

A COASEAN APPROACH TO COST-BENEFIT ANALYSIS

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Many federal regulators are required to perform cost-benefit analysis of rules proposed to correct the failure of private markets to efficiently allocate society's resources owing to so-called "externalities." Yet, as Ronald Coase showed decades ago, social inefficiencies cannot persist if the "costs of market transactions" are zero, putting the entire notion of market failure on shaky ground. Transacting is of course costly, but these are real costs that must be factored into the social welfare calculus. What kind of failure is it when the parties affected by an apparent externality could resolve the inefficiency but in practice decline to do so because the costs of transacting outweigh the net benefits? This article proposes a relatively simple Coasean approach to cost-benefit analysis. Where the parties deal face-to-face in competitive markets, a rule is justified only if the regulator can show it is likely to reduce the relevant transaction costs. If so, the parties can be relied on to adjust their private arrangements to maximize the net gains from trade out of self-interest. There is no need for the regulator to quantify costs and benefits. This is information the parties—the men and women "on the spot"—are best able to identify on their own.

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“[W]hatever we may have in mind as our ideal world, it is clear that we have not yet discovered how to get to it from where we are.”¹

“What I think will be considered in future to have been the important contribution of [*The Nature of the Firm*] is the explicit introduction of transaction costs into economic analysis.”²

— R.H. Coase

INTRODUCTION

Economists have struggled for decades over how to do reliable cost-benefit analysis (CBA).³ During this time, Reagan-, Clinton-, and Obama-era executive orders and federal case law have increasingly required executive agencies to address “material failures of private markets” by integrating CBA into the

1. R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 43 (1960). This is arguably the most influential article ever published in economics. See William M. Landes & Sonia Lahr-Pastor, *Measuring Coase’s Influence*, 54 J.L. & ECON. 383, 383 (2011).

2. R. H. Coase, *The Institutional Structure of Production*, 28 OCCASIONAL PAPERS L. SCH. U. CHI. 1, 7 (1992).

3. See Wendy L. Gramm, *Regulatory Review Issues, October 1985–February 1988*, 63 ADMIN. L. REV. 27, 33 (2011).

rule-making process, with the stated objective being to “maximize net benefits” to society.⁴ Federal statutes and case law have recently extended the CBA mandate to include independent agency rulemaking, primarily by financial regulators. Yet substantial controversy continues to swirl over the feasibility of CBA in a variety of settings and for a host of reasons, the most important among them being uncertainty in quantifying costs and benefits.⁵

The neoclassical model of market exchange provides the theoretical foundation for traditional CBA. It illustrates the welfare effects of trade embedded in market demand and supply assuming, among other things, that people behave “as if” they are rational maximizers,⁶ that the affected parties face zero transaction costs, and that there are no externalities. In equilibrium, the model hypothesizes that market prices reflect *marginal* benefits and costs, and that the parties will capture all possible gains from trade in the form of consumer and producer surplus, which together constitute net social benefits or “social welfare.”

The neoclassical model’s main scientific function is to predict the direction of affected parties’ response to parametric shocks, a method known as comparative statics. If the tax on cigarettes

4. Exec. Order No. 12,866, 3 C.F.R. 638, 639 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88 (2012) (“Each agency shall identify the problem that it intends to address (including, where applicable, the failures of private markets or public institutions that warrant new agency action) as well as assess the significance of that problem.”).

5. *See generally* Matthew D. Adler & Eric A. Posner, *Rethinking Cost-Benefit Analysis*, 109 YALE L.J. 165, 167 (1999); John C. Coates IV, *Cost-Benefit Analysis of Financial Regulation: Case Studies and Implications*, 124 YALE L.J. 882 (2015); Jeffrey N. Gordon, *The Empty Call for Benefit-Cost Analysis in Financial Regulation*, 43 J. LEGAL STUD. 351 (2014); Jonathan S. Masur & Eric A. Posner, *Cost-Benefit Analysis and the Judicial Role*, 85 U. CHI. L. REV. 935 (2018) [hereinafter Masur & Posner, *Cost-Benefit Analysis*]; Jonathan S. Masur & Eric A. Posner, *Unquantified Benefits and the Problem of Regulation under Uncertainty*, 102 CORNELL L. REV. 87 (2016) [hereinafter Masur & Posner, *Unquantified Benefits*]; Eric A. Posner & E. Glen Weyl, *Cost-Benefit Analysis of Financial Regulations: A Response to Criticisms*, 124 YALE L.J.F. 246 (2015); Cass R. Sunstein, *Financial Regulation and Cost-Benefit Analysis*, 124 YALE L.J.F. 263, 264–65 (2015); Abby McCloskey & Hester Peirce, *Holding Financial Regulators Accountable: A Case for Economic Analysis*, AM. ENTERPRISE INST. (May 20, 2014), <http://www.aei.org/publication/holding-financial-regulators-accountable-a-case-for-economic-analysis/>[<https://perma.cc/VTR8-38XQ>].

6. MILTON FRIEDMAN, *The Methodology of Positive Economics*, in *ESSAYS IN POSITIVE ECONOMICS* 3, 40–41 (1953).

increases, for example, will the price, quantity traded, and quality of tobacco increase or decrease? The model makes no predictions about the magnitude of these changes, only their direction.⁷ According to the theory, all that is necessary to make predictions in the basic model is that demand curves slope down and supply curves slope up, that some observable parameter has changed, and that the effects of the change can be measured ordinally.⁸ The neoclassical model has tremendous predictive power in this regard. It is testable, has been tested, and has gone largely unrefuted.⁹ Federal courts have found it sufficiently reliable to be admissible into evidence as the basis for expert opinion testimony under the *Daubert* standard, which establishes testability, or falsifiability, of the underlying theory as one important factor.¹⁰

In contrast to comparative statics, CBA attempts to cardinally measure, or to quantify, the magnitude of changes in total consumer and producer surplus from the imposition of a proposed regulatory rule. This requires an estimate of consumers' subjective willingness to pay for a good and producers' subjective willingness to provide the good along the relevant range of demand and supply. These values are exceedingly difficult to measure reliably. Various workarounds can be used, but ultimately in many settings CBA would have difficulty passing

7. In the language of mathematics, predictions focus on the sign of a partial derivative rather than its magnitude.

8. Ordinal measurement reflects a simple rank ordering of outcomes, whereas cardinal measurement reflects the relative magnitude of differences between outcomes. For an explanation of the distinction between ordinal and cardinal measurement in the CBA context, see Adler & Posner, *supra* note 5, at 191–92 (1999).

9. Ellig and Peirce argue that two important criteria for assessing the quality of an agency's economic analysis are whether it clearly identifies a market failure and whether it outlines a testable theory capable of being refuted by observed facts. Jerry Ellig & Hester Peirce, *SEC Regulatory Analysis: "A Long Way to Go and a Short Time to Get There"* 8 BROOK. J. CORP., FIN. & COM. L. 361, 379 (2014).

10. See, e.g., *In re Delta/Airtran Baggage Fee Antitrust Litig.*, 245 F. Supp. 3d 1343, 1359 (N.D. Ga. 2017) (collecting cases where expert testimony based on predictive economic models was admitted under *Daubert* to prove conspiracies to fix prices). The factors that determine admissibility are: (1) whether the body of knowledge on which the testimony is based is testable and has been tested; (2) whether it has been subjected to peer review and publication; (3) whether it has a known or knowable error rate; (4) whether there are established standards controlling its operation; and (5) whether it is generally accepted as reliable within a relevant scientific community. See *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 580, 593 (1993).

muster under the *Daubert* standard for the admissibility of expert opinion testimony. How, for example, could someone who wants to challenge the accuracy of a CBA test it and refute it other than to criticize its methods and offer a contradictory CBA, which may be more convincing but will be equally untestable?

A critical question largely ignored in the recent CBA debate but embraced here is why regulation is justified to begin with and how the answer to this question affects the policy analysis. At least as far back as the writings of A.C. Pigou almost a century ago, mainstream welfare economists have asserted that regulation by an omniscient social planner is justified when markets fail to efficiently allocate resources owing to so-called “externalities”—situations in which one party takes an action that imposes costs or bestows benefits on another party but fails to account for them in choosing his activity level.¹¹ As a result, in pursuing his self-interest he does too much or too little of the activity, leading to socially inefficient resource allocation—failure to maximize net benefits to society. The accepted policy implication is that government regulation correcting the market failure is necessary to improve resource allocation and increase net benefits.

In his path-breaking work *The Problem of Social Cost*, Nobel laureate Coase turned this belief on its head.¹² He showed that any prospect of inefficient resource allocation creates an opportunity for market participants to benefit by internalizing the externality through private transactions. Put more simply, people can profit by resolving inefficiencies. If transaction costs were zero, the parties would negotiate to maximize net benefits out of self-interest. A change in the regulatory rule would have no effect on resource allocation or the parties’ joint welfare and government regulation would be unnecessary.¹³

11. See, e.g., ARTHUR CECIL PIGOU, *THE ECONOMICS OF WELFARE* 293–99 (1920). The activity level might be the amount of trading a broker does for a client’s account over which he has trading discretion or the amount of research he does as a basis for recommending trades to a client who directs his own account.

12. See Coase, *supra* note 1, at 43; see also R. H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386, 403 (1937) (using the phrase “the costs of using the price mechanism” rather than “the costs of market transactions”).

13. Although the parties’ joint wealth would be at a maximum, the distribution of wealth between them is indeterminate.

Transaction costs are never zero, and they inevitably increase with the number, size, and complexity of transactions, eventually overwhelming the benefits from negotiating further adjustments. Some inefficiency will persist in the form of hypothetical resource misallocation, by definition a state of affairs in which marginal social benefits fall short of marginal social costs or vice versa. Potential net benefits are lost, but only because the transaction costs the parties must incur to capture them are even greater. Transaction costs are real costs to society and should be factored into the social calculus. In a given regulatory framework, the parties will negotiate what they privately perceive as efficient resource allocation with due consideration for the costs of transacting. The outcome is an equilibrium in the sense that neither party has any incentive to negotiate further adjustments given the transaction costs they face, and the conclusion must be that net-net social benefits are maximized. In a dynamic world, the parties have ongoing incentives to identify and adopt practices that reduce the cost of transacting and move their equilibrium toward first-best resource allocation.

Coase's main point, often misunderstood, is that transaction costs explain why the rule of liability—here, the regulatory rule—affects resource allocation. Rather than asking whether the overall benefits of a proposed rule will exceed the overall costs, in a Coasean framework the proper question is simply whether, at the margin, a proposed regulation will reduce the parties' costs of transacting. If not, the regulation should be scrapped absent convincing evidence that its benefits exceed its costs.¹⁴ If so, regulators should move forward confident that people can be counted on to perform their own CBA "on the spot," or not, and make all efficient adjustments to the new rule based on their "knowledge of the particular circumstances of time and place."¹⁵ This knowledge is fleeting, circumstantial, and inherently unavailable to outside observers because it re-

14. A reduction in transaction costs is a necessary but not a sufficient condition for regulation. A sufficient condition is that the discounted present value of reduced transaction costs exceeds the up-front cost of changing the regulation, perhaps including the cost to the regulator of performing the CBA. See Masur & Posner, *Unquantified Benefits*, *supra* note 5, at 116 for a related discussion.

15. F.A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519, 521–22 (1945).

quires them to identify a counterfactual, yet another reason quantified CBA of proposed regulation is so difficult.¹⁶

This analysis is not to say private markets solve all problems or that government regulation is incapable of improving resource allocation. As a policy matter, it simply says that in low-transaction-cost settings, such as where the parties deal face-to-face in competitive markets, regulation is justified if it reduces the parties' costs of transacting. It is insufficient to identify so-called "problems" that need correcting without having credibly made this showing. Only then can it be properly characterized as a market failure calling for a corrective rule. Regulators should bear this fundamental point in mind when performing CBA of corrective rules in keeping with their executive order charge to base new rules on "the best reasonably obtainable scientific, technical, economic, and other information."¹⁷

The Coasean approach, characterized here as transaction cost-benefit analysis (TCBA), avoids much of the measurement problem that plagues regulators when performing traditional CBA because it requires them to assess only the direction of the marginal effect of a proposed rule on the costs of transacting—comparative statics. There is plenty of excellent theoretical and empirical scholarship on the cost of transacting available to serve as a guidepost.

Transaction cost-benefit analysis stands to dramatically reduce the information burden regulators face in certain situations to assess a rule's likely effects on net social benefits. It can serve as both a substitute for and as a complement to traditional CBA. It is likely to prove most helpful where the parties face sufficiently low transaction costs that they can bargain face-to-face and competitive markets can be relied on to move them toward optimal resource allocation. Traditional vertical relationships (those between manufacturers, retailers, and consumers or between principals and agents), which inherently pose conflicts of interest, are a broad category on point. Even where transaction costs so high that market transactions between the affected parties are precluded, TCBA provides an

16. *Id.* at 521–24; JAMES M. BUCHANAN, *COST AND CHOICE: AN INQUIRY IN ECONOMIC THEORY* 25–26 (Midway Reprint 1978) (1969).

17. Exec. Order No. 12,866, 3 C.F.R. 638, 639 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88 (2012).

insightful framework to guide traditional CBA. This Article puts that issue aside for the time being.

Coase's fundamental insight about the nature of market failure and the relevance of transaction costs to understanding it has been largely absent from the recent scholarship on CBA of federal financial market regulation. This article seeks to fill the void. Part I briefly recounts the history of CBA in federal regulation and identifies the sources of federal agencies' requirement to perform CBA of proposed rules. It also reviews a selection of the recent scholarly literature addressing whether quantified CBA of proposed financial regulation is feasible. The consensus on this question appears to be that complete quantification is impossible but that regulators should nevertheless attempt to quantify costs and benefits of a proposed rule "as best [they] can" and describe potentially unquantifiable costs and benefits in qualitative terms.¹⁸ Though errors are inevitable, this puts the regulator on record and provides both a long-run basis for assessing success and a reference point for adaptive learning.¹⁹

Part II briefly discusses the neoclassical model as the foundation for traditional CBA and illustrates the widely accepted economic rationale for regulation by an omniscient social planner based on market failure.²⁰ Part III takes a closer look at market failure. Early on, Knight showed that Pigou and his followers mistook the absence of property rights for market failure. Where property rights are well defined and enforced, markets routinely resolve many Pigouvian externalities long before they appear on the regulatory radar screen.

Part IV examines what is meant by "transaction costs," concluding that they consist of the costs of defining and enforcing economic property rights to valuable asset flows.²¹ It reviews some of the foundational scholarly literature on the economics of property rights. The underlying theory is testable and has been successfully and repeatedly tested. Where appropriate,

18. *Chamber of Commerce v. SEC*, 412 F.3d 133, 143 (D.C. Cir. 2005).

19. See *infra* Part V.

20. PIGOU, *supra* note 11, at 329–35.

21. See Douglas W. Allen, *What are Transaction Costs?*, 14 RES. L. & ECON. 1, 12–13 (1991).

this literature can serve as helpful guide for regulators when performing TCBA of proposed rules.

Part V provides a summary and concluding remarks. It discusses the circumstances in which TCBA is likely to provide simpler and more reliable answers than traditional CBA and where it can serve as a helpful complement CBA.

I. OVERVIEW OF COST-BENEFIT ANALYSIS OF FEDERAL REGULATION

A. *Brief History*

It is difficult to pinpoint the origin of CBA in the U.S. According to one source, the Army Corps of Engineers began using it as early as 1902,²² but it gained considerable traction with the rise of the administrative state starting with the New Deal.²³ There is also evidence the Army Corps of Engineers used it informally to evaluate various dam projects on the Snake and Columbia Rivers during the early 1930s.²⁴ More formal use of CBA apparently began during the Johnson administration, with modestly increasing importance and sophistication during the Nixon, Ford, and Carter administrations.²⁵ In 1980, President Carter signed the Paperwork Reduction Act into law.²⁶ This statute created the Office of Information and Regulatory Affairs (OIRA) as part of the Office of Management and Budget (OMB) to “review and approve agency collections of information, including those related to regulations.”²⁷

22. THEODORE M. PORTER, *TRUST IN NUMBERS: THE PURSUIT OF OBJECTIVITY IN SCIENCE AND PUBLIC LIFE* 153 (1995).

23. Henry G. Manne, *Economics and Financial Regulation*, 35 *REGULATION*, Summer 2012, at 20.

24. Richard O. Zerbe, Jr. & Linda J. Graham, *The Role of Rights in Benefit Cost Methodology: The Example of Salmon and Hydroelectric Dams*, 74 *WASH. L. REV.* 763, 766 (1999).

25. See Jim Tozzi, *OIRA's Formative Years: The Historical Record of Centralized Regulatory Review Preceding OIRA's Founding*, 63 *ADMIN. L. REV.* 37, 41–43 (2011).

26. Paperwork Reduction Act, Pub. L. No. 96-511, 94 Stat. 2812 (1980) (codified as amended at 44 U.S.C. §§ 3501–3521 (2012)).

27. Susan E. Dudley, *Observations on OIRA's Thirtieth Anniversary*, 63 *ADMIN. L. REV.* 113, 114 (2011); see also Gramm, *supra* note 3, at 28; Tozzi, *supra* note 25, at 55.

B. Executive Agency CBA

Shortly after taking office, President Reagan put teeth into regulatory oversight with his Executive Order 12,291, mandating that executive agencies perform cost-benefit analysis of proposed “major” rules.²⁸ Section 2 of the Order stated, in relevant part:

(a) Administrative decisions shall be based on adequate information concerning the need for and consequences of proposed government action;

(b) Regulatory action shall not be undertaken unless the potential benefits to society for the regulation *outweigh* the potential costs to society;

...

(e) Agencies shall set regulatory priorities with the aim of *maximizing the aggregate net benefits to society*, taking into account the condition of the particular industries affected by regulations, the condition of the national economy, and other regulatory actions contemplated for the future.²⁹

The Order made OIRA responsible for assessing proposed regulations to ensure they plausibly maximize aggregate net benefits to society. It requires executive agencies to perform and publish regulatory impact analysis of major rules, and it also requires the Director of the OMB to “[m]onitor agency compliance with the requirements of this Order and advise the President with respect to such compliance.”³⁰ Although OIRA’s early years were rocky,³¹ it eventually became a powerful, though surprisingly inconspicuous force, on the federal regulatory landscape.³²

28. Exec. Order No. 12,291, § 3(a), 3 C.F.R. 127, 128 (1981) (revoked 1993). Section 1(d) reads as follows: “‘Agency’ means any authority of the United States that is an ‘agency’ under 44 U.S.C. 3502(1), excluding those agencies specified in 44 U.S.C. 3502(10).” *Id.* The latter section of the U.S. Code refers to “independent regulatory agencies” and specifically lists the SEC among them. 44 U.S.C. § 3502(10) (Supp. IV 1980).

29. Exec. Order No. 12,291, § 2, 3 C.F.R. at 128 (emphasis added).

30. *Id.* § 6(a)(8), at 131.

31. Gramm, *supra* note 3, at 29–30.

32. Donald R. Arbuckle, *Obscure but Powerful: Who are those Guys?*, 63 ADMIN. L. REV. 131, 132 (2011).

In 1993, President Clinton's Executive Order 12,866 replaced Executive Order 12,291.³³ Section 1(a) softens the substantive cost-benefit provisions, stating that "agencies should select those approaches that maximize net benefits . . . unless a statute requires another regulatory approach."³⁴ It also adds assessment of "distributive impacts" and "equity" into the calculus.³⁵ Section 1(b)(6) weakens the threshold for approval by requiring that benefits merely "justify"³⁶ costs rather than "outweigh" them.³⁷

Notably, the Order states that costs and benefits can include both quantitative and qualitative measures, and it frames the call for regulation in the language of market failure. Its preamble provides the following seemingly sensible foundation for federal regulation: "the private sector and private markets are the best engine for economic growth Federal agencies should promulgate only such regulations as . . . are made necessary by compelling public need, such as *material failures of private markets* to protect . . . the well-being of the American people."³⁸ It lists various principles to guide agency CBA, among them: to "identify the problem it intends to address" and its significance; to "identify and assess available . . . economic incentives to encourage the desired behavior"; to base decisions on "the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation"; to "the extent feasible, [to] specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt"; and to "minimiz[e] the potential for uncertainty."³⁹ Section 2(b) of the Order requires OMB to issue guidance on the proper conduct of CBA to affected agencies.⁴⁰ Among them, OMB's 2003 guidance advises that

33. Exec. Order No. 12,866, 3 C.F.R. 638 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88 (2012).

34. *Id.* § 1(a), at 639.

35. *Id.*

36. *Id.* § 1(b)(6).

37. Exec. Order No. 12,291, §2(b), 3 C.F.R. 127, 128 (1981) (revoked 1993).

38. Exec. Order No. 12,866, pmb1., § 1(a), 3 C.F.R. at 638–39 (emphasis added).

39. *Id.* § 1(b), at 639–40.

40. *Id.* § 2(b), at 640.

“‘[o]ppportunity cost’ is the appropriate concept for valuing . . . costs.”⁴¹

Order 12,866 remains in effect today, but in January 2011, President Obama reinforced it with Executive Order 13,563, among other things requiring executive agencies to allow Internet submission of public comments, to provide for greater coordination with other agencies, to ensure scientific integrity, and to further provide for retrospective analysis of existing rules.⁴² Although independent agencies are exempt from executive orders, Executive Order 13,579 urges them to comply with Executive Order 13,563 to the extent permitted by law.⁴³ Arguably, these orders collectively outline best practices for all federal agency rulemaking, including both executive and independent agencies.

Largely owing to OIRA review, executive agency CBA is widely considered to be of variable but sometimes acceptable quality, with much of the CBA done by the Environmental Protection Agency (EPA) being the best model.⁴⁴ Independent agency CBA lags behind but appears to be improving.⁴⁵

C. *Independent Agency CBA*

An early statutory mandate for independent agency CBA appears in the 1974 amendments to the Commodity Exchange Act of 1936 (CEA) authorizing creation of the Commodity Futures Trading Commission (CFTC). Section 19(a) of the CEA states in relevant part:

(1) In general

Before promulgating a regulation under this chapter or issuing an order . . . the Commission shall consider the costs and benefits of the action of the Commission.

41. Circular A-4, Regulatory Analysis, 68 Fed. Reg. 58,366 (Oct. 9, 2003).

42. See Exec. Order No. 13,563, 3 C.F.R. 215 (2012), reprinted in 5 U.S.C. § 601 app. at 101–02 (2012).

43. Exec. Order No. 13,579, 3 C.F.R. 256 (2012), reprinted in 5 U.S.C. § 601 app. at 102.

44. See Richard L. Revesz, *Cost-Benefit Analysis and the Structure of the Administrative State: The Case of Financial Services Regulation*, 34 YALE J. ON REG. 545, 550–52 (2017).

45. See Ellig & Peirce, *supra* note 9, at 383; see also Jerry Ellig, *Evaluating the Quality and Use of Regulatory Impact Analysis: The Mercatus Center’s Regulatory Report Card, 2008–2013*, at 4–5 (Mercatus Ctr., Working Paper, 2016).

(2) Considerations

The costs and benefits of the proposed Commission action shall be evaluated in light of—

(A) considerations of protection of market participants and the public;

(B) considerations of the efficiency, competitiveness, and financial integrity of futures markets;

(C) considerations of price discovery;

(D) considerations of sound risk management practices; and

(E) other public interest considerations.⁴⁶

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank) also specifically requires an independent agency to perform CBA. Title X of Dodd-Frank creates the Bureau of Consumer Financial Protection, and Section 1022(b)(2)(A) gives it rulemaking authority provided that in so doing it considers “the potential benefits and costs to consumers and covered persons, including the *potential reduction of access* by consumers to consumer financial products or services resulting from such rule.”⁴⁷

In 1996, Congress passed the National Securities Market Improvement Act (NSMIA) adding the following language to the Securities Act of 1933 (SA),⁴⁸ Securities Exchange Act of 1934 (SEA),⁴⁹ and the Investment Company Act of 1940 (ICA)⁵⁰:

CONSIDERATION OF PROMOTION OF EFFICIENCY, COMPETITION, AND CAPITAL FORMATION.—Whenever pursuant to this title the Commission is engaged in rulemaking and is required to consider or determine whether an action is *necessary or appropriate* in the public interest, the Commission shall also consider, in addition to the protection of investors, whether the action will *promote efficiency, competition, and capital formation*.⁵¹

46. 7 U.S.C. § 19(a).

47. 12 U.S.C. § 5512(b)(2)(A)(i) (emphasis added).

48. 15 U.S.C. § 77b(b).

49. *Id.* § 78c(f).

50. *Id.* § 80a-2(c).

51. National Securities Markets Improvement Act of 1996, Pub. L. No. 104-290, § 106, 110 Stat. 3424–25 (emphasis added). In addition, the SEA requires that

Beginning in 2005, three cases from the U.S. Court of Appeals for the D.C. Circuit found that this language requires the Securities and Exchange Commission (SEC) to perform CBA of its proposed regulations, and in each case it found the SEC's CBA deficient and therefore "arbitrary and capricious" in violation of the Administrative Procedure Act (APA).⁵²

In *U.S. Chamber of Commerce v. SEC*, the Chamber sought review of the SEC's Investment Company Governance Rule (Governance Rule),⁵³ which would have conditioned various exemptions most mutual funds enjoy from provisions of the ICA on having boards with at least seventy-five percent outside directors and an independent chairman.⁵⁴ The D.C. Circuit Court found that the SEC had failed to adequately consider the costs of the conditions it proposed and hence their likely effect on efficiency, competition, and capital formation.⁵⁵ Although an empirical study is unnecessary, a regulator must nevertheless do its best to assess costs.⁵⁶ Uncertainty may limit what the Commission can do but does not excuse its statutory obligation to do what it can to apprise itself, and hence the public and the Congress, of the economic consequences of a proposed regulation before it chooses to adopt it.⁵⁷

In *American Equity v. SEC* the petitioner, American Equity Investment Life Insurance Company, sought the D.C. Circuit

"The Commission and the Secretary of the Treasury, in making rules and regulations pursuant to any provisions of this chapter, shall consider among other matters the impact any such rule or regulation would have on competition." 15 U.S.C. § 78w(a)(2).

52. *Bus. Roundtable v. SEC*, 647 F.3d 1144, 1148 (D.C. Cir. 2011); *Am. Equity Inv. Life Ins. Co. v. SEC*, 613 F.3d 166, 177 (D.C. Cir. 2010); *Chamber of Commerce v. SEC*, 412 F.3d 133, 144 (D.C. Cir. 2005).

53. 412 F.3d at 137. The SEA, the ICA, and the Investment Advisors Act (IAA) all allow persons aggrieved by a final order of the Commission to obtain review of the order in the United States Court of Appeals for the circuit in which he resides or has his principal place of business or in the District of Columbia Circuit. SEA § 25(a), 15 U.S.C. § 78y(a); ICA § 43(a), 15 U.S.C. § 78y(a); IAA § 213(a), 15 U.S.C. § 80b-13(a).

54. The ICA mandates that mutual funds have at least forty percent outside directors. By ICA Rule 12(b)-1, the SEC had already conditioned various exemptions on a mutual fund having a majority of outside directors. 17 C.F.R. pts. 239, 240, 270, 274.

55. *Chamber of Commerce*, 412 F.3d at 144.

56. *Id.* at 142-43.

57. *Id.* at 144.

Court's review of SEC Rule 151A under the SEA,⁵⁸ finding that fixed index annuities are securities rather than an insurance contract.⁵⁹ As an issuer of securities, American Equity therefore would be subject to the Act's registration and reporting requirements. The thrust of the SEC's rationale for the rule was that the absence of a clear basis for identifying the regulatory status of fixed index annuities injected sufficient uncertainty into the market that efficiency, competition, and capital formation were undermined. In the Court's opinion, however, it was not enough for the SEC simply to declare that *some* rule is necessary.⁶⁰ It must first establish a pre-rule benchmark and then identify the relative merits of the proposed rule in comparison to the baseline.⁶¹ It had not done so, and so the Court vacated the rule.⁶²

Most recently, in *Business Roundtable v. SEC*, the D.C. Circuit Court vacated SEA Rule 14a-11,⁶³ known as the Proxy Access Rule.⁶⁴ With modest limitations, the Rule would have required firms subject to the SEA, including investment companies, to add to their proxy materials the name of any person or persons nominated for a directors seat by a shareholder who has held at least three percent of the firm's voting stock for a least three years.⁶⁵ The effect of the rule would have been to allow qualified dissident shareholders partial control over the ballot to elect the company's board of directors. The SEC reasoned that the rule could create "benefits (including the possible benefit of improved board accountability and company performance) [that] justify the costs" and that any adverse effects on the board would derive generally from long established state law proxy rules and not from the rule's enhanced proxy access requirements.⁶⁶

The court disagreed, vacating the rule. In its words:

58. 15 U.S.C. § 78mm.

59. 613 F.3d 166, 167 (D.C. Cir. 2010).

60. *Id.* at 177.

61. *Id.* at 178.

62. *Id.*

63. Facilitating Shareholder Director Nominations, 75 Fed. Reg. 56,668 (Sept. 16, 2010).

64. 647 F.3d 1144, 1148 (D.C. Cir. 2011).

65. *See* 75 Fed. Reg. at 56,674–75.

66. *Id.* at 56,761.

[The SEC] inconsistently and opportunistically framed the costs and benefits of the rule; failed adequately to quantify the certain costs or to explain why those costs could not be quantified; neglected to support its predictive judgments; contradicted itself; and failed to respond to substantial problems raised by commenters. For these and other reasons, its decision to apply the rule to investment companies was also arbitrary.⁶⁷

The court faulted the SEC for declaring the costs of board distraction from enhanced proxy access to be merely an incident of traditional state law proxy rules. Citing to *Chamber of Commerce*, the court reiterated: “As we have said before, this type of reasoning, which fails to view a cost *at the margin*, is illogical and, in an economic analysis, unacceptable.”⁶⁸

These D.C. Circuit Court decisions prompted a decided response. In 2012 the SEC published an internal guidance memorandum recognizing that it has a general “statutory obligation to determine as best it can the economic implications of [a proposed] rule,” although not CBA per se.⁶⁹ As a matter of good regulatory practice, however, it instructs SEC economists to “quantify anticipated costs and benefits even where the available data is imperfect.”⁷⁰ It also advises that staff economists be given a more prominent role in the rule-writing process, from inception through adoption.⁷¹ Soon afterwards the SEC dramatically increased the number of economists on its staff.⁷²

Recall the statement in Executive Order 12,866 that “agencies should select those approaches that maximize net bene-

67. *Bus. Roundtable*, 647 F.3d at 1148–49.

68. *Id.* at 1151 (emphasis added) (citing *Chamber of Commerce v. SEC*, 647 F.3d 133, 143 (D.C. Cir. 2005)).

69. Memorandum from the Div. of Risk, Strategy and Fin. Innovation and the Office of the Gen. Counsel, U.S. Sec. & Exch. Comm’n, to the Staff of the Rulemaking Div. and Offices, U.S. Sec. & Exch. Comm’n, on Current Guidance on Economic Analysis in SEC Rulemakings 1 (March 16, 2012), https://www.sec.gov/divisions/riskfin/rsfi_guidance_econ_analy_secrulemaking.pdf [<https://perma.cc/9WWY-AZ8C>].

70. *Id.* at 13.

71. See Ellig & Peirce, *supra* note 9, at 365–66; Bruce R. Kraus, *Economists in the Room at the SEC*, 124 *YALE L.J.F.* 280, 281 (2015).

72. See Joshua T. White, *The Evolving Role of Economic Analysis in SEC Rulemaking*, 50 *GA. L. REV.* 293, 308–09 (2015).

fits . . . unless a statute requires another regulatory approach.”⁷³ In *National Association of Manufacturers v. SEC*, the D.C. Circuit Court addressed the adequacy of the SEC’s CBA of its Conflict Minerals rule.⁷⁴ Section 1502 of Dodd-Frank charged the SEC with issuing regulations requiring firms using “conflict minerals” in the Republic of the Congo to investigate and disclose the origin of those minerals.⁷⁵ In passing the statute, Congress had specifically determined that “[the rule’s] costs were necessary and appropriate in furthering the goals’ of peace and security in the Congo.”⁷⁶ In response to the National Association’s challenge, the court found that the SEC had “exhaustively analyzed the final rule’s costs.”⁷⁷ Because Congress “intended the rule to achieve ‘compelling social benefits’ . . . [the SEC] is not required ‘to measure the immeasurable’ and need not conduct a ‘rigorous, quantitative economic analysis’ unless the statute explicitly directs it to do so.”⁷⁸

Two federal cases recently found that general language in the EPA’s enabling legislation requires it to assess the costs and benefits of a proposed rule. Most important, in *Michigan v. EPA*, the U.S. Supreme Court found that the EPA must consider both costs and benefits in regulating under the Clean Air Act’s “appropriate and necessary” standard,⁷⁹ and that its refusal to consider costs in coming to the decision to regulate power plants was an unreasonable interpretation of the Clean Air Act.⁸⁰

As the Court put it:

[T]he phrase “appropriate and necessary” requires at least some attention to cost. One would not say that it is even rational, never mind “appropriate,” to impose billions of dol-

73. Exec. Order No. 12,866, § 1(a), 3 C.F.R. 638, 639 (1994), reprinted as amended in 5 U.S.C. § 601 app. at 88 (2012) (emphasis added).

74. 748 F.3d 359, 363 (D.C. Cir. 2014), *adhered to on reh’g*, 800 F.3d 518 (D.C. Cir. 2015).

75. See 15 U.S.C. § 78m(p)(1)(A) (2012).

76. *Nat’l Ass’n of Mfrs.*, 748 F.3d at 369 (D.C. Cir. 2014) (quoting Conflict Minerals, 77 Fed. Reg. 56,274, 56,350 (Sept. 12, 2012)).

77. *Id.*

78. *Id.* (citations omitted) (quoting Conflict Minerals, 77 Fed. Reg. at 56,350, and *Inv. Co. Inst. v. CFTC*, 720 F.3d 370, 379 (D.C. Cir. 2013)).

79. 42 U.S.C. § 7412(n)(1)(A).

80. 135 S. Ct. 2699, 2707 (2015).

lars in economic costs in return for a few dollars in health or environmental benefits No regulation is “appropriate” if it does significantly more harm than good.⁸¹

A full-blown CBA is unwarranted at the preliminary stage, however. In the Court’s words: “We need not and do not hold that the law unambiguously required the Agency, when making this preliminary estimate, to conduct a formal cost-benefit analysis in which each advantage and disadvantage is assigned a monetary value.”⁸²

More recently, the District Court for the District of Columbia relied on *Michigan v. EPA* to invalidate the MetLife corporation’s designation by the Financial Stability Oversight Council (FSOC) as a systemically important financial institution (SIFI) in *MetLife, Inc. v. FSOC*.⁸³ Under Dodd-Frank, the FSOC may designate a “nonbank financial company” for enhanced supervision by the Federal Reserve System’s Board of Governors if it determines that “material financial distress” at the company “could pose a threat to the financial stability of the United States.”⁸⁴ The court rejected the FSOC’s determination that it is not required to consider the costs to the company in its risk calculus, finding that it must identify a causal connection between the risk of financial distress and the prospect of significant damage to the U.S. economy.⁸⁵ Costs to the company are part of this determination.⁸⁶ Otherwise the FSOC has no way of knowing whether the designation does significantly more harm than good, and it is therefore “arbitrary and capricious” under the APA.⁸⁷

D. The Scholarly Literature

Federal statutes and case law requiring independent agencies to perform CBA of proposed rules focus largely on financial regulators such as the SEC and CFTC, and much of the recent scholarship assailing or defending judicially reviewable

81. *Id.*

82. *Id.* at 2711.

83. 177 F. Supp. 3d 219, 240 (D.D.C. 2016).

84. 12 U.S.C. § 5323(a)(1).

85. *See Metlife*, 177 F. Supp. 3d at 242.

86. *See id.* at 239.

87. *Id.* at 241.

CBA therefore focuses on financial regulation. Largely absent from this literature, however, is any critical discussion of the need to identify the nature of the specific market failure driving the regulation or how a careful assessment of these fundamentals might feed into the underlying economic analysis.⁸⁸

Coates provides an exhaustive review of the feasibility of quantified CBA in financial regulation.⁸⁹ This includes his attempt to perform reliable CBA in six subject areas, which he reports to have proven impossible.⁹⁰ He identifies any number of insurmountable difficulties and rejects claims by those who argue that quantified CBA, as done in the environmental setting, can provide a workable model for use in financial regulation. He asserts that economic analysis of environmental regulation involves an assessment of relatively simple physical interaction.⁹¹ Economic analysis of financial markets is different because the market lies at the heart of the entire economy, involves various human elements that cannot be quantified, and is subject to various “non-stationary relationships” that exhibit “long-term structural changes.”⁹² As he puts it, unless “evidence is developed to illuminate when [CBA of financial regu-

88. Ellig & Peirce, *supra* note 9, are a notable exception. One study argues that transaction costs should be included as one component of costs in traditional CBA. Frank A.G. den Butter, Marc de Graaf & André Nijsen, *The Transaction Costs Perspective on Costs And Benefits of Government Regulation: Extending The Standard Cost Model* (Tinbergen Inst., Discussion Paper No. 2009-13/3, 2009). Another argues for the importance of considering institutional transaction costs when conducting cost benefit analysis on environmental regulations. Dale B. Thompson, *Beyond Benefit-Cost Analysis: Institutional Transaction Costs and Regulation of Water Quality*, 39 NAT. RESOURCES J. 517 (1999). Neither of them takes the approach offered here.

89. See, e.g., Coates, *supra* note 5.

90. The six subject areas are (1) Section 404 of the Sarbanes-Oxley Act requiring the SEC's rules creating the Public Company Accounting Oversight Board (PCAOB) and to impose on public companies new mandatory disclosures under Section 404 of the Sarbanes-Oxley Act of 2002; (2) the SEC's proposed 2004 Investment Company Governance Rule, addressed by the Court in *Chamber of Commerce I*; (3) heightened bank capital requirements mandated by the Basel Committee on Banking Supervision following the 2008 mortgage crisis; (4) the Volcker Rule under the Dodd-Frank Act prohibiting U.S. banks from engaging in “proprietary trading” for their own accounts; (5) the SEC's proposed 2013 rule on cross-border swaps; and (6) the U.K.'s Financial Services Authority's 2011 mortgage market reforms. See *id.* at 996–97.

91. See *id.* at 1001.

92. *Id.* at 888. See generally Gordon, *supra* note 5.

lation] passes its own test, courts and secondary agencies (that is, agencies other than those charged with rulemaking responsibility) should have no role in second-guessing the choice of when to conduct [it], or the details . . . when it is used.”⁹³ Until CBA of financial regulation develops further, any attempt at quantification is merely “guesstimation.”⁹⁴ In the meantime, he argues it should be used strictly as a conceptual framework to guide informed decisions ultimately based on unreviewable “expert judgment.”⁹⁵

Writing in response, Posner and Weyl argue that financial markets are ideally suited to quantified CBA because they “generate a vast amount of data [that is] monetary in nature.”⁹⁶ Accordingly, quantified CBA is much more suited to assessing financial market regulation than environmental health and safety regulation. They argue that most of Coates’s criticisms of quantified CBA of financial regulation are really criticisms of any and all CBA.⁹⁷ In their view, any uncertainty with quantified CBA is an argument in favor of further academic research rather than rejection of CBA altogether.⁹⁸

More recently, Masur and Posner recognize that in any given setting the regulator may be unable to quantify costs and benefits with precision owing to uncertainty, in which case it should use its most informed judgment.⁹⁹ To move forward with a rule based on judgment regarding difficult-to-quantify costs and benefits, the regulator should publish its best estimate of costs and benefits and report its methodology as a basis for retrospective evaluation. This process essentially provides for iterative learning over time.¹⁰⁰

Sunstein recognizes that financial regulators are plagued by the Hayekian knowledge problem; the information necessary to formulate rational regulations is dispersed across many members of society. In some cases “Knightian uncertainty” will

93. Coates, *supra* note 5, at 888.

94. *Id.* at 887.

95. *Id.* at 903.

96. Posner & Weyl, *supra* note 5, at 247.

97. *See id.* at 251.

98. *See id.* at 246.

99. *See* Masur & Posner, *Cost-Benefit Analysis*, *supra* note 5, at 941.

100. *Id.* at 945.

make it impossible for them to perform reliable CBA.¹⁰¹ He nonetheless concludes that “[t]here is no reason to think that it is always or usually impossible for financial regulators to conduct cost benefit analysis,” pointing out that “Executive Order 13,563 . . . directs executive agencies ‘to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible.’”¹⁰²

Revesz takes a somewhat different approach. Rather than focusing on whether, or to what extent, quantified CBA of financial regulation is feasible, he emphasizes the need for institutional reforms necessary to ensure financial regulators are able to perform CBA of sufficient quality to survive judicial scrutiny.¹⁰³ These reforms are all the more pressing, he argues, owing to the Supreme Court’s decision in *Michigan v. EPA*, which relied on the “appropriate and necessary” language of the Clean Air Act to find the EPA’s failure to consider costs in regulating power plant emissions unreasonable.¹⁰⁴ Similar language appears in the SEC’s enabling legislation—in its case “necessary or appropriate in the public interest”—and Dodd-Frank uses it eighty times, in many cases for provisions directed to the SEC or CFTC.¹⁰⁵ Revesz points out that the quality of CBA done by executive agencies is relatively high owing to OIRA review. The EPA, which has built significant economic expertise in this area, is apparently the acknowledged forerunner.¹⁰⁶ He recommends institutional reforms that will help bring the quality of financial regulators’ CBA up to EPA standards, either by subjecting them to review by the FSOC or, preferably, to OIRA. But his formulation would not preclude judicial review.¹⁰⁷ Rather, it would subject CBA of financial regulation to two levels of review, one administrative and one judicial. With first-stage administrative review, he believes federal courts would be in-

101. Sunstein, *supra* note 5, at 265.

102. *Id.* at 264–65 (quoting Exec. Order No. 13,563, § 1(c), 3 C.F.R. 215, 216 (2012), *reprinted in* 5 U.S.C. § 601 app. at 101–02 (2012)).

103. *See* Revesz, *supra* note 44, at 548.

104. *See id.*

105. *Id.* at 548.

106. *Id.* at 545, 592.

107. *Id.* at 549–50.

clined to defer to the agency but that judicial review is nonetheless appropriate.¹⁰⁸

Although insightful as far as it goes, none of this scholarship discusses or even cites Coase, mentions market failure as the ostensible justification for regulation, or examines how the market failure framework might inform CBA. Mannix provides a notable exception. He argues that regulators suffer from an agency problem. They are charged with identifying and correcting market failure, but they may have a tendency to overregulate because they neither bear the full costs of their actions nor capture the full benefits.¹⁰⁹ That is, their behavior is subject to distorting externalities. The CBA requirement serves as an effective check on the agency problem, ensuring regulators act as “faithful agents of the public’s interest.”¹¹⁰

Of relevance here, Mannix notes that the Obama administration opened the door to incorporating behavioral economics into regulatory CBA. As he describes it, since then “regulatory agencies have increasingly used consumer irrationality to justify regulatory interventions—even where there is no apparent market failure. They attribute economic benefits amounting to many billions of dollars to regulatory actions that give consumers nothing new and simply deprive them of their preferred choices.”¹¹¹ If regulators are to be trusted as stewards of the public interest, they must be willing to accept those being regulated as sovereign in their preferences. He quotes Gayer and Viscusi on this point, whose statement also supports the Coasean approach:

How can it be that consumers are leaving billions of potential economic gains on the table? . . . Moreover, how can it also be the case that firms seeking to earn profits are likewise ignoring highly attractive opportunities to save money? . . . Rather than accept the implications that consumers and firms are acting so starkly against their economic interest, a more plausible explanation is that there is something

108. *Id.* at 593–94.

109. See Brian F. Mannix, *Benefit-Cost Analysis as a Check on Administrative Discretion*, 24 SUP. CT. ECON. REV. 155, 164–65 (2017).

110. *Id.* at 165.

111. *Id.*

incorrect in the assumptions being made in the regulatory [CBA].¹¹²

In the following statement, Mannix recognizes the fundamental premise of TCBA: “improvements [in efficiency] would be accomplished by the market instead of the government if the market were better able to overcome transaction costs.”¹¹³ It takes only one more step in reasoning to recognize that requiring regulators to demonstrate a reduction in transaction costs before imposing a new rule provides an economically correct constraint on regulatory overreach. Equally important, by leaving the regulated free to respond as they choose to a properly justified rule, TCBA accords them sovereignty over their preferences. Although seemingly normative, this point accentuates the informational advantage of TCBA, which recognizes the positive proposition that the parties being regulated are better equipped to assess the costs and benefits of various possible responses than are regulators.

Another point worth mentioning is that the debate over the feasibility of quantified CBA focuses attention largely on macro-level regulation, such as banking reserve requirements, measures to control systemic risk, and cross-border swaps market regulation. Yet much of what the SEC regulates occurs on the micro level, often involving garden-variety vertical arrangements familiar in the antitrust arena.¹¹⁴ The transaction costs the parties would face to privately address putative market failures in economy-wide settings might make private ordering solutions completely ineffectual (although market participants’ ingenuity in this regard is often surprising). But transaction costs in the issuer-brokerage-investor, issuer-investment-bank-investor, securities-exchange-investment-company-investor, and other vertical relationships in financial services are presumably fairly low. Indeed, in each case it is apparent that reducing transaction costs is an important reason these relationships are structured as they are. In financial services, transaction costs may hinder the parties from maximiz-

112. *Id.* at 164–65 (quoting Ted Gayer & W. Kip Viscusi, *Overriding consumer preferences with energy regulations*, 43 J. REG. ECON. 248, 263 (2013)).

113. *Id.* at 160.

114. See D. Bruce Johnsen, *A Transaction Cost Assessment of SEC Regulation Best Interest*, 2018 COLUM. BUS. L. REV. 695.

ing net benefits, but they are surely low enough that any regulation reducing the relevant costs of transacting could lead the parties to adjust their relations to increase net benefits.

II. OVERVIEW OF TRADITIONAL COST-BENEFIT ANALYSIS

A. *Assessing Welfare in the Basic Neoclassical Model*

In 1896, Pareto proposed *Pareto optimality* as the ideal basis for welfare trade-offs in social policy.¹¹⁵ A given allocation of resources is Pareto optimal if there is no reallocation that would improve one person's welfare without reducing another's. In a world of zero transaction costs, voluntary market exchange would lead to Pareto optimality and regulation would be unnecessary. Despite the contractarian appeal of relying exclusively on voluntary exchange to allocate resources, Pareto optimality is an unworkable standard for justifying regulation. There can be no doubt regulation is warranted in some settings in which relying purely on voluntary exchange is impossible, and there will always be winners and losers. The cost of finding the losers, divining their losses, and compensating them to assure that they would be no worse off is simply unworkable.

The Kaldor-Hicks rule emerged in roughly 1939 as an alternative to Pareto optimality and has since become the default rule for assessing net benefits to society in the context of CBA.¹¹⁶ A given reallocation of resources is Kaldor-Hicks efficient if the winners could, in principle, fully compensate the losers and still improve their own welfare. It has come to be known as the "potential compensation test."¹¹⁷ Obviously, Kaldor-Hicks efficiency removes many conceptual roadblocks to social policy, but it has suffered crippling critiques as well. In 1951 Arrow theoretically demonstrated the impossibility of constructing a unique social welfare function based on ordinal preferences that avoids the necessity of making thorny moral judgments. If confined to ordinal preferences, most economists

115. RICHARD O. ZERBE, JR. & ALLEN S. BELLA, A PRIMER FOR BENEFIT-COST ANALYSIS 12 (2006).

116. See J.R. Hicks, *The Foundations of Welfare Economics*, 49 ECON. J. 696 (1939); Nicholas Kaldor, *Welfare Propositions of Economics and Interpersonal Comparisons of Utility*, 49 ECON. J. 549 (1939).

117. ZERBE & BELLA, *supra* note 115, at 80.

are steadfastly agnostic about how to weight the benefits and costs of social policy choices to affected parties because interpersonal welfare comparisons cannot be made.¹¹⁸ Adler and Posner sidestep these problems by arguing that CBA need not require moral pronouncements but can instead be usefully treated as an imperfect but practical and informative regulatory “decision rule,” presumably one that both enables and constrains the administrative state.¹¹⁹

The neoclassical model provides the theoretical foundation for traditional CBA. It illustrates the welfare effects of trade embedded in market demand and supply assuming, among other things, that individuals and firms are rational maximizers, that no buyer or seller has market power, that all decision makers bear the full costs of their decisions and capture the full benefits, that all parties have full information, and that the interacting parties face zero transaction costs. In equilibrium, the model hypothesizes that market prices will reflect *marginal* benefits and costs, and that the parties will capture all potential gains from trade in the form of consumer and producer surplus, or social welfare. With costless transacting, the allocation of resources is said to be socially optimal, or “first best.”

These assumptions provide a foundation for explaining how individuals and firms make decisions and are not an attempt to accurately characterize reality. The main concern is that the assumptions lead to testable predictions consistent with real-world observations. Whether or not people make cognitively rational decisions is irrelevant. The important question is whether they behave “as if” they are cognitively rational and fully informed.¹²⁰ Transaction cost economics has shown many times that behavior seemingly inconsistent with the neoclassical model can be easily explained by relaxing its assumptions to accommodate the costs of transacting, as Coase predicted.

118. Adler & Posner, *supra* note 5, at 192–94 (1999).

119. *Id.*

120. FRIEDMAN, *supra* note 6, at 40–41. In a competitive market, firms that happen to zig when they should zag will be eliminated from the system. Those remaining will appear to have chosen correctly even if their managers lacked the wherewithal to make an intelligent choice. Armen A. Alchian, *Uncertainty, Evolution, and Economic Theory*, 58 J. POL. ECON. 211, 213 (1950).

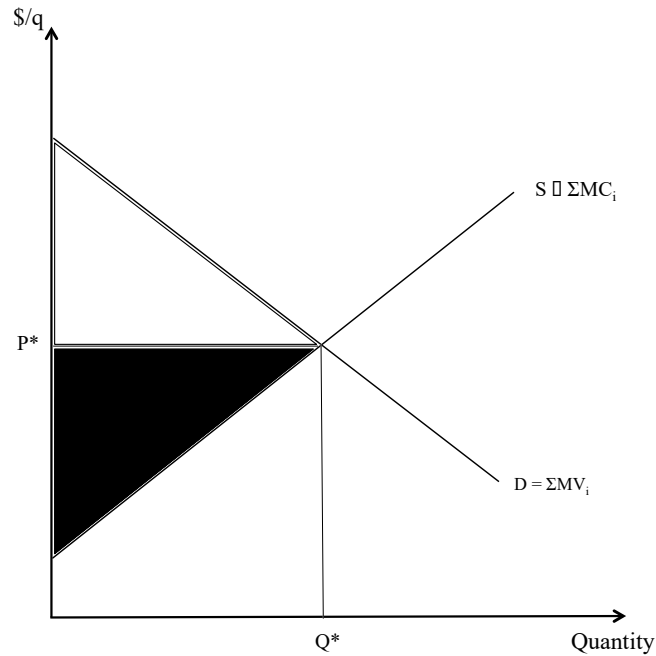


Figure 1
Social Welfare

Figure 1 shows the unit rate of output for a traded good, Q , on the horizontal axis and the price in dollars per unit, P , on the vertical axis. Line D shows consumer demand for the good, which is synonymous with aggregate marginal valuation ($\sum MV_i$) across i consumers for each possible rate of output. The demand curve slopes downward to the right to reflect diminishing marginal valuation. Line S shows aggregate supply of the good across j producers, roughly reflecting their aggregate marginal cost ($\sum MC_j$) for each possible quantity, with these costs equal to the value of productive inputs if deployed elsewhere. The supply curve slopes up to the right, reflecting increasing marginal cost.

In a well-functioning, competitive market with no transaction costs, the equilibrium price is P^* and output is Q^* . Consumers make total expenditures equal to rectangle $P^* \times Q^*$. For the marginal unit of the good, consumer valuation is exactly

equal to price, and consumers are indifferent to whether they buy this unit or not, so it generates no surplus, or “net benefits,” at the margin. Moving backward along the demand curve, consumers’ valuation of the good increasingly exceeds the price they pay. For Q^* units per period rather than zero, their total valuation is represented by the large trapezoid under the demand curve between zero units and Q^* units. Subtracting their total expenditures, $P^* \times Q^*$, the remaining upper dotted triangle is known as consumer surplus, one component of net social benefits.

A similar story can be told for producers. For Q^* units, they are indifferent to whether or not they supply the marginal unit because $P^* = MC$ for that unit. As a result of supplying Q^* units rather than zero, they earn total revenues of $P^* \times Q^*$, exactly what consumers spend. Their cost of supplying Q^* units is the trapezoid beneath MC from zero to Q^* . The difference, represented by the lower cross-hatched triangle, is known as producer surplus, the other component of net social benefits.

Together, consumer and producer surplus constitute the gains from trade, total social welfare, or, what Executive Order 12,291 refers to as the “net benefits to society”¹²¹ from Q^* units of the good rather than zero. The resulting allocation of resources is said to be Pareto optimal because no reallocation can improve social welfare. Hypothetically, if output is forced below Q^* , consumers sacrifice more value than producers save. If output is forced above Q^* , producers lose more value than consumers gain.

The neoclassical model is a remarkably powerful tool for predicting the direction of the marginal effects from outside shocks. Obvious examples include the imposition of a new tax or a restriction on trade that shifts either the demand or supply curve and causes predictable changes in prices, rates of output, and other indicia of the parties’ behavior. More generally, the model can be used to explain how and why observed patterns of behavior vary across time or cross-sections when the constraints market participants face change at the margin. The

121. Exec. Order No. 12,291, § 2(c), 3 C.F.R. 127, 128 (1981) (revoked 1993).

model is testable, has been repeatedly tested, and has survived testing largely intact.

The neoclassical model's reliability falls off as we move beyond marginal analysis. Quantifying net social benefits, or even just the marginal effect on net social benefits from a given shock, is far less reliable. Economists hypothesize that the area under a demand curve up to any arbitrary rate of output reflects total consumer valuation, but getting enough data to reliably estimate a real-world demand curve is problematic. Not only is the real world a noisy place, but most of the variation we observe is in a narrow neighborhood around the equilibrium price and quantity. Among other things, accurate quantification requires the researcher to estimate how much people would pay for the first few units of a good whose normal consumption might be in the millions. Although the CBA methodology is based on theory that is reliable for predicting marginal effects, the thorny scientific question is what evidence could possibly refute any specific measure of social welfare or, by implication, any CBA?

The same can be said on the producer side. The supply curve roughly reflects marginal costs aggregated across all producers, but (as Executive Order 12,866 recognizes) the economic definition of cost is opportunity cost, the value of the next best opportunity forgone. Opportunity cost is seldom observable in an objective way even though marginal changes in opportunity cost can be identified. They have only a loose relationship to out-of-pocket expenses, do not appear as such on balance sheets or income statements, and in any event reflect the value of actions not taken and are therefore unobservable. Indeed, economists generally do not assert that market participants themselves know the opportunity cost of their decisions, only that they behave as if they know. Assessing opportunity cost at the margin is also troublesome because it represents the increase in total cost owing to a one-unit increase in output holding all else equal, a normally unobservable counter-factual. What most laymen have in mind when they think of cost is average cost, or total cost divided by total output, which is much easier to observe and measure but in many settings is an inappropriate basis for predicting the choices people make or the relevant costs for CBA.

This analysis is not to say quantification is hopeless. Over the years, econometricians have made tremendous progress developing empirical methods to help see through noise in the data and to disentangle the various factors that influence market outcomes. Far more complete data is now available.¹²² With the advent of scanners that record millions of retail transactions evidencing huge variations in prices and quantities, economists have begun to make headway estimating demand and consumer surplus, possibly bringing quantified CBA within reach in specific settings. One early study estimates the demand for a new breakfast cereal, putting the annual addition to consumer surplus from a single new product in the range of \$66 to \$78 million.¹²³ Another estimates the demand for Uber rides, with total benefits to U.S. consumers in the billions of dollars.¹²⁴ In some settings, an appropriate CBA requires a valuation of life. Empirical estimates of the value of a statistical human life are widely used in environmental and other CBA and, being based in part on market prices and revealed preferences, are generally considered reliable. In all of these situations, the researcher picks the subject matter based on knowledge that sufficient data is available for analysis, rather than because of the pressing need to do CBA of proposed regulation in a specific setting. In most financial settings calling for CBA of corrective rules, the necessary data is unlikely to exist and collecting it may be too costly or time consuming to be feasible.

B. *Market Failure as a Basis for Corrective Rules*

The notion that government regulation is warranted to correct market failure goes back at least to A.C. Pigou's influential treatise, *The Economics of Welfare*. In the original edition, Pigou used the example of two roads linking two cities. One road he

122. See Manne, *supra* note 23, at 22.

123. Jerry A. Hausman, *Valuation of New Goods under Perfect and Imperfect Competition*, in *THE ECONOMICS OF NEW GOODS* 209, 228, 234–35 (Timothy F. Bresnahan & Robert J. Gordon eds., 1996) (“The correct economic approach to the evaluation of new goods has been known for over fifty years, since Hicks’s pioneering contribution. However, it has not been implemented by government statistical agencies, perhaps because of its complications and data requirements. Data are now available.”).

124. Peter Cohen, et al., *Using Big Data to Estimate Consumer Surplus: The Case of Uber* 5 (Nat’l Bureau of Econ. Research, Working Paper No. 22,627, 2016).

assumed to be slow but with sufficient capacity that it is never congested. The other he assumed to be faster but subject to congestion. If all travelers have access to both roads, and with sufficient demand, they will join the fast road until it becomes so congested that the marginal traveler is indifferent between which road he chooses, and travel time on the fast road is the same as on the slow road. Self-interested travelers overuse the fast road because they neglect the congestion costs they impose on their fellow travelers, a standard negative externality calling for some form of corrective regulation by an omniscient social planner.¹²⁵

The neoclassical model states that people acting in their own self-interest will allocate resources efficiently as long as they bear the full costs or capture the full benefits of their actions. When some costs or benefits fall on third parties—so-called externalities—the decision maker's resource allocation decisions could exceed or fall short of optimality, and if so the market is said to fail. Every undergraduate economics major learns that regulation by an omniscient social planner is justified when the market fails owing to externalities. For lack of a better alternative, the government serves as a stand-in.

125. PIGOU, *supra* note 11, at 194.

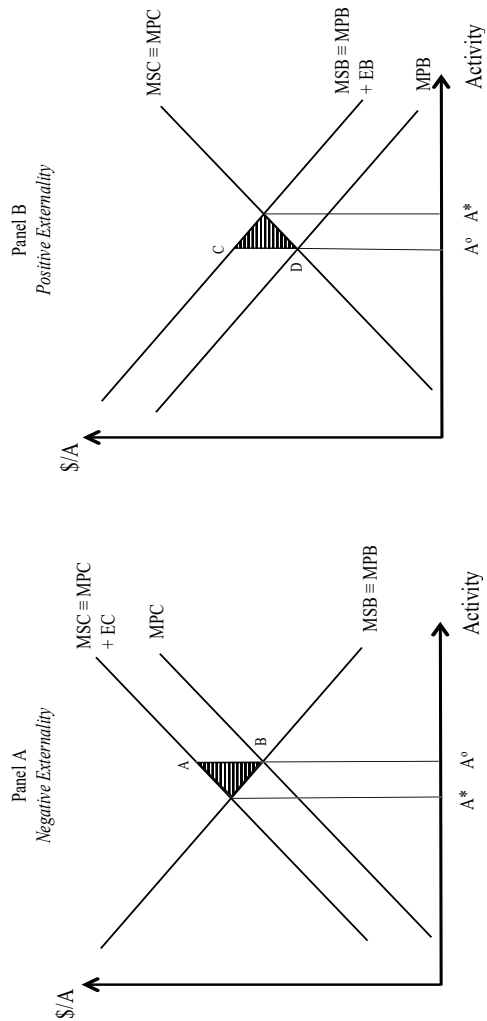


Figure 2
Externalities

Figure 2 illustrates how externalities are thought to lead to market failure. Panel A shows a negative externality and Panel B shows a positive externality. In either case the activity in question may involve a nontraded good such as driving on public roads. Line MPB in Panel A reflects the marginal private benefits to a decision maker from engaging in a socially productive activity, such as driving to work. Because he captures all benefits, there are no external benefits that spill over onto

others; thus, marginal private benefit is identical to marginal social benefit ($MPB \equiv MSB$). On the other side of the equation, his private costs are given by MPC . Being self-interested, he will engage in A° units of the activity, where $MPB = MPC$. According to standard welfare analysis, at A° he does too much of the activity, neglecting to consider the marginal external costs, EC , that spill over onto others in the form of traffic congestion. From society's standpoint optimality occurs at A^* , where marginal social benefits exactly equal marginal social costs; $MSB = MSC \equiv MPC + EC$. Social welfare falls short of the optimum by the dotted triangle, a deadweight loss reflecting resource use whose social value falls short of their social cost, more generally referred to as forgone gains from trade.

The mechanics of positive externalities, shown in Panel B, follow much the same reasoning. Here, the decision maker equates his marginal private benefit with his marginal private cost and ignores any external benefits that spill onto others because he is unable to charge a price for them. He ends up doing too little of the activity; that is, A° falls short of A^* . The shaded triangle shows the associated loss in social welfare. A relevant example comes from the principal-agent setting. The agent is charged with taking action to generate benefits for the principal, but although the agent bears the full costs of such actions he normally receives only a small fraction of the associated benefits. He therefore stops short of the activity level that maximizes benefits to the principal net of his own (and society's) costs. For example, a retail securities broker might exert too little effort identifying profitable trades for his client's benefit or under-search for price improvement on trades the client orders.

A simple solution to too much or too little activity is government mandates, such as limiting to A^* the number of travelers allowed to enter the roadway in Panel A. A common example is HOV restrictions requiring a minimum number of vehicle occupants on specific roads at peak travel times. Speed limits, in essence, are another. Examples of mandates to solve positive externalities include required vaccinations and minimum schooling requirements. Mandates can be cumbersome because they require the regulator to gather information to identify A^* and leave little discretion to market participants about how to make efficient adjustments in response.

Corrective taxes are an alternative to quantity mandates. By forcing travelers to bear the full social cost of their travel decisions, for example, a road tax equal to the marginal external cost at A^o (distance AB) is said to correct the market failure and restore socially optimal resource allocation and also leave people free to choose how much and when to travel. They naturally choose activity level A^* rather than A^o . Gasoline and cigarette taxes are arguable examples of corrective taxation. Where feasible, corrective taxes impose a smaller information burden on the regulator than government mandates because they allow market participants to make economizing adjustments so long as they are willing to pay the tax.

Two additional responses are available to address market failure. One is for the government to do nothing and the other is for it to require one party to compensate the other by establishing or changing the rule of liability. These possibilities are discussed below.

III. A CLOSER LOOK AT MARKET FAILURE

A. *From Pigou to Knight to Coase*

Writing just a few years after Pigou published his two roads example, Knight rejected the claim that market failure necessarily justifies government regulation.¹²⁶ In response to Pigou's example, Knight showed that the optimal tax Pigou endorsed to correct the market failure would be exactly the same as the profit-maximizing toll a private road owner would charge.¹²⁷ From this he concluded it was not market failure that caused overuse of the fast road but Pigou's unstated assumption that the road was unowned—in the public domain—and therefore subject to open access and the attendant resource misallocation.¹²⁸ Knight's insight was devastating. The only reason Pigou

126. F.H. Knight, *Some Fallacies in the Interpretation of Social Cost*, 38 Q.J. ECON. 582 (1924).

127. *Id.* at 587. For a brief history of roadway ownership and administration, see DOUGLAS W. ALLEN, *THE INSTITUTIONAL REVOLUTION: MEASUREMENT AND THE ECONOMIC EMERGENCE OF THE MODERN WORLD 179–84* (2012).

128. Knight, *supra* note 126, at 586–87. This is not to say that open access is always inefficient. See Michel A. Habib & D. Bruce Johnsen, *The Quality-Assuring Role of Mutual Fund Advisory Fees*, 46 INT'L REV. L. & ECON. 1 (2016); D. Bruce Johnsen, *Myths About Mutual Fund Fees: Economic Insights on Jones v. Harris*, 35 J.

found an externality is because he assumed away private property rights to a scarce resource, the road.

Knight also made the important point that the social function of private property consists of the incentive it provides owners to use their property efficiently, by setting prices (and other terms of trade) that maximize net benefit to society, in this case by gathering the information necessary to identify the profit-maximizing toll.¹²⁹ The owner loses profits if he sets a toll leading to inefficient resource allocation. It is entirely plausible in many cases that government regulators lack the wherewithal or incentive to identify the optimal tax or toll even if they know congestion when they see it. They are neither omniscient, nor do they bear the full costs or receive the full benefits of their actions.

Nearly thirty-five years later, Coase famously introduced the “costs of market transactions” into the market failure debate.¹³⁰ This helped operationalize Knight’s insight about property rights because transaction costs are capable of leading to testable theory. Coase used the example of a rancher’s cattle straying and trampling the neighboring farmer’s crops, a garden-variety negative externality that the common law regularly addressed under the law of nuisance.¹³¹ Assuming zero transaction costs, he showed that the rule of liability would have no effect on the number of cattle (resource allocation) the rancher raises or the resulting crop damage.¹³² Whether ranchers have to pay for damage to farmers’ crops or farmers have to pay ranchers to reduce their herd size, efficient resource allocation will prevail.

This irrelevance result has since come to be known as the Coase Theorem, although Coase never touted his analysis as “the Coase Theorem” and did not endorse the relevance of zero

CORP. L. 561, 590–94 (2010); Dean Lueck, *The Rule of First Possession and the Design of the Law*, 38 J.L. & ECON. 393, 405 (1995).

129. Knight, *supra* note 126, at 591. Although Knight’s analysis focused on Pigou’s call for corrective taxation, it applies equally to quantity mandates.

130. *The Problem of Social Cost* was the culmination of several of Coase’s earlier works. Coase, *supra* note 12; R. H. Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1 (1959).

131. Coase, *supra* note 1, at 2–3.

132. *Id.* at 8.

transaction costs to the real world.¹³³ Nonetheless, countless scholarly articles have attempted to refute the Coase Theorem. Some claim to have done so theoretically by showing that if bargaining is costly the rule of liability can affect resource allocation even where the costs of market exchange are zero.¹³⁴ This result follows only by excluding bargaining costs from the costs of market transactions. As Douglas Allen observes, those who labored to refute the Coase Theorem “won the argument, but . . . missed the point and helped to side line transaction cost economics as far as the mainstream profession was concerned.”¹³⁵

A core group of economists began integrating the cost of transacting into the neoclassical model to explain the workings of the economic system, especially the contours of economic organization, as Coase had predicted.¹³⁶ In recognition of this point, Allen offers the Coase Theorem Part II: “When transaction costs are positive, property rights are allocated to maximize the gains from trade net of the transaction costs.”¹³⁷

In a Coasean framework, it begs the question to label one party the victim and the other the wrongdoer, or to say that one party injures or imposes costs on another. Two parties simply want to use a scarce resource in mutually incompatible ways, an inevitable condition in a world of scarcity. The traveler who enters the fast road no more imposes costs on other travelers than they impose costs on him and on each other. The rancher whose cattle stray is no more economically responsible for injury to the farmer from increasing his herd size than the farmer is responsible for planting crops where the cattle are likely to stray. In Coase’s words, “it is true that there would be no crop damage without the cattle. It is equally true that there

133. The Coase Theorem is virtually identical to the Modigliani and Miller Irrelevance Theorem (under given assumptions, a firm’s capital structure will have no effect on firm value). Franco Modigliani & Merton H. Miller, *The Cost of Capital, Corporation Finance and the Theory of Investment*, 48 AM. ECON. REV. 261, 268 (1958). For such theorems, the explanatory power comes from relaxing the underlying assumptions.

134. See, e.g., Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1 (1982).

135. Douglas W. Allen, *Theoretical Difficulties with Transaction Cost Measurement*, 2 DIVISION LAB. & TRANSACTION COSTS 1, 6 (2006).

136. Allen, *supra* note 21, at 12–13.

137. Allen, *supra* note 135, at 5.

would be no crop damage without the crops.”¹³⁸ Injury, or damage, is a reciprocal problem and, operationally, the costs of transacting determines who ends up with what rights.

More generally, transaction costs guide understanding of the structure of property rights, whether the focus is the rule of liability, the choice of contract terms or business form, the prevailing business customs, the pattern of social norms, or any other evolved mechanism to determine who holds rights to which value flows. Inefficient resource allocation leaves money on the table and creates an opportunity for market participants to cooperate to capture gains from trade. It can persist only where the costs of transacting exceed the value of forgone gains from trade. Transaction costs are real costs and, as always, it pays people to spend a dollar only if doing so generates more than a dollar in gains.

Transaction cost economics identifies costs that the frictionless neoclassical model assumes away, and when properly accounted for they provide considerable insight into how people respond to changes in all sorts of rules. As a result, it can better predict the likely effects of government regulation on transacting parties’ behavior. Regulation constrains transacting their choices, driving them to a new equilibrium determined in part by the costs of transacting. The relevant policy question is whether the new equilibrium is an improvement over the old, which depends at least in part on how the regulation affects the costs of transacting. In the real world, it makes little sense to claim government can correct a market failure unless it has a clear comparative advantage in reducing transaction costs. As Coase lamented:

A better approach would seem to be to start our analysis with a situation approximating that which actually exists, to examine the effects of a proposed policy change and to attempt to decide whether the new situation would be, in total, better or worse than the original one. In this way, conclusions for policy would have some relevance to the actual situation.¹³⁹

138. Coase, *supra* note 1, at 13.

139. *Id.* at 43.

What is more, trying to divine what the world would look like if transaction costs were zero is little help for setting policy. The operational goal of transaction cost economics is to understand how differences in, or shocks to, the costs of transacting influence interacting parties' equilibrium behavior, including prices, outputs, various other terms of exchange, and the evolved structure of property rights and other institutions.

B. Externalities Everywhere and Nowhere

Quite literally, externalities are everywhere, but private ordering internalizes most of them before they are ever recognized. Imagine Mr. A enjoys eating eggs, which he produces and consumes up to the point where his MPB is equal to his MPC. Now imagine Ms. B also likes eggs but has none, and that there is no trade between them. Strictly speaking, according to Pigou's definition, Ms. B's unmet valuation qualifies as a positive externality resulting from Mr. A's decision about how many eggs to produce. Ms. B's valuation must be included in the MSB, and Mr. A does not account for this in his production and consumption decisions. The conclusion must be that Mr. A produces too few eggs and keeps too many for himself because the net benefit he gets from the marginal egg is zero, and that Ms. B values a single egg far more than zero. Should the government correct the market failure by compelling Mr. A to increase output and share his eggs with Ms. B? Tax Mr. A? Possibly, but, with clear economic property rights, the problem is routinely solved through market transactions, which can be expected to continue until social net benefits are maximized inclusive of transaction costs.

It is difficult to see an externality in these situations because transaction costs are low enough to allow the parties to negotiate a better outcome, which they routinely do. If the goal is to understand or explain the terms of trade observed in the real world as a function of the costs of transacting, it is literally accurate in the Pigouvian sense to say that trade internalizes externalities resulting from the absence of trade. Any claim of real-world externalities should be met with a healthy skepticism and a willingness to drill down to identify the relevant costs of transacting and equilibrium conditions before concluding there is a problem that needs fixing. It may be that corrective government regulation is appropriate, but, at least where the par-

ties deal directly, the case should first be made that the government has a comparative advantage over the parties in reducing the relevant transaction costs, and that the regulation will, in fact, reduce these costs.

There are countless examples of externalities being internalized in private markets, and this internalization occurs even where the transacting parties are anonymous to one another.¹⁴⁰ Cars now come equipped with sensors, cameras, and warning mechanisms that help spatially challenged drivers park, which reduces the delay other drivers experience. Grocery stores supply shoppers with carts having seats to keep young children from wandering and unloading shelves for entertainment, allowing other shoppers to save valuable time and the store owner to increase prices incrementally without losing sales. Coffee shops now have smart-phone apps to make pre-ordering and payment simple and quick, thereby reducing customer waiting times. The list of externalities routinely internalized to the advantage of interacting parties is endless but goes largely unnoticed.

Cheung may have been the first to develop “a theory of contractual choice”¹⁴¹ to show how private parties in the real world successfully avoid market failure of the kind Pigou hypothesized.¹⁴² Prior to Cheung’s insightful work, development economists considered share contracting in agriculture inefficient because tenants receive only a fraction of the crop but bear the entire cost of variable inputs including their own labor, a classic positive externality.¹⁴³ The inference was that they would undersupply effort. Development economists generally considered fixed rent contracts more efficient because the tenant who makes on-site decisions about working the land bears one hundred percent of the consequences of any inefficiency. Cheung pointed out that private landowners can choose between fixed rent and cropshare contracts, and that in equilibri-

140. See generally STEVEN N.S. CHEUNG, *THE MYTH OF SOCIAL COST* (3d ed. 1992).

141. See John McManus, *The Theory of Share Tenancy by Steven N. S. Cheung*, 3 *CAN. J. ECON.* 349, 350 (1970).

142. See generally STEVEN N.S. CHEUNG, *THE THEORY OF SHARE TENANCY* (1969).

143. See, e.g., Charles Issawi, *Farm Output Under Fixed Rents and Share Tenancy*, 33 *LAND ECON.* 74, 74–76 (1957).

um they often chose cropshare.¹⁴⁴ Development economists characterized landlords who did so as irrational. Yet Cheung convincingly shows that non-price terms of the cropshare contract mitigate the undersupply problem by more carefully clarifying who has what rights and responsibilities.¹⁴⁵ He systematically explains the choice between fixed rent and share contracts based on variations in transaction costs and crop risk across different crops. Depending on circumstances, cropshare contracts can be either more or less efficient than fixed rent contracts.¹⁴⁶ He empirically tests his transaction-cost-versus-risk-aversion hypothesis and fails to reject it.¹⁴⁷

A large amount of early scholarly work on transaction costs shows that the alleged externalities used to support calls for government regulation were sometimes imaginary. In 1973, Cheung responded to Meade's 1952 description of insoluble market failure between beekeepers and apple orchardists.¹⁴⁸ According to Meade, because of the parties' inability to transact and price the pollination services beekeepers provide orchardists or the nectar the orchardists provide beekeepers, the parties will devote too few resources to growing apples and raising bees.¹⁴⁹ As did Pigou, Meade concluded that the problem of "unpaid factors" could be addressed only by government imposed taxes or subsidies.¹⁵⁰

Cheung's analysis of the beekeeping industry buried these claims. While thumbing through the yellow pages of the local telephone directory one day, he came across advertisements offering beekeeping services.¹⁵¹ In talking with beekeepers and orchardists, he soon found that they routinely negotiate over pollination services and nectar collection. What is more, the

144. See CHEUNG, *supra* note 140, at 68.

145. See *id.* at 66–72.

146. See *id.* at 72–79.

147. See *id.* at 158–59.

148. See Steven N. S. Cheung, *The Fable of the Bees: An Economic Investigation*, 16 J.L. & ECON. 11 (1973). Cheung notes that "[Pigou deleted] the example of two roads . . . from later editions of *The Economics of Welfare*, presumably in an attempt to avoid the criticism by F. H. Knight." *Id.* at 11 n.2.

149. *Id.* at 12 (citing J. E. Meade, *External Economies and Diseconomies in a Competitive Situation*, 51 Econ. J. 54, 56–57, 58 (1952)).

150. *Id.*

151. *Id.* at 19.

terms of their agreements systematically vary across different crops consistent with the hypothesis of joint wealth maximization constrained by the cost of transacting.¹⁵²

Apple trees, it turns out, require beekeeper services for pollination in the early spring but yield very little nectar for honey. Alfalfa grown for hay requires no pollination services but yields ample nectar for honey. Although his hand-assembled database is limited, Cheung finds strong empirical evidence that apple orchardists pay beekeepers to place their hives nearby in the spring and beekeepers pay alfalfa growers for the right to place their hives near alfalfa fields later in late summer.¹⁵³ The other agreed terms and customary practices are remarkably consistent with constrained wealth maximization.¹⁵⁴

Economists working in the Pigouvian tradition have also used lighthouses as evidence of market failure and the need for corrective government regulation. Lighthouse keepers, the story goes, are unable to charge ship captains for their warning services on dark and stormy nights. Because of the unpaid factor, there will be too few lighthouses, and a system of government subsidies is in order. Notable economists including John Stuart Mill, Pigou, Henry Sidgwick, and even Nobel laureate Paul Samuelson all subscribed to this story of market failure.¹⁵⁵

On investigating, Coase found that the British lighthouse system had largely relied for centuries on private parties to finance, build, and operate lighthouses.¹⁵⁶ Rather than government taxes and subsidies, private lighthouse owners routinely levied fees on ships large and small.¹⁵⁷ Fees varied according to economic circumstances. Collecting them was often a simple matter of visiting ship captains in nearby ports to request payment. Concurrently, Trinity House, an ancient quasi-public or-

152. *Id.* at 26.

153. *Id.* at 23, tbl. 2.

154. Cheung reports that the parties rarely resort to written contracts, but when they do it is primarily to serve as evidence for beekeepers to secure bank financing. Apparently, it pays the parties to incur the transaction costs of formalizing their agreements to reduce the transaction costs beekeepers face in negotiating bank financing. *Id.* at 29.

155. See R.H. Coase, *The Lighthouse in Economics*, 17 J.L. & ECON. 357, 357–60 (1974).

156. *Id.* at 363–64; see also ALLEN, *supra* note 127, at 172–79.

157. See Coase, *supra* note 155, at 364–65.

ganization descended from a medieval seaman's guild, also financed and owned lighthouses and administered fee collection for centuries based on Crown patents.¹⁵⁸ Trinity House eventually came under government oversight by the Ministry of Trade and consolidated its control over privately owned-lighthouse, but the system of self-funding continued at least up to the time of Coase's work.

Worth noting is the entrepreneurial role private lighthouse firms played. Clearly these firms succeeded in building lighthouses in the most precarious circumstances of the sea's destructive forces. Trinity House often contracted for their construction services in one way or another.¹⁵⁹ In many cases, it appears the private firm that built a lighthouse in a precarious location retained ownership and collected fees until such time that the lighthouse's survival became reasonably certain, at which time ownership often devolved one way or another to Trinity House. The private builder therefore bore the residual from the lighthouse's structural integrity over its early years. Once that was proven, Trinity House assumed ownership bore the residual from efficient administration and fee collection.

The cooperative adjustments market participants make for mutual gain are relentless and often subtle, even where the parties are anonymous to one another. Consider taxes. The standard neoclassical analysis of tax incidence makes several interesting points regarding the likely effect on price, output, the distribution of tax burden, lost gains from trade owing to resource misallocation, and the like, but the point of interest here is that producers and consumers have a common interest in cooperating to reduce the tax burden in terms of both total tax payments and lost gains from trade.

Barzel extends the neoclassical model of taxation and demonstrates the ingenuity transacting parties often summon when it comes to cooperative wealth capture.¹⁶⁰ In the U.S., the late 1950s and 1960s witnessed a substantial increase in state cigarette taxes, which were often levied at a fixed dollar amount (say 11¢) per pack, with the pack price in the neigh-

158. *See id.* at 363.

159. *See id.* at 363–65.

160. Yoram Barzel, *An Alternative Approach to the Analysis of Taxation*, 84 J. POL. ECON. 1177 (1976).

borhood of 30¢ pack.¹⁶¹ The tax rate varied substantially across states.¹⁶² Yet packs of cigarettes are not fundamentally what consumers value. Instead they want something more akin to “smoking pleasure.” Not all packs are alike when it comes to smoking pleasure, either at a given moment in time or through time. In response to higher taxes, producers and consumers adjusted by moving from eighty-five millimeter to one-hundred millimeter cigarettes, regular- to king-sized, lower- to higher-quality tobacco, and in-store to vending machine purchases (which include valuable convenience with every pack).¹⁶³ This allowed them to transact more smoking pleasure in every pack and per dollar of tax paid. The tax per pack was fixed, but not the size of packs or the tax per unit of smoking pleasure.

Unit sales of larger packs were no doubt more than what otherwise would have occurred, and per pack prices adjusted upward, surprisingly in many states by more than the amount of the tax.¹⁶⁴ This is theoretically impossible under standard neoclassical analysis, which assumes the characteristics of the good remain fixed. The reduction in the number of packs traded reduced total tax payments by more than enough to compensate for the added costs producers incurred providing consumers with larger packs of higher quality tobacco. Prior to the tax, the new larger packs would have been sub-optimal. Rather than direct bargaining, competition drove these adjustments.

The tax laws, although superficially clear, were incomplete and subject to joint wealth-increasing adjustments by self-interested market participants. By failing to carefully define what constituted a “pack” of cigarettes, state tax laws failed to clearly define the government’s legal rights to collect taxes. This left value in the public domain and subjected it to capture by producers and consumers, who reclaimed economic property rights to some portion of their lost gains from trade through

161. *See id.* at 1193.

162. *See id.*

163. *See id.*

164. *See id.* at 1194.

cooperative adjustments in the characteristics of the taxed good.¹⁶⁵

Umbeck's examination of the famous California gold rush of 1848 extends Cheung's theory of contract choice.¹⁶⁶ He shows that when gold was first discovered miners' initial reaction was to form into groups to work gold-bearing land under sharing contracts.¹⁶⁷ He specifies the trade-offs between transaction costs and risk across sharing and land allotment contracts and shows that as population in the gold fields rose the optimal group size also rose. The miners then systematically abandoned high transaction cost sharing contracts in favor of low transaction cost land allotment contracts.¹⁶⁸

Scholars have conducted a large amount of empirical testing of transaction cost economics. A major theoretical development came with Allen and Lueck. They reject a trade-off between risk aversion and transaction costs as a basis for contract choice in favor of a trade-off between alternative transaction costs.¹⁶⁹ As they explain it, "[the] difficulty with [risk-based] models is that they have been short on testable hypotheses because they rely on measurement of risk preferences or proxies for them."¹⁷⁰

Their analysis of over 1600 cropshare contracts in the American Midwest includes the traditional moral hazard and incomplete-contracts problems, but adds the transaction costs of allocating both the responsibility for inputs and the divisions of

165. Similar adjustments have occurred in other goods subject to a per unit tax. The 1960s witnessed large increases in the per gallon gasoline tax, following Pigou, to correct the negative pollution externality motorists "imposed" on those who wanted to breath fresh air. The market adjusted by moving to higher-lead gasoline to boost octane content and per gallon mileage, thereby reducing the number of gallons transacted and total tax payments. Although fewer gallons of gasoline were traded, each gallon contained more lead, gasoline's primary pollutant. The net effect may have been an increase in lead emissions. *See id.* at 1195. Unlike a per unit tax, with a percentage, or *ad velorem*, tax on the purchase price consumers and producers have a common interest in unbundling valuable attributes of the ex ante economic good and to transact them separately free of the tax. *See id.*

166. *See* John Umbeck, *A Theory of Contract Choice and the California Gold Rush*, 20 J.L. & ECON. 421, 421–22 (1977).

167. *See id.* at 422–23.

168. *See id.* at 435–37.

169. Douglas W. Allen & Dean Lueck, *Transaction Costs and the Design of Cropshare Contracts*, 24 RAND J. ECON. 78, 79 (1993).

170. *Id.*

outputs—economic property rights—between the farmer and the landowner. Uncertainty resulting from weather, pests, and other exogenous factors remains important in the analysis. Rather than entering the model through risk aversion,¹⁷¹ however, it enters on the transaction cost side by raising prospects that the farmer might attempt to capture value by undersupplying effort, overusing non-contractible soil attributes such as moisture content, underreporting crop output, and overreporting costly shared inputs such as seed, fertilizer, herbicides and pesticides, power for irrigation, crop drying costs, and so on.¹⁷² Even risk neutral parties will be averse to ex post variation in these behaviors because of the potential for moral hazard and the costliness of measuring one another's true contribution.

The authors hypothesize that cropshare contracts have the benefit of reducing the farmer's incentive to deplete the capital value of the soil.¹⁷³ They predict that the parties will choose cropshare contracts over cash rent contracts when the potential for soil exploitation is high and the measurement costs of dividing the crop are small.¹⁷⁴ Their empirical results fail to reject their transaction cost theory and otherwise overwhelmingly support it.¹⁷⁵

IV. WHAT ARE TRANSACTION COSTS?

For the concept of transaction costs to be useful in social science, they must be defined specifically enough that any theory relying on them is capable of being refuted. As Cheung notes: "A theory potentially consistent with everything explains nothing."¹⁷⁶ And regardless of the merit of transaction costs as an analytical tool for the social sciences, for the purposes of this

171. For other work that relies purely on transaction costs rather than risk aversion, see Sanford J. Grossman & Oliver D Hart, *The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration*, 94 J. POL. ECON. 691 (1986); Bengt Holmstrom & Paul Milgrom, *Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design*, 7 J. LAW, ECON. & ORG. 24 (1991); Keith B. Lefler & Randal R. Rucker, *Transaction Costs and the Efficient Organization of Production: A Study of Timber-Harvesting Contracts*, 99 J. POL. ECON. 1060 (1991).

172. See Allen & Lueck, *supra* note 169, at 79, 81.

173. See *id.* at 80.

174. See *id.*

175. See *id.* at 89–92.

176. Steven N.S. Cheung, *A Theory of Price Control*, 17 J.L. & ECON. 53, 54 (1974).

Article the concept must be specific enough to assist regulators called on to perform TCBA of proposed rules.

An intuitive definition of transaction costs is that they consist of all costs absent from a one-man (“Robinson Crusoe”) economy.¹⁷⁷ That is, they encompass the costs of all human interaction of any economic substance. For most purposes this definition is overly broad, among other reasons because it would subsume transportation costs, which better qualify as garden-variety production costs common to frictionless models.

A second possible definition of transaction costs is that they consist of the costs of transferring legal ownership or, as Coase stated by way of example in *The Problem of Social Costs*, the “costs of market transactions.”¹⁷⁸ Though adequate for some purposes, this definition is too narrow for many others, in part because it excludes the costs of transactions in which no transfer of legal ownership occurs, such as those occurring within firms and other organizations, or even in a market setting involving bargaining and strategic behavior.

A third definition is that transaction costs consist of the costs of establishing and maintaining *economic* property rights.¹⁷⁹ This definition accommodates a world in which ownership is never complete, always leaving some value in the public domain and subject to competitive capture. Because Pigou’s road lies in the public domain, its travelers establish *de facto* ownership over their place on the road by occupying it first. A competitive race to first possession results in crowding and congestion and overuse, which dissipates some of the road’s potential value.¹⁸⁰

Even where a private road owner holds legal title and restricts access to those who pay a toll, however, for practical purposes some of its value inevitably remains in the public

177. See Douglas W. Allen, *Transaction Costs*, in 1 ENCYCLOPEDIA OF LAW & ECONOMICS 893, 906 (1999).

178. Coase, *supra* note 1, at 37; see also Allen, *supra* note 135, at 6.

179. Allen, *supra* note 135, at 5.

180. Absent an owner, it is conceivable those who want to use the road can get together and negotiate efficient restrictions on use, but the cost of such collective action—a transaction cost—is likely to be prohibitive in many settings. Private ownership can be seen as a transaction-cost-reducing stand-in for collective action because a private owner not only profits from good outcomes but loses from bad outcomes.

domain because the costs of perfect exclusion are too high. Toll-paying travelers have the ability to capture this value, at a cost, and face a competitive race to do so against other travelers, and ultimately the road owner. They might agree to constrain their behavior, but unless the road owner installs a perfect and very costly system of cameras, helicopters, radar detectors, and so on, to measure travelers' actual behavior, any given traveler can extract more value from using the road than is jointly efficient.

The parties would probably agree that travelers have the right to stop on the roadside to fix a flat tire, but what about to take a nap or watch wildlife, both of which are likely to slow other travelers and reduce the toll they are willing to pay. What about speeding, which may benefit the speeder but increases the prospect of injury to others and also reduces the amount of toll they are willing to pay? What about vehicle weight limits to save wear-and-tear on the road? If the toll is assessed based on weight, any trucker knows to fill his fuel tanks after getting a weight certificate rather than before. This type of maximizing behavior is reciprocal. Despite advertising safe passage, the road owner might neglect to erect warning signs and other markers, to ward off highwaymen, or to keep cattle and large wildlife from straying onto the road. All of these possibilities and more feed into the equilibrium toll and other terms of travel, which the owner can vary by time of day, weather conditions, size or weight of vehicle, traveler loyalty, and so on, so as to mitigate dissipation, but subject to the costs of transacting.

Who ends up with what rights in practice depends on the parties' opportunities to capture value lying in the public domain, which depends predictably on the costs of transacting. Equilibrium occurs where the marginal cost of transacting equals the marginal "external cost" or "external benefit," depending on the situation. For any level of activity beyond A^0 in Panel A of Figure 2, the gains from reducing the level of activity exceed the transaction costs, consistent with market equilibrium. The lengths of line segments AB and CD in Figure 2 illustrate this point. If the costs of transacting at A^0 in Panel A are less than the value reflected in line segment AB, the parties would find it in their interest to move to a lower and more socially efficient level of activity. At A^0 , the marginal private cost (MPC) of the activity is equal to the marginal social cost (MSC)

inclusive of transaction costs. The parties are in equilibrium in the sense that neither is interested in adjusting given the transaction costs they would incur to do so. This outcome is socially optimal since the transaction costs of avoiding the externality exceed the social benefits.

This framework provides a theoretical basis for understanding the structure of economic property rights, as well as the effect any external intrusion such as government regulation is likely to have on the parties' decisions. It also makes clear that any regulation that reduces transaction costs will move the interacting parties toward A*. A parallel story can be told for Panel B and positive externalities. A reduction in transaction costs is therefore the theoretically ideal goal of regulation aimed at correcting market failure, and of course this need not preclude alternatives. A showing by regulators that a proposed rule will reduce transactions costs (for parties that deal face-to-face in competitive markets) is a sufficient condition for the rule to increase social welfare. It is possible a rule that increases transaction costs reduces other costs, such as standard production costs, by an amount sufficient to increase social welfare, and this is where traditional CBA may be helpful. Nevertheless, to understand the nature of the problem it will normally pay to examine the transaction costs that bring it about.

Doug Allen correctly defines economic property rights as the ability, whether legally protected or not, to exercise a choice over an economic good.¹⁸¹ Economic property rights are de facto in nature rather than de jure.¹⁸² This definition raises three questions. First, what maximand is appropriate for hypothesizing about the right-holder's motivation in exercising his choice? Second, what is meant by an economic "good"? Third, what is meant by a "right"?

Scholars who focus on the economics of property rights have had success hypothesizing that people maximize expected wealth net of transaction costs. As a maximand, wealth has two

181. Allen, *supra* note 177, at 898; Allen, *supra* note 135, at 3. Being concerned about transaction costs as the basis for explaining individual choice, transaction cost analysis often assumes transacting parties are risk neutral. This is clearly an unrealistic assumption, but one that has shown surprising explanatory power.

182. Donald J. Boudreaux and Roger Meiners, *Externality: The Biggest Straw Man of Our Time* (unpublished working paper).

favorable attributes helpful for understanding the structure of economic property rights. Wealth is a stock concept representing future expected value flows discounted to the present at the appropriate interest rate. It concentrates attention on decisions having intertemporal consequences. Wealth maximization implies that people will invest to enhance their wealth to the extent, and only to the extent, that their expectations about capturing the investment returns are likely to be met, that is, to the extent economic property rights are secure. Wealth maximization recognizes that any theory of property rights must account for multiple periods. In addition, value, and hence wealth, is potentially measurable in the real world through revealed preference.¹⁸³ Revealed preference is defined as the actor's willingness to give up some valued good to get another good or vice versa.¹⁸⁴ It is often observable at the margin in the competitive struggle to establish or maintain economic property rights.¹⁸⁵

Following Demsetz, a "right" is forward-looking and reflects the ability of the holder to form accurate expectations about capturing the value of an economic good.¹⁸⁶ The more definite the right the more a wealth maximizing right-holder will invest to increase its net present value. Any number of mechanisms effectively increases the certainty of rights. Law with its sanctions is one of them. Others include reputation, custom or social norms, and the threat of violence and other forms of self-help. Each of these, in relevant situations, carries its own transaction costs, which has implications for the structure of economic property rights.

183. See D. Bruce Johnsen, *Wealth is Value*, 15 J. LEGAL STUD. 263, 264–65 (1986).

184. The CBA literature characterized the values as "willingness to pay" (WTP) to get a good one does not have and "willingness to accept" (WTA) other goods to give up a good one does have. See Richard O. Zerbe, *The Legal Foundation of Cost Benefit Analysis*, 2 CHARLESTON L. REV. 93, 108–10 (2007). Note that the text emphasizes willingness to *forgo* rather than willingness to *pay*. Forgone value may be either paid to another party or dissipated, and this distinction is extremely important where legal property rights are imperfectly defined and the relevant parties are attempting to capture value lying in the public domain.

185. See DAVID D. FRIEDMAN, *LAW'S ORDER: WHAT ECONOMICS HAS TO DO WITH LAW AND WHY IT MATTERS* 19, 22 (2000); Johnsen, *supra* note 183, at 274.

186. Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 347 (1967).

The standard definition of an economic “good” is that it consists of anything for which more is preferred to less. But what is the “thing”? It is not necessarily a tangible object. Any tangible object, Blackacre for example, will generate value on multiple dimensions, each of which might be treated as a separate intangible “thing” owned, in law or in fact, by separate parties and with their boundaries imperfectly defined and enforced.¹⁸⁷ Partition of the surface and mineral estates in land, various servitudes on the surface estate, leases, and usufructs are obvious examples.

Economic property rights consist of the ability to exercise choice through time over one or more intangible sources of value that can be regarded as a capital asset,¹⁸⁸ often but not invariably embodied in an identifiable thing in the following sense. “Rights” of any kind do not simply give the holder the ability to capture value; they also give the holder the ability to expect to capture value, potentially as a stream that flows out over time on some dimension of a legally ownable good. Rights to the yearly harvest of apples from an orchard, rights to the orchard’s yearly flow of nectar for honey, and rights to collect branches periodically pruned from the trees for use as firewood are obvious examples. Rights over these value flows can be unbundled and packaged into separate intangible assets, with their capitalized value, or wealth, equaling the expected value of the net flows discounted to present value.¹⁸⁹

To the extent the structure of rights is clear and reliable, the parties often find it worthwhile to cooperate to increase their joint wealth by making specialized investments in their respective assets. Specialized investment to protect an asset from capture by others is one source of value creation. Another, conditional on the first, is specialized investment to increase the productivity of the asset.

187. Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691, 1691–92 (2012).

188. Even in law, intellectual property rights are intangible and generally have no association with any tangible thing.

189. See Smith, *supra* note 187, at 1693 (“Property organizes this world into lumpy packages of legal relations—legal things—by setting boundaries around useful attributes that tend to be strong complements. The law of property in effect encapsulates these lumpy packages, or modules, semitransparently from other modules and the outside world generally.” (footnote omitted)).

Economic property rights motivate specialists to make informed investments in the assets over which they exercise choice, especially where future states of the world are uncertain. In many settings, an asset owner cannot simply hire a valuation specialist as a consultant to provide the necessary expertise because the cost of assessing the specialist's valuation in a noisy world are too high.

As the world unfolds, asset values often depart from what was expected at the moment of investment. This can occur because of random noise, which the specialist cannot control, or because he exercised poor judgment or simply shirked—call it “entrepreneurial moral hazard.” Knowing little about the specialist's expertise, a non-specialist owner lacks the wherewithal to effectively assess whether random noise or moral hazard caused a bad outcome. Where the costs of transacting allow, requiring the specialist to make the investment and to own the results by bearing the asset's residual value averts moral hazard and increases the gains from trade.¹⁹⁰ Assigning responsibility in this way is an important function of economic (and legal) property rights.¹⁹¹

Secured lending provides insight into one among many possible examples of how intangible assets can be unbundled and owned separately from a tangible thing. Imagine construction of a commercial building to be used as an office tower by a specialist in office-tower (OT) management. Unknown to the OT specialist, should the bad state come to pass, the best alternative use of the office tower is converted into a hotel. Public reports confirm that office-tower-to-hotel conversions have occurred in significant numbers at times during the past.¹⁹² Office

190. YORAM BARZEL, *ECONOMIC ANALYSIS OF PROPERTY RIGHTS* 56 (1989); Armen A. Alchian & Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 *AM. ECON. REV.* 777, 782 (1972).

191. If someone claims to have special expertise at creating value on Dimension X of an identified thing, it is efficient for him to own the associated residual subject to the constraint of costly transacting. Alternatively, if economic ownership of Dimension X is given to someone with restrictions on resale, as with restricted stock, he has an incentive to invest in specialized expertise to enhance its value.

192. See, e.g., Drew Ward, *Old offices get new lease on life as hotels*, *WALL ST. J.*, Aug. 21, 1996, at B1; Laura Kusisto, *Desks Swapped for Bed: As Demand for Rooms Increases, Office Building Are Converted to Hotels*, *WALL ST. J.* (Mar. 25, 2012), <https://www.wsj.com/articles/SB10001424052702303404704577304041654456890> [<https://perma.cc/Q2GL-AW4G>]; Kosaku Narioka, *Land-Squeezed Developers Con-*

towers with rectangular floor plans make better conversions than those with square floor plans because they ensure each room has a window without leaving dead space in the center of the building. For given square footage, however, the construction costs of rectangular floors plans are higher because of their greater wall perimeter per square foot of floor space.

In contemplating the investment, an OT specialist is likely to wonder what he can do with buildings of various configurations if the bad state occurs. If he finances a portion of construction cost with secured debt, he is likely to find he can borrow more to finance a tower with a rectangular floor plan than one with a square floor plan, because the secured lender is a specialist at knowing what can be done with the building in the bad state and how much it will fetch when redeployed should the OT specialist default. The lender bonds his valuation of the building's redeployment value as a hotel by lending this amount minus anticipated transaction costs and taking a security interest in the tower. If he is correct, he profits, and if he is incorrect, he suffers losses. Embodied in the tangible thing, the building, are two intangible assets, an office tower and a hotel, each owned by the appropriate specialist.¹⁹³ And this is true even in the absence of secured lending, although it may remain unknown to the OT specialist, making it difficult for him to know when redeployment is called for and raising the cost of discovering the best alternative use of the OT.

The OT specialist need not know any of this if he borrows with a secured nonrecourse loan. He makes his decision about the best configuration of the building for use as an office tower after trading off alternative construction costs and loan terms from different lenders. Ex post, he then defaults if the revenue the building generates in the future falls short of his mortgage payments, which is the jointly efficient thing to do. The OT

vert Office Buildings Into Hotels, WALL ST. J. (May 2, 2017), <https://www.wsj.com/articles/land-squeezed-developers-convert-office-buildings-into-hotels-1493736404> [<https://perma.cc/Q5F6-AEKA>].

193. A skeptic might point out that secured lenders such as banks have no apparent specialized expertise. The response is that they serve as intermediaries between different specialists. It is clear from some industries, however, that lenders do have specialized expertise, as in the case of aircraft leasing-lending. See generally Michel A. Habib & D. Bruce Johnsen, *The Financing and Redeployment of Specific Assets*, 54 J. FIN. 693 (1999).

specialist bears the residual from his accuracy in predicting the payoff to the building as an office tower, the lender bears the residual from his accuracy in predicting the building's redeployment value, and the arrangement avoids ex post bargaining on revelation of the state. Default is a feature, not a bug.

Hiring a consultant to provide the information embedded in the lender's valuation and actually carrying out the conversion would require the OT specialist to incur inordinate transaction costs, for example by spending resources bargaining ex post in the event redeployment becomes necessary. Secured debt reduces the transaction costs of discovering this information and arranging for redeployment by efficiently allocating ownership across states of the world in a way that is nearly self-executing.¹⁹⁴

V. SUMMARY AND CONCLUDING REMARKS

The theoretical foundation Coase laid by highlighting the cost of transacting as a basis for understanding economic organization has dramatically changed the way we should regard regulation. One need only refer to the history of antitrust case law to see the dramatic influence of Coase's work. Where once courts condemned vertical business arrangements as illegal per se, vertical arrangements now command a full factual inquiry under the rule of reason, in large part because courts have recognized they reduce the costs of transacting.¹⁹⁵ In practical effect, they have taken on reasonable per se status. Recent judicial review of both executive and independent agency rulemaking requires regulators to assess the costs and benefits of proposed rules and to justify them on some kind of proportionality basis. This requirement stands to impose an equally dramatic constraint on the growth of the administrative state if it is properly conceived and implemented.

Cost-benefit analysis is one approach to proportionality review, but it is plagued by serious informational problems that

194. See generally *id.*; Michel A. Habib & D. Bruce Johnsen, *The Private Placement of Debt and Outside Equity as an Information Revelation Mechanism*, 13 REV. FIN. STUD. 1017 (2000); D. Bruce Johnsen, *The Quasi-Rent Structure of Corporate Enterprise: A Transaction Cost Theory*, 44 EMORY L.J. 1277 (1995).

195. See generally Johnsen, *supra* note 114.

the neoclassical model was never designed to address, such as measuring infra-marginal welfare or valuating non-traded goods. Instead, the model is designed to generate comparative statics predictions capable of being tested by real world facts, a task it has performed admirably well with increasing success, including by integrating transaction costs into the analysis.

This Article proposes an alternative approach to assessing proportionality, TCBA. Transaction cost-benefit analysis captures Coase's fundamental point that the parties to market transactions routinely cooperate to maximize the joint gains from trade but that transaction costs keep them from achieving first best resource allocation. In a Coasean framework, any regulation that reduces the parties' costs of transacting can be presumed to increase their joint gains from trade net of transaction costs.

Unlike traditional CBA, which requires a cardinal accounting of the total costs and benefits of a rule change, TCBA has the benefit of requiring the regulator to identify only the direction of the marginal effect the rule is likely to have on the parties' costs of transacting, leaving them to conduct the associated proportionality review. Allowing regulators to establish a presumption of proportionality by showing a proposed rule reduces the relevant costs of transacting should substantially reduce the informational burden they face. It is both consistent with the neoclassical model's comparative statics focus and with the notion that correcting market failure should be the driving force behind regulation.

Showing that a proposed rule reduces transaction costs is not the only way to establish proportionality, and it may be inappropriate or impractical in some settings. Transaction cost-benefit analysis is most workable where the regulated parties transact face-to-face in competitive markets. In these settings, regulators should be able to identify the relevant parties, the economic good and market in which they transact, the nature of the market failure they suffer, and the relevant transaction costs that prevent them from achieving first-best resource allocation. With this information at hand, a determined regulator can plausibly predict how a proposed rule is likely to affect the relevant transaction costs. Reliably doing so requires the regulator to wholly embrace the neoclassical model's fundamental insight that market participants, though remorselessly self-

interested, will normally try to cooperate for their mutual gain. And this true no matter how grasping, or ill-informed, or irrational they actually appear to be. Unless observed departures from *homo economicus* can be properly integrated into the model's analysis they should be treated as pure noise.

Transaction cost-benefit analysis is likely to prove most helpful where transaction costs are fairly low. Examples include the many vertical relationships currently subject to regulation, including but not limited to the following: (1) the issuers of corporate stock, the broker-dealers who place and trade their securities, and the institutional and retail clients who hold them; (2) the securities exchanges, their members, and the holders of corporate securities; (3) commodities brokers and their clients; (4) merchants, credit card-issuing banks, and cardholders; (5) defined benefit pension plans and their members; (6) employers and employees in the context of workplace safety; (7) product-market manufacturers, retailers, and consumers in the anti-trust context; (8) pharmaceuticals and medical devices, doctors, and patients; etc. Even in these low transaction cost settings, however, traditional CBA should also be performed, if only as a robustness check.

At the other extreme, TCBA may provide few clear answers where transaction costs are high, as with the provision of vaccines to protect against infectious diseases; the management of migratory birds, whales, or other fauna that do not respect sovereign boundaries; and the control of emissions from polluting factories whose smoke comes to ground many miles from the source, for example. Determining the direction of the effect of proposed regulations on the costs of transacting in these settings may be extremely difficult, but it is certainly no more difficult than the cardinal accounting for costs and benefits that traditional CBA would require.

At the very least, TCBA explicitly recognizes an overall framework essential for the proper conduct of CBA, and both should be conducted in parallel. Masur and Posner correctly argue that requiring regulators to perform CBA according to established protocol would be beneficial even where costs and benefits are impossible to reliably quantify because it puts the regulator on record and provides a basis for ex post iterative

learning.¹⁹⁶ Similarly, even where transaction costs are high, TCBA should be used to inform the long-run process of knowledge accumulation.

Transaction costs may appear extremely high, potentially even seemingly prohibitive, in some settings, such as with intergenerational exchange. How do future generations make their willingness to pay felt in the present? In certain settings the solution is deceptively simple. Simply create some form of legal property rights. Allowing private parties to own wildlife stocks has proven to be a powerful mechanism for preservation in many cases. The shift from prohibiting trade in alligator hides to allowing trade in certified farm-raised alligator hides probably helped saved the species.¹⁹⁷ With trade in and profit from alligator hides impossible, habitat destruction due to development led to an alarming decline in numbers during the 1960s. The shift to allowing trade in certified farm-raised alligators' hides put profit into preservation. Alligator populations rebounded.¹⁹⁸ All that was needed was a reliable certification process for legitimate private ownership of hides.

Ted Turner is known for owning and stewarding an expanding population of bison on his large, heavily fenced landholdings in the Rocky Mountain West.¹⁹⁹ With private ownership, future generations' willingness to pay for bison meat or hides, or just for the opportunity to view bison, in their natural setting is transmitted through the price mechanism to the current generation by private ownership. No one has ever expressed fear, for example, that chickens will go extinct and leave future generations wanting. Their owners have too much to gain by transferring chicken populations to the next generation for profit.

196. Masur & Posner, *Cost-Benefit Analysis*, *supra* note 5, at 945.

197. See Robert A. Thomas, *Hunting Alligators*, PERC REPORTS, Sept. 1999, at 12, 12; LA. DEP'T WILDLIFE & FISHERIES, *General Alligator Information*, <http://www.wlf.louisiana.gov/general-alligator-information> (last visited Jan. 21, 2019) [<https://perma.cc/7AWU-JU7Z>].

198. See Thomas, *supra* note 197, at 12; LA. DEP'T WILDLIFE & FISHERIES, *supra* note 197.

199. See *Turner Ranches FAQ*, TURNER ENTERPRISES, INC., <https://www.tedturner.com/turner-ranches/turner-ranches-faq/> [<https://perma.cc/YG3X-A6R5>] (last visited Jan. 15, 2019); Deena Shanker, *Bison Returned From the Brink Just in Time for Climate Change*, BLOOMBERG (July 31, 2017), <https://www.bloomberg.com/news/features/2017-07-31/bison-returned-from-the-brink-just-in-time-for-climate-change> [<https://perma.cc/R8S2-NLTP>].

Reports have surfaced recently that honeybee colonies are threatened owing to disease, and that they are dying out at an alarming rate.²⁰⁰ The results, we are told, could be disastrous because honeybees are an “apex” species essential for pollination and possibly even for mankind’s very existence.²⁰¹ More sober reports reveal that private owners—beekeepers—are introducing new colonies at the replacement rate.²⁰² At least for the time being, honeybees are safe because they are privately owned.

In each of these examples, private property reduces the transactions costs the affected parties must bear to make their valuations felt. Where private ownership is too costly to be feasible, intermediate solutions have proven viable so that legal property rights properly channel the competitive race for economic property rights and thereby reduce the costs of transacting. Throughout the world, various marine fisheries were once in shambles, with dangerously low and declining stocks owing to open access resource rights.²⁰³ Under open access, ownership of individual fish occurs only when they are reduced to the fisher’s possession under the law of capture. No fisher has the incentive to reduce fishing effort to maintain or enhance the stocks necessary for regeneration. The race for economic prop-

200. Sean Rossman, *A Third of the Nation’s Honeybee Colonies Died Last Year. Why you should care.*, USA TODAY (May 26 2017), <https://www.usatoday.com/story/news/nation-now/2017/05/26/third-nations-honeybee-colonies-died-last-year-why-you-should-care/348418001/> [<https://perma.cc/SQ4T-ELVP>]; see also Alan Bjerga, *Honeybees May Be Dying in Larger Numbers Due to Climate Change*, BLOOMBERG (May 24, 2018), <https://www.bloomberg.com/news/articles/2018-05-23/bee-death-increase-may-be-tied-to-climate-change-survey-says> [<https://perma.cc/4H6V-XBQ6>].

201. One third of food eaten by humans is directly or indirectly pollinated by honeybees who “pollinate about \$15 billion worth of U.S. crops each year” including the entirety of the U.S. almond industry. Rossman, *supra* note 200.

202. Shawn Regan, *How Capitalism Saved the Bees*, PERC REPORTS (July 20, 2017), <https://www.perc.org/2017/07/20/how-capitalism-saved-the-bees/> [<https://perma.cc/V36U-3ET7>].

203. See, for example, the North Sea herring stock’s collapse in the 20th century due to overfishing or the Campeche shrimp fishery’s decline due to open access conditions and overfishing. See Edward B. Barbier & Ivar Strand, *Valuing Mangrove-Fishery Linkages: A Case Study of Campeche, Mexico*, 12 ENV’T & RESOURCE ECON. 151 (1998); Mark Dickey-Collas, et al., *Lessons learned from the stock collapse and recovery of North Sea herring: a review*, 67 ICES J. MARINE SCI. 1875 (2010).

erty rights dissipated the value of many marine resources and put a large number of species on the endangered list.

Traditional gear and entry restrictions have proven incapable of stemming the decline. The advent of individual transferable quotas (ITQs) has changed all that, in part by reducing transaction costs. With an ITQ system, the regulator sets the total allowable catch for the season and each ITQ holder has a right to harvest his allotted share. With the total allowable catch fixed at presumably sustainable levels, each fisher's share becomes a specific number of fish and there is no need to race to catch fish before others do. With IQTs being transferable, inefficient or high cost fishers are free to sell their rights to those who are more efficient and, therefore, willing to pay an attractive price. The seller receives compensation for relinquishing his rights, harvesting costs fall, and both parties capture gains from trade. What is more, under an ITQ system quota, holders have an incentive to invest to enhance the underlying stocks.²⁰⁴ The evidence is clear that fish populations across the globe have prospered where ITQs have been implemented.²⁰⁵ Compared to gear and entry regulations under open access rights, ITQs reduce the transaction costs affected parties face to make their valuations felt and to capture the value flows over which they hold fairly clear legal and economic rights.

Executive Order 12,866 requires executive agencies to base decisions on "the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation."²⁰⁶ This Article argues that TCBA qualifies, and is a plausible alternative to traditional CBA that can serve as both a complement and a substitute. Following Executive Order 12,866, the presumption should be that "the private sector and private markets are the best engine for economic growth" and should be regulated only when the case can be made that they suffer from a "material

204. See TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* 107–21 (2001).

205. Christopher Costello & Robert Deacon, *The Efficiency Gains from Fully Delineating Rights in an ITQ Fishery*, 22 *MARINE RESOURCE ECON.* 347 (2007).

206. Exec. Order No. 12,866, § 1(b)(7), 3 C.F.R. 638, 639 (1994), *reprinted as amended in* 5 U.S.C. § 601 app. at 88 (2012).

failure[]."207 Observed patterns of interaction that persist in the market presumptively reflect the best efforts of the parties to capture gains from trade, constrained as they inevitably are by the costs of transacting. Sensible regulation must be premised on understanding why, and under what current circumstances, observed market practices reflect an equilibrium determined in part by the costs of transacting and how government regulation might improve the equilibrium by reducing transaction costs. Transaction cost-benefit analysis promises to provide an effective and economically correct tool in the emergent trend to constrain the administrative state.

207. *Id.* pmb1., § 1(a), at 638.