Introduction: Innovation in Legal Thinking

This book introduces principles and methods of economic analysis of law, also known as "law and economics." Principles are the fundamental conceptions, assumptions, or beliefs that are common to those who employ economic analysis of law. Methods are the tools, techniques, or tricks they use. The aggregate of all legal thinkers could be imagined as a massive workshop. All human knowledge and events are the inputs that the workshop of jurists uses. The outputs include judicial decisions, statutes, proposals for changes of rules, and interpretations. To a novice, this workshop seems cavernous and daunting. This book is a guide to that area of the workshop where economic analysis of law occurs and introduces the use of its tools. The principles section shows the common understandings, assumptions, and goals, what problems economic analysis of law engages. The methods section explains its main tools.

For students who are uncomfortable trying to learn the universe of legal thinking, understanding the direction of this book may be daunting. Let us start our travel through economic analysis of law with a simplifying metaphor. Rather than jurists, let us act as managers of an apartment building. How should we act in our managerial capacity? If this question is too abstract, suppose we have reached a concrete problem. Our building's heating system has failed. What should we do?

A. Proposals, Consequences, and Ideals

The building manager must react to the problem. Study the manager's decision by separating three components: proposals, consequences, and ideals. Proposals are the alternative plans for immediate action. The manager proceeds to predict the consequences to which each

choice will lead. Finally, the manager compares the consequences with his long-term, relatively constant ideals. This reveals which choice promotes best the manager's ideals. A novice manager may consider two proposals, fixing the heating system or replacing it with an identical unit. A seasoned manager may develop a third alternative proposal and consider replacing the unit with one that uses a different source of energy.

The adoption of each proposal produces specific consequences. The building manager's alternative proposals may produce different immediate expenditures, different maintenance costs, different resulting levels of humidity, different ranges of temperature fluctuation, and a different sense of fulfilling civic obligations about energy conservation or avoidance of pollution. Consequences include fines for violating fire regulations and the depletion of the building's funds that would preclude future repairs.

Finally, the manager compares the consequences of each proposal with his ideals. The manager's ideals may be to satisfy the residents, to attract residents who would pay greater rents, or to minimize expenses at the cost of some dissatisfaction. Ideals tend to be independent of the context in which the problem arose; they tend to be the constant, long-term targets that guide action. The manager can finally choose the proposal that promotes his ideals best.

In the sphere of legal thinking, proposals are the alternative interpretations or rules. Each proposal will lead to different consequences. The legal system will choose the best for its ideals. The analogy to the building manager tries to make this juxtaposition more concrete.

This book approaches legal thinking on the basis of separating proposals, consequences, and ideals. Individual jurists choose proposals based on their consequences to promote the ideals of the legal system. The proposals may be different statutory provisions or different interpretations. The consequences are the resulting actions and reactions of individuals, the outcomes to which each proposal would lead. The proposal that leads to a consequence that furthers most the ideals is the preferred proposal.

Economic analysis of law helps develop alternative legal proposals, helps ascertain their consequences, and assesses which consequences best advance the established ideals. From one perspective, economic analysis of law does not establish ideals. Ideals are selected by social mechanisms outside economic analysis of law. A simplistic explanation may state that ideals are set through the political system and, in

democratic systems, that ideals are the product of majority vote. Economic analysis of law applies and develops principles, approaches, methods, or tools that seek to make each task as objective and scientific as possible. Those that have reached a sufficient level of technique comprise the second part of this book, which seeks to explain how to use those tools, Chapters 7–12. The first part of the book, Chapters 1–6, discusses the principles that drive the application of economic analysis of law.

B. Toward Scientific Analysis of Law

To its users, economic analysis of law is the greatest innovation in legal thinking at least since the code of Hammurabi – since the very idea of having laws. With modern "law and economics" the law becomes a formal, scientific, often quantifiable field of study. The importance of this development cannot be understated. For thousands of years, fundamental questions about how to organize society were imponderables. Is democracy the best political system? Does the death penalty deter? Should abortion be banned? May potentially addictive drugs be taken for entertainment? Economic analysis of law may not answer all such questions. Nevertheless, law and economics does offer hope of producing a method for answering them. Economic analysis has already answered numerous others. For example, economic analysis persuasively shows that the tort system is desirable, or that the prohibition of insider trading is desirable.

Law and economics presents a methodology that its users believe overcomes the limitations of less quantitative approaches to law, mainly those associated with moral philosophy or political theory. The scientific justification and optimization of rules removes those rules from the set of contested rules that do not have a known optimal shape.

Some claim that economic analysis of law is itself a moral philosophy and that it resembles "rule utilitarianism" or "preference utilitarianism." This categorization, however, is partly misleading. The deployment of the methods used by economic analysis of law does not depend on acceptance of a utilitarian moral philosophy. Moreover, economic analysis of law is not a methodological slave to any form of utilitarianism. Some economically minded jurists feel they can restate moral philosophies in economic terms and apply the tools of economic analysis of law to fulfill the ideals of each moral philosophy. From this perspective, the tools of economic analysis of law are agnostic. They

can be used by communists, capitalists, or stoics. Each user of its tools may have a different conception of the ideal toward which the tools of economic analysis of law are used.

The first few chapters discuss the principles of economic analysis of law. This book starts with the juxtaposition of what many consider the goal of economic analysis of law, social welfare, and moral philosophy.

The chapters that discuss more technical matters, from mathematical modeling to statistics, make heavy use of graphics. Law students routinely seek to avoid algebra. This book uses graphics as visual aides to present the technical knowledge without relying on algebra.

General books on law and economics are not rare, but the emphasis on economic methods rather than legal subjects and the heavy use of examples and illustrations may set this one apart. Several other authors follow the example of the leaders, the classic textbook of the renowned scholars Robert Cooter and Thomas Ulen. Their book introduces economic analysis of law by rigorously establishing the economic analysis that supports the principal areas of private law. An easier economic approach is followed with a highly approachable style by Peter Grossman and Daniel Cole. The indefatigable and prolific Richard Posner reduces the coverage of technical economics and covers a broader spectrum of law. Barnes and Stout produce a casebook version of economic analysis. Seidenfeld follows the rigorous economic method while reducing the span of law, as does Miceli.

All these books and likely several omitted ones belong in every scholar's library. They may give some of their readers, an appearance of a fixed pairing of a method of economic analysis with some area of law. That correspondence is artificial and limiting. Legal subjects change. New economic methods are born. Economic analysis of law is evolving. The appearance that a single method of economic analysis applies best to specific areas of law gives a false impression of solidity that may stifle creative argumentation. As teachers, most law professors try to encourage novel arguments and try to elicit creative legal thinking even against some student reluctance. This book tries to apply each economic method to several legal areas.

Books on law and economics also seem very difficult. Even law professors who specialize in law and economics have trouble decoding passages in those books. Yet, the difficulty does not lie in incomprehensible mathematics or dense text. Much of the difficulty is in the latent assumptions that underlie the economic approach to law and

in false impressions about it. In response, this book starts from those fundamental assumptions, the principles of law and economics. Those chapters are intended for readers who find that law and economics has a partly alien character in legal discourse. Chapter 1 seems to engage formal logic but it is crucial for adapting the scientific method to law. The discussion of normative reasoning may be quite important for readers who approach law from the sciences as well as for readers who are apprehensive about the quantification of law. The former need to realize that normative reasoning is very different from the positive reasoning of science. The latter need to take comfort that normative reasoning is an inseparable component of legal thought.

Those who find moral reasoning intuitive cannot approach economic analysis without the juxtaposition of moral philosophy and economic analysis of law, as discussed in Chapter 2. Many may approach law from political science. Chapter 3 connects law to the political process. Chapter 4 engages redistribution because law is intimately related to the distribution of wealth. The related positions of law and economics are confusing because of genuine disagreement among scholars. The chapter stresses the shared common ground, which makes the disagreements seem marginal.

The leading and most radical methodological innovation of economic analysis of law is the "Coase theorem," or, more properly, the presumption of irrelevance of legal change that Coase's analysis implies, also known as the invariance principle. The theorem is very intuitive, almost self-evident, to those who can build the abstract world it assumes. Chapters 5 and 6 engage Coase's idea as the formidable structure that it is. The remaining chapters are about methods.

Economic analysis of law receives additional power from the continuity, volume, and rigor of economic research. Yet, many lawyers find the settings analyzed to be simplistic and the articles of economics journals to be incomprehensible, full of jargon and obscure conventions. Chapter 7 introduces the language of economic journals with the hope of increasing access to that research. It also includes a discussion of the method of optimization by using derivatives and the method of differential equations.

Chapters 8 and 9 bring a neglected topic into focus by exploring how probability theory informs legal analysis. Although the topic dates from the Renaissance, it is underutilized in law.

Most of lawyers' activity is related to business, even outside the specialties that are explicitly about business and finance. Chapter 10

introduces some financial innovations related to valuation and Chapter 11 discusses option pricing and derivatives. The consequences for policy are legion.

No method of analysis that seeks practical application can avoid statistics as the scientific method of observation. Chapter 13 introduces statistical methods after Chapter 12 provides guidance on using spreadsheet programs for simple applications.

Chapter 14 concludes the book with a look at methodologies that are still nascent in law, such as fractals, evolutionary theory, and cellular automata. These new methods hold some promise but have not found as much application in law as they might. In light of the continuous search for methodological improvements, they may be instructive examples of qualified success.

Too many topics seem to pass in a rush. That is the glory of the topic. Law and economics is a young method. The scholar who understands it does not simply obtain a tool. The method also transports the scholar to the edge of vast unexplored territory that beckons.

For the reader who seeks more guidance on how the topics of this book correspond to those of scientific and economic analysis more broadly, Table 0.1 tracks the correspondence of major historical scientific ideas to chapters and subchapters of this book. From the set of recent innovations, Table 0.1 reports only those rewarded with Nobel prizes. This set is certainly too small, but the result should reveal how vast the undertaking of bringing legal thinking closer to science is.

A note about style may help. Although this book aspires to the international market, it uses the spelling conventions of legal publications in the United States. The spelling differences are minor and can be summarized in the phrase "labor to favor colorful neighbors" (rather than "labor to favor colorful neighbours"). Because this book is likely to be used outside the U.S. legal academy, its citation format is that of general science. The principal differences regard the location of the number of volumes, the year of publication, and the page. This book uses a pattern where the title of the book or journal appears italicized, followed by the number of the volume – not the page – then the year and, after a colon, the pages. For example, a reference to page 55 of a journal article starting on page 44 with the title "Title" authored by "Author" and published in volume 99 (year 2000) of the publication "Obscure Law Journal" would appear as Author, "Title," *Obscure Law Journal* 99 (2000):55. The pattern of legal publications in the US would tend to be *Author, Title*, 99 OBSCURE L.J. 44, 55 (2000).

Table 0.1. *The correspondence of chapters to major scientific contributions*

Contribution	Contributor	Chapter
Optimization by solving the derivative	Newton, Leibnitz	"Modeling Negligence Law: Optimization" in Chapter 7
Differential equations	Newton, Leibnitz	"Modeling the End of Affirmative Action: Differential Equations" in Chapter 7
Probability theory	Pascal, Fermat	Chapters 8 and 9
Normal distribution	Gauss et al.	"The Normal Distribution" in Chapter 9
Least-squares regression	Gauss, Legendre	Chapter 13
Vote cycling (Nobel 1972)	Arrow	Segment on voting in Chapter 3
Public choice (Nobel 1986)	Tullock, Buchanan	Segments on voting in and public choice in Chapter 3
Capital asset pricing model (Nobel 1990)	Sharpe, Miller, Markowitz, et al.	Chapter 10
Coasean irrelevance (Nobel 1991)	Coase, Calabresi	Chapters 5 and 6
Ubiquity of incentives (Nobel 1992)	Becker	Fundamental assumption throughout, discussed in "Ubiquitous Importance of Incentives" of Chapter 2
Game theory (Nobel 1994)	Harsanyi, Selten, Nash et al.	Chapter 3
Optimal tax (Nobel 1996)	Mirrlees, Vickrey	Discussion of redistribution exclusively by taxation in Chapter 4
Call option valuation (Nobel 1997)	Black, Merton, Scholes	Chapter 11
Welfare economics (Nobel 1998)	Sen	Discussions of social welfare in Chapter 2 and distribution of wealth in Chapter 4
Two-step regression with selection (Nobel 2000)	Heckman	"Observations That Are Filtered by a Threshold" in Chapter 13
Bounded rationality (Nobel 2002)	Kahneman, Smith	"Bounded Rationality" in Chapter 3

C. BIBLIOGRAPHICAL NOTE

Every chapter ends with a bibliographical note that identifies further reading. An introductory chapter like this one can point out an omission. This book does not cover microeconomic theory and

microeconomic equilibrium because their normative use is specialized, arising mostly in antitrust law. Readers who are convinced that market forces tend to be desirable and who may be frustrated over the absence of a chapter on microeconomic equilibrium might be comforted by the identification of destructive economic dynamics by Jack Hirshleifer, *The Dark Side of the Force: Economic Foundations of Conflict Theory* (New York: Cambridge University Press, 2001).

Part 1: Principles

1. From Formal Logic to Normative Reasoning

This book is about normative reasoning. If the science of logic could perform legal normative reasoning, then this book would be about the principles and methods of logic, and it might have contained a chapter akin to this one showing how economic analysis could help normative reasoning but in a way different than syllogistic logic. This chapter shows why logic cannot perform legal reasoning. The juxtaposition of logic and normative reasoning also clarifies what normative reasoning is.

To provide a consistent example illustrating each chapter's goal, every chapter has an introductory example based on the same legal opinion, *Meinhard v. Salmon*.[1] The facts that are relevant here are simple. Salmon received a lucrative offer from Gerry, a business acquaintance. The offer could have expanded Salmon's business. Unbeknownst to Gerry, Salmon's business, which was the reason for their acquaintance, had a secret partner, Meinhard. If Gerry knew that Salmon operated in two capacities, as an individual and as a member of a partnership, then Gerry may have specified which of the two he selected as the recipient of his offer. Meinhard, the invisible partner, claimed the offer should be treated as made to the partnership. The litigation that Meinhard started eventually reached the highest court of the jurisdiction and the famous American judge, Benjamin Cardozo, and his colleague Andrews, who is almost equally famous for his vocal dissenting opinions. Previously established law did not answer the question directly. The judges could not mechanically apply formal logic. Instead, they were forced to use informal normative reasoning to choose an interpretation and decide

[1] 249 N.Y. 458 (1928). The text of the opinion is reproduced in Appendix A.