the only condition that must be satisfied in order for natural selection acting on genetic evolution to favor such a system is that the system produce norms whose average efficiency exceeds the average efficiency of norms that would result if individuals engaged exclusively in individual learning. The standard set by a comparison with the latter is low. Individual learning applied across the board to all acquisitions of commercial practices would be ineffectual. Moreover, the forces acting on the transmission of commercial norms will be expected sometimes to lead to quite inefficient practices that are resistant to correction by either natural selection acting through the market or individual learning as applied in guided variation or directly biased transmission.

In sum, considerable faith can be placed in the claim that the average efficiency of the practices identified by commercial norms will increase over time. In this sense, the analysis provided by the theory of cultural evolution confirms the proposition that commercial norms will evolve efficiently. But this analysis provides no basis for inferring that commercial practices will be even nearly optimal on average. The only inference that can be made from the claim that commercial norms evolve efficiently is that commercial norms on average will identify practices that are sufficiently wealth-maximizing that merchants will be better-off on average following them than relying on individual learning to select all of their commercial practices. Given the high average costs of individual learning, commercial norms could evolve efficiently even though they identify quite inefficient practices. Indeed, the theory of cultural evolution suggests that

⁷⁴ The phenomenon of "evolutionary lag" has been integrated into analyses of the evolution of commercial law, but those analyses fail to take into account the phenomenon of evolutionary lag, or cultural inertia, in nonlegal practices. For example, Goetz and Scott argue that because state-supplied standard rules of contract "evolve slowly, official rules necessarily lag behind the emergence of new conditions, resulting in increasingly ill-fitting formulations. By implying a variety of terms derived from the general commercial environment, the state expands the supply of widely useful, standard forms of agreement. . . . These 'customary' formulations serve as general standards for particular sets of transactions, *thus reducing the error caused by reliance on ill-fitting official formulations*" (Goetz and Scott, at 276-77 [cited in note 5] [emphasis added]). Their claim that reliance on informal practices will mitigate the inefficiency caused by evolutionary lag in the development of state-supplied contract terms assumes that the evolution of commercial customs is not itself subject to evolutionary lag. According to the theory of cultural evolution, this assumption is false. Thus, Goetz and Scott's strategy of incorporating informal practices as contract terms, apart from its other merits, is a dubious solution to the problem of evolutionary lag in legal rules.

there will be some, if only a minority, of commercial practices that are not merely suboptimal but far more inefficient than the alternative practices that could have been produced easily by individual learning.

III. OPTIMALITY AND REALITY IN DESIGNING COMMERCIAL LAW

The cultural evolution analysis of commercial norms is significant in its implications for legal design strategies. The dominant approach to legal design is provided by the incorporation strategy, yet lawmakers and scholars regularly attempt to improve on commercial norms by engaging in extended reasoning and experimentation. The standard economic defense of the incorporation strategy, however, presumes that there is little room for improvement, and so little point in such attempts.⁷⁵ The cultural evolution analysis of commercial norms rebuts that presumption.

The economic defense of the incorporation strategy can be presented as follows: commercial actors who do not adopt efficient practices will be competed out of business by those who do. Therefore, once a common practice develops, contract law should give legal effect to that practice. Doing so will save contracting expenses for the majority of contractors, for whom the common practice is probably optimal, and will impose on the minority of contractors, who require different terms, the lesser aggregate amount of contracting expenses. Assuming that the expenses of contracting for individuals in the majority and the minority are the same on average, majoritarian default rules minimize the deadweight loss caused by contracting expenses.⁷⁶

The key premise of this defense of the incorporation strategy is the claim that common practices of commercial actors are probably optimal. The argument I have presented challenges this premise. Clearly, most commercial

⁷⁵ Claims for the efficiency of commercial norms are, however, typically made alongside the weaker claim for the comparative superiority of commercial norms to legal alternatives. For example, in the tort context, Richard Epstein argues that "[w]hen custom is used, the courts can, in effect, function in a *reactive* fashion, relying on the practices formulated by those who have powerful incentives to get things right because of the daily peril in which they labor. . . . The effort to second-guess what a business has done requires a court to look with deep suspicion on the one source of information with a built-in tendency to reliability and to substitute its, or a jury's judgment of what is prudent and what is not for the judgment of those in the field, even though both judge and jury have inferior knowledge and a weaker incentive to get things right" (*The Path to the T. J. Hooper: The Theory and History of Custom in the Law of Tort*, 21 J Legal Stud 1, 24 [1992]).

⁷⁶ It is possible, however, that an inefficient, minoritarian rule could result in an inefficient pooling equilibrium. In that case, because the gains to the majority of contracting out of that rule are exceeded by the transaction costs, the deadweight loss consists in the suboptimal contract terms in the majority's contracts, rather than the unnecessary transaction costs typically associated with a minoritarian default rule. See Barry Adler, *The Questionable Ascent of Hadley v Baxendale* (unpublished manuscript, 1997).

actors intend their practices to maximize profit. But the claim that actors seek to maximize profit cannot suffice to demonstrate that their practices will be optimal. A rational, profit-maximizing merchant will invest in the development of more efficient commercial practices until the marginal cost of such investments equals the marginal gain in expected increased efficiency. Merchants therefore will cease investments in developing more efficient commercial practices long before they develop optimal practices. Further increases in efficiency will almost invariably be available, although the cost to individual merchants of discovering how to achieve those increases will outweigh their benefits. In essence, this is the lesson of the theory of cultural evolution. Given that individual learning is generally less cost-effective than social learning, merchants who rely on social learning will be more likely to succeed. But in order for social learning to be generally more cost-effective than individual learning, the practices they recommend need only be more cost-effective for individual merchants to adopt than the alternative of adopting commercial practices by investing in individual learning. Cost-effective investments in acquiring commercial practices are unlikely to lead to optimal commercial practices. Optimality is a luxury that merchants cannot afford.

Of course, a demonstration of the suboptimality of commercial practices does not by itself prove that alternative legal design strategies can effectively improve on the default rules selected by the incorporation strategy. At best, establishing that the reality of commercial practice is less than the theoretical ideal provides a necessary, but not sufficient, condition for seeking alternative design strategies. To argue otherwise is to risk "committing the Pigouvian fallacy of comparing the real with the ideal."⁷⁷ Thus, whether the shortcomings of the incorporation strategy can be improved on by alternative legal design strategies will depend not only on whether commercial practice is likely to be optimal but also on whether more efficient alternative legal rules can be cost-effectively designed and implemented. A demonstration that designed legal rules can be more efficient than evolved commercial laws cannot suffice to demonstrate that a practical institutional system can be created to insure the production and implementation of efficient default rules by alternative design strategies. Notwithstanding the fact that there are good reasons to believe that legal design can *in principle* produce more efficient rules than the evolutionary process producing commer-

⁷⁷ Robert E. Scott, at 336 (cited in note 44). The distinction between the real and the ideal also emphasizes the importance of taking transition costs into account. Even if a theoretically possible regime is superior to an existing one, given the reality of expected transition costs, it may be that the current system is optimal in the sense that no superior alternative is cost-effective given transition costs.

cial practice,⁷⁸ public choice,⁷⁹ psychological,⁸⁰ and informational problems present potentially serious obstacles to creating a system in which the content of commercial law is sometimes given by design, rather than by evolution. Moreover, the same forces affecting the evolution of commercial norms will affect the evolution of norms governing any potential process that attempts to improve on commercial norms. Although these norms are not themselves commercial norms, they may also impede attempts to improve on commercial practice. To make the positive case for supplementing the incorporation strategy with alternative legal design strategies, more must be done than demonstrating that these practices leave room for improvement. By doing the latter, however, I hope to have provided reason to undertake the former.

⁷⁸ "As economically oriented contractualists are apt to put it, 'government,' in the person of judges, legislators, or regulators, is only infrequently likely to do better than [contractual partners] on either the incentive or the information dimension. Government regulation is therefore quite unlikely to make [the contracting parties'] contract better for [the contracting parties]. Government's role is to produce public goods and deal with negative externalities. Regulation of contractual relationships is therefore justified only when they have adverse effects on third parties" (Robert C. Clark, *Contracts, Elites, and Traditions in the Making of Corporate Law*, 89 Colum L Rev 1703, 1714-15 [1989]). Along the same lines, James White argues that because business practice often ignores or contradicts legal rules, "lawmakers must be more willing to make the law conform to the sensible practices of business and to accept the fact that the law is incapable of changing those practices except at great cost" (James J. White, *Contract Law in Modern Commercial Transactions, an Artifact of Twentieth Century Business Life*, 22 Washburn L J 1 [1982]). But see Posner (cited in note 5) (arguing that the state can and has effectively identified and transformed inefficient social norms).

⁷⁹ See, for example, Alan Schwartz and Robert E. Scott, *The Political Economy of Private Legislatures*, 143 U Pa L Rev 595 (1995) (arguing that the American Law Institute and the National Conference of Commissioners on Uniform State Law are subject to standard public choice problems that lead to bias in the substance and form of legal rules they promulgate).

⁸⁰ It is possible that substituting a more efficient default rule for a less efficient one that is based on common commercial practice might be futile. Alan Schwartz argues that default rules that seek to change common practice should be thought of as "problem-solving" defaults. He claims they "must solve a problem that a reasonable portion of contractors will face in a way that is acceptable to those contractors. A rule that fails the former aspect of this test is wasted effort; a rule that fails the latter aspect will not survive in the marketplace" (Alan Schwartz, *The Default Rule Paradigm and the Limits of Contract Law*, 390 S Cal Interdisciplinary L J 389, 392 [1993]). Thus, even if lawmakers replace a default rule based on commercial practice with an improved default rule, merchants might be sufficiently deferential to the norm that they will contract around the more efficient default rule to use the less efficient one recommended by the norm. Unless the psychological disposition to follow the norm is overcome, commercial parties might continue their less efficient practices, opting out of the alternative default rule whose efficiency they will fail to appreciate. See also, Alan Schwartz, *Relational Contracts in the Courts: An Analysis of Incomplete Agreements and Judicial Strategies*, 21 J Legal Stud 271, 277 (1992) ("courts that pursue transcendent fairness will sometimes supply parties with inefficient terms. This often will be wasted effort because typical parties have an incentive to contract out"). But Schwartz also notes that "[t]he effort would not be wasted if fair terms were mandatory" (Schwartz, *Relational Contracts*, at 277 n11).

IV. CONCLUSION

If the incorporation strategy can be relied on to produce nearly optimal commercial rules, there is little point in debating even the relative merits of alternative rules, much less the feasibility of creating legal institutions that will effectively implement a system for designing those alternatives. Because innovation is costly, the wisdom of seeking viable alternative legal design strategies to supplement the incorporation strategy depends entirely on demonstrating that common commercial practice on average will leave considerable room for improvement: if the incorporation strategy ain't broke, don't fix it. In this article, I have argued that although the incorporation strategy is the best available method for creating a complete system of contract default rules, the practices it incorporates are likely nonetheless to be significantly suboptimal. This suggests that if alternative, cost-effective methods of legal design can be devised and implemented to improve on individual commercial practices, significant efficiency gains might be achieved. Although legal design is fraught with problems, the analysis in this article suggests that the search for solutions to those problems may well be worth the candle.