

University of Pennsylvania Law School
Penn Law: Legal Scholarship Repository

Faculty Scholarship

10-2013

Coase

Herbert J. Hovenkamp
University of Pennsylvania Law School

Follow this and additional works at: http://scholarship.law.upenn.edu/faculty_scholarship

 Part of the [Economic History Commons](#), [Legal Commons](#), and the [Legal History Commons](#)

Recommended Citation

Hovenkamp, Herbert J., "Coase" (2013). *Faculty Scholarship*. 1842.
http://scholarship.law.upenn.edu/faculty_scholarship/1842

This Article is brought to you for free and open access by Penn Law: Legal Scholarship Repository. It has been accepted for inclusion in Faculty Scholarship by an authorized administrator of Penn Law: Legal Scholarship Repository. For more information, please contact PennlawIR@law.upenn.edu.

COASE

Herbert Hovenkamp*

Ronald Harry Coase (1910-2013) was born in suburban London. His father worked for the British post office as a telegraph operator, as did his mother until marriage. Coase attended the University of London and then the London School of Economics, receiving a Bachelor of Commerce degree in 1932. After lectureships at Dundee and Liverpool he returned to LSE from 1935 to 1951. He then moved to the United States to the State University of New York at Buffalo. In 1958 he went to the University of Virginia, and in 1964 to the University of Chicago. For a time he was editor of the *Journal of Law and Economics*. Coase received the Nobel Prize in Economics in 1991. By his own admission, he did not like mathematics – a fact that set him apart from most of the economists of his generation.

Coase was hardly the most prodigious writer among Nobel laureate economists, but what he wrote was highly influential. Indeed, in a real sense he may be called the father of the discipline of law and economics. His reputation rests heavily on two articles. "The Nature of the Firm" (Coase, 1937) was written during the period 1932-1934, while Coase was an assistant lecturer at the School of Economics and Commerce, Dundee, Scotland (Coase, 1994). He wrote "The Problem of Social Cost" (Coase, 1960) while he was at the University of Virginia.

Coase has stated that "The Nature of the Firm" was conceived in 1931 and essentially finished in 1934. He was in his early twenties and just beginning his academic career. His article was intended to address a different issue than the ones that eventually made it prominent. Marginalists since the great industrial economist Alfred Marshall at Cambridge were troubled about why a single industry contains firms of different sizes and structures. For example, if fixed costs were at all substantial, one might expect the market to be taken over by a single firm, which would have lower per unit costs than any rival. In the highly influential eighth edition of his *Principles of Economics* (1920) Marshall developed the idea of the "representative firm," a hypothetical mature firm with "normal" cost characteristics, although individual firms in various stages of development could vary. Marshall never specified precisely what made a firm "representative," and identifying it was like identifying the "representative" tree in a forest (Marshall, 1890; 1920).

This analytically unsatisfactory theory led to criticism and attempts at refinement. One influential critique was American economist John Maurice Clark's book on fixed costs (Clark, 1923), which addressed the problem in terms of diverse technologies and

* Ben V. & Dorothy Willie Professor of Law and History, University of Iowa. Thanks to Erik Hovenkamp and Robert T. Miller for commenting on a draft.

pricing strategies: scale economies don't produce a single firm because firms are not identical. The subsequent rise of theories of product differentiation made the idea of a "representative" firm obsolete in microeconomics, although it retained more traction in macroeconomics, particularly in Keynes. Firms in differentiated markets can have quite different sizes and structures. They compete by appealing to divergent consumer tastes.

In 1928 Lionel Robbins, head of the London School of Economics, strongly criticized Marshall's concept of the representative firm for failing to apply the very marginalist rigor that Marshall himself advocated. (Robbins, 1928). Arthur Cecil Pigou, Marshall's successor at Cambridge, developed the idea of the "equilibrium firm," arguing that a firm will expand when its marginal cost is lower than the market's supply price, but contract when it is higher. The equilibrium firm is one whose marginal cost just equals the market supply price. In 1931 Cambridge economist E.A.G. Robinson added in *The Structure of Competitive Industry* that "management costs" must also be considered in any question about firm size and structure (Robinson, 1931; Hovenkamp, 2011). So Coase was not writing on a clean slate.

This history explains Coase's strange paean to Marshall in the opening paragraphs of "The Nature of the Firm." Coase stated his intent to use "two of the most powerful instruments of economic analysis developed by Marshall, the idea of the margin and that of substitution, together giving the idea of substitution at the margin." (Coase, 1937). By 1937 the ideas of marginalism and substitution to equilibrium had become conventional in economics. They were not worth mentioning, except that Coase was pointing out a gap in Marshall's approach. Coase then observed that marginal cost includes all relevant incremental costs, including what he termed "marketing costs," by which he meant "the costs of using the price mechanism." The term "transaction costs," for which Coase is now popularly associated, did not appear in this article.

Coase's highly elegant model argued that for every production or distribution decision a firm compares alternative approaches, including purchase on the market as an alternative to internal production, by various means. Internal production, internal management, and use of external markets are all costly. The firm's management selects the alternative that maximizes firm value. The aggregate of these decisions accounts fully for the firm's size and "shape" -- that is, the variety of markets in which it operates and the extent of its vertical integration. The elegance of Coase's argument lay not only in its simplicity, but also its enormous range, extending far beyond vertical integration itself to such questions as whether to differentiate one's product, use more or less centralized governance, equity or debt financing, and the like. In the process "The Nature of the Firm" developed a powerful theme that came to dominate Coase's work -- namely, a property right and a contract are simply alternative ways of getting something done. For example, an automobile maker's decision whether to build its own spark plugs or purchase them is simply a choice between property and contract.

Over his career Coase repeatedly criticized "blackboard" economists who abstracted from reality, repeatedly calling for more empirical research. (e.g., Coase, 1992). But the empirical research that went into "The Nature of the Firm" is minimal. Coase visited a few firms, conducted a very few interviews, and overheard some phone calls about procurement. His theory was purely analytic in the British tradition, assuming how a rational actor would select among alternative production decisions.

"The Nature of the Firm" lay ignored for thirty years after its publication, with leading texts on industrial organization not even mentioning it (e.g., Bain, 1959). In 1942 the prominent economist and public intellectual Kenneth E. Boulding wrote an article discussing the leading literature on the theory of the firm over the preceding ten years, but did not cite Coase's article (Boulding, 1942). It was finally re-discovered after "The Problem of Social Cost" was published in 1960 (Cheung, 1983).

In 1959 Coase published an article arguing that an auction-style market would be a better way to allocate radio spectrum than the largely political arrangements currently in use: "...it is not clear why we should have to rely on the Federal Communications Commission rather than the ordinary pricing mechanism to decide whether a particular frequency should be used by the police, or for a radiotelephone, or for a taxi service...." (Coase, 1959) That article contained this insight that came out of "The Nature of the Firm," but became the basis of "The Problem of Social Cost" a year later. Speaking of a cave, Coase noted that the law of property determines who owns it. However,

...the law merely determines the person with whom it is necessary to make a contract to obtain the use of the cave. Whether the cave is used for storing bank records, as a natural gas reservoir, or for growing mushrooms depends, not on the law of property, but on whether the bank, the natural gas corporation, or the mushroom concern will pay the most in order to be able to use the cave. (Coase, 1959, at 25).

The principal purpose of governmental spectrum allocation, Coase observed, was to prevent interference that occurred when spectrum assignments conflicted with one another. Coase introduced the case of *Sturges v. Bridgman* (1879), a nuisance dispute involving a physician who shared a building with a confectioner. The thumping of the confectioner's mechanical mortar and pestle interfered with the physician's use of his stethoscope. Coase pointed out that neither *Sturges* nor the spectrum case involved conflicts between a wrongdoer and a victim. They merely represented inconsistent property interests. In a well functioning market the interest would go to the person who was willing to pay the most for it.

Coase elaborated on this theme a year later in "The Problem of Social Cost." (Coase, 1960). His foil was no longer the FCC but rather Pigou, who had died the

previous year. Pigou was the first neoclassical economist to write extensively about how the costs of moving resources should be factored into economic analysis, although his concept of "costs of movement" was more inclusive than Coase's "transaction costs." Pigou argued that in cases involving multiple, unorganized users of rivalrous resources, individuals would tend toward excessive use. In such cases the state should intervene with taxes or regulations designed to encourage efficient use. One example, that Pigou gave and Coase discussed was the factory that belched smoke, injuring downwind landowners. Clean air was the resource in question. To the extent the factory did not bear the full social cost of dirty air it would overpollute. Pigou argued that the factory should be given legal liability so as to reduce or eliminate the smoke, or else assessed a tax that was "equivalent in money terms to the damages it would cost." (Pigou 1932, Ch. 9). Coase argued that it was incorrect to think of the factory as the "wrongdoer" and the property owners as victims. Both performed useful social activity that were simply inconsistent uses of land. His second point was that without transaction costs private bargaining would address the problem, not necessarily by shutting the factory down, but rather by assigning the right to whoever valued it most highly.

Coase did not invent the term "Coase Theorem." That credit belongs to George J. Stigler, Coase's colleague at Chicago. Stigler also provided this definition: "Under Perfect Competition Private and Social Costs will be Equal." (Stigler, 1966, p. 113) The definition was probably intended to capture Coase's differences with Pigou.

Stigler's initial definition caught Coase's insights very poorly. Coase's paper had virtually nothing to do with perfect competition. The markets in "The Problem of Social Cost" are largely bilateral monopolies, and Coase readily acknowledged that the price at which legal entitlements in such markets are transferred is indeterminate. Under perfect competition prices are at marginal cost. Finally Stigler's definition trivializes the Coase Theorem by turning it into a minor and fairly obvious corollary of the First Welfare Theorem, which was already well known when "The Problem of Social Cost" was published. (Blaug 2007). Coase corrected Stigler's statement to say "with zero transaction costs private and social costs will be equal." (Coase, 1988, p. 158). Stigler later revised his definition to state "when there are no transaction costs the assignments of legal rights have no effect upon the allocation of resources among economic enterprises...." (Stigler, 2003, at 77).

As formalized, the Coase Theorem is said to have two parts, or perhaps two different applications, which are not mutually exclusive. First, an "efficiency" thesis states that if transaction costs are zero, then the initial allocation of a right is irrelevant to efficiency because the right will be traded to its highest value user. The final allocation maximizes private value among the bargainers. It also maximizes social value, *provided* that no outsider to the bargain is adversely affected -- that is, there are no negative externalities. Second, an "invariance" thesis states that if transaction costs are zero, then

where the right ends up is invariant to the underlying legal rule that creates it -- "irrespective of the initial assignment of rights." (Coase, 1992). One limitation is that the right must be "alienable," meaning that the parties can contract around it through settlement. For example, in *Sturges* it does not matter whether Bridgman's mortar and pestle is or is not declared a nuisance. Whether the machine is shut down depends entirely on whether Sturges values the right to be free of the noise more than Bridgeman values the right to use the machine. One problem with "inalienable" legislated rights is that the parties cannot bargain around them. For example, if a zoning law prohibited the use of Bridgeman's machine, then the parties could not bargain to the efficient solution if use of the machine was more valuable than the interference it caused. At least for biological actors, the endowment effect can undermine the invariance thesis if an actor's willingness-to-accept for a particular right is greater than his willingness-to-pay. (Hovenkamp, 1990; Kahneman, et al, 1990).

Writing about the Coase Theorem has been voluminous, making "The Problem of Social Cost" the most cited law review article of all time. It drew an almost immediate response in tort and property law, two areas where the infant law and economics movement cut its teeth. In 1964 University of Chicago law professors Walter Blum and Harry Kalven acknowledged its importance in an article on tort liability. They observed, however, that the actors in Coase's account were neighbors well aware of the accident possibilities before they occurred. The Theorem would not work for automobile accidents, however, because prior to the accident the parties would not be in a position to negotiate over such issues as right of way. (Blum & Kalven, 1964; see Medema, 2013).

By contrast, Guido Calabresi developed an alternative that relied on objective criteria for determining who would have won a bargain had the parties been able to negotiate. In such cases liability should be assigned to the "least cost avoider." (Calabresi, 1970) From there the debate spread into numerous areas, including questions such as when strict liability was a more efficient tort rule than negligence. In property law the literature considered whether common law rules such as nuisance or else private restrictive covenants were effective alternatives to zoning. (E.g., Ellickson, 1973).

Another issue was the choice between "alienable" rules that could be privately bargained and "inalienable" rules that could not be. (Calabresi and Melamed, 1972). Generally speaking, private injunction rules with alienable entitlements set up a mechanism like the one Coase contemplated. The rule creates a property interest in a plaintiff, if entitled to the injunction, but permits the parties to bargain around it. By contrast, a pure damages rule permits the conduct to continue but may require one person to pay the other an amount determined by the court. Once again, however, the parties are free to negotiate their own private arrangement. An "inalienability" rule, by contrast, assigns the right in one way and prohibits the parties from changing it by private agreement.

Generally speaking, inalienability rules make the most sense when transaction costs are high, meaning that the parties are unlikely to reach the efficient bargain, *provided* the State can by objective means determine which party would have won the right in a free bargain. For example, the common law rule requiring cars to yield to trains at grade crossings ordinarily creates an inalienability rule. When both are speeding toward the intersection, the car and the train are not in a good position to bargain over the right of way. Further, the costs of stopping and restarting are much higher for the train than for the car. So the state assigns the right of way to the train.

The choice between injunction rules and damages rules is more problematic. One view is that injunction rules are preferred when transaction costs are low and the parties are likely to bargain to an efficient result. By contrast, damages rules are superior when value determination is complex, perhaps because multiple parties are involved or there might be holdouts. One critique of this view is that it implicitly assumes that the court is a better decision maker than the parties themselves. (Polinsky, 1980; Krier & Schwab, 1995) The common law, it should be noted, tends to prefer injunctions more as damages are more difficult for an external observer to calculate. For example, breach of an agreement to sell land, thought to be unique, is usually remedied by specific performance. However, breach of an agreement to sell a commodity is generally remedied by expectancy damages. In 1972 then Professor Richard A. Posner analyzed these and many other questions in his regularly updated book *Economic Analysis of Law*, which was explicitly indebted to Coase and in a real sense institutionalized law and economics in legal analysis.

A "Coasean market" is one in which all affected parties must agree before a particular transaction can occur. In a traditional neoclassical market, by contrast, there might be thousands of buyers and sellers but only one of each is necessary to a deal. For example, when one buyer purchases bread from one seller the rest of the market does not participate and is largely indifferent. The difference among markets is readily apparent in a case such as *Sturges v. Bridgeman*. While Victorian London contained thousands of physicians, confectioners, and suitable houses, the "market" that Coase discusses involved a single seller, a single buyer, and a single duplex house. In the long run either *Sturges* or *Bridgeman* could avoid the conflict by moving way, thus indicating that Coase's focus is not merely on a very tiny market but also on the short run. This small grouping is a market to the extent that the costs of exiting exceed the costs of reaching a bargain and staying. One important impact of the Coase Theorem was to increase economists' focus on very small markets, such as the two parties to a tort dispute, a few homeowners in a subdivision, a husband and wife, or the relation between shareholders, creditors, and managers in a single firm.

The requirement that all parties in a Coasean market must agree poses difficulties as the number of parties increases or their interests are more diverse. For example, a

smokestack factory might willingly compensate 100 downwind landowners in order to keep running. But each one may be entitled to an injunction (abatement of the nuisance), so all must agree about how to share the award. More adjacent landowners, larger landowners, or those with more valuable homes will seek a larger share, and until these issues are resolved there will be no agreement. The result could be endless cycles of coalitions and counter-coalitions. That this is a consequence of high transaction costs is by no means clear. A rational participant bargains as long as the cost of a further offer is less than the expected payoff. So if bargaining were indeed costless but there was any uncertainty about outcomes bargaining would not stop. In these situations positive transaction costs force the agreement by making continuing bargaining more costly at the margin than any expected payoff. The transaction/bargain cost curve thus has a lopsided "U" shape, with endless bargaining when transaction costs are near zero, more successful bargaining when they are a little higher, and less successful as they rise to yet higher levels.

When multiparty Coasean bargains do occur they can result in excessive stability. Exiting from them can be just as difficult as entering them in the first place. For example, zoning laws can usually be changed by the majority vote of a legislative body as economic conditions change. By contrast, contractual servitudes generally require the unanimous consent of all affected parties, producing significant holdup problems when the majority believes or market values indicate that a servitude has become counterproductive. (Hovenkamp, 2002).

Coase acknowledged many of these difficulties in his 1959 article on the Federal Communications Commission, although he paid little attention to them later and much of the transaction cost literature has ignored them. Coase noted that "when large numbers of people are involved, the argument for the institution of property rights is weakened and that for general regulations becomes stronger." Speaking of smoke pollution, he acknowledged that "if many people are harmed and there are several sources of pollution, it is more difficult to reach a satisfactory solution through the market." As a result, "in these circumstances it may be preferable to impose special regulations...."(Coase, 1959, at 27, 29).

These admissions invite the question whether Coase really attacked Pigou fairly. The argument for Pigouvian taxes was not concerned about conflicting rights as between two bargainers where no one else was affected. Rather, it was with problems such as highway congestion or pollution, which affect many users, both spatially and often temporally. As a result Pigouvian taxes, such as a carbon tax, continue to have support among mainstream economists. (E.g, Mankiw, 2012, pp. 207-210; Medema, 2011; Baumol, 1972) The cost of fossil fuels includes not only production and distribution costs, but also longer run environmental costs. The affected interests include hundreds of millions of people and even future generations.

In the 1960s and 1970s "The Nature of the Firm" was rediscovered. Together with "The Problem of Social Cost," they became cornerstones in the development of "New Institutional Economics" (NIE) and its variations, sometimes called "organizational economics" or "transaction cost economics." The earlier work of Oliver E. Williamson, particularly *Markets and Hierarchies*, probably did more than anything to bring "The Nature of the Firm" into the spotlight. (Williamson, 1975) NIE refocused economic study on "institutions," an idea developed by the first generation of institutionalist economists a half century earlier, including Thorstein Veblen, Richard T. Ely, and John Commons. But NIE was dramatically different from the generally nontechnical, evolutionary, and often anti-marginalist conceptions of the original institutionalists. (Hovenkamp, 2013) The general thrust of NIE was to move economics away from large traditional markets to the study of very small ones, even viewing relationships inside the organization as a market. While the Coasean literature as applied to separate economic actors spoke of "transaction costs" as interfering with the efficient allocation of resources, the concept of "agency costs" came to describe costs internal to the firm that might obstruct efficient value maximization (e.g., Jensen & Meckling, 1976). Another result was more refined studies of the risk and cost profiles that firms faced in deciding whether and how to integrate, including the significant costs of making costly, specialized commitments to one's trading partner. (e.g., Klein, et al, 1978; Coase, 2000).

Coase made several other contributions to economics, including law and economics. One was his 1946 article "The Marginal Cost Controversy." In 1938 Harold Hotelling had argued that, because marginal cost pricing is essential to competition, outcomes in industries with very high fixed costs, such as railroads and electric utilities, would be suboptimal. (Hotelling 1938). Prices would be driven to marginal cost, with insufficient surplus to cover fixed costs. The correction was government subsidies permitting such firms to recoup their fixed cost investment. Coase's rejoinder was to develop the concept of two-part pricing, with an entry or access fee to cover the fixed cost component and a per use variable fee to cover the marginal component. (Coase, 1946). Most of the subsequent literature on Coase's argument concludes two things. *First*, two-part pricing will rarely yield optimal outcomes when competitive providers set their own prices, although they are often more efficient than purely linear pricing. *Second*, however, two part tariffs can be (and are) an effective way to encourage closer-to-optimal output in price-regulated markets by bringing the per use price closer to marginal cost. (Tirole, 1988, pp. 142-146; Brown, et. al. 1992).

Two of Coase's important contributions in the early 1970s concerned the diverse topics of the durable goods monopolist and the scope of public goods. An article on durability and monopoly developed the "Coase conjecture" that in the very act of selling the monopolist of a durable good dissipates its monopoly power. (Coase, 1972) It ends up competing with its own previous output, resold on secondary markets. Durability

varies considerably, from nearly perfect in the case of land (Coase's opening example) to highly imperfect in the case of clothing (a used suit at Goodwill is a poor competitor for a new suit at Macys). The value of such a monopolist's output, Coase argued, depends on its ability to make a credible commitment to limit future output. For example, while van Gogh's painting *The Starry Night* (1889) is priceless, people can obtain a copy for \$5 because the painting is in the public domain and no one can make a credible commitment that future output will be limited. In addition, the durable goods monopolist may be able to profit by leasing rather than selling.

In "The Lighthouse in Economics" (Coase, 1974) Coase wondered about the extent to which traditionally defined public goods really constitute a market failure. The lighthouse had appeared frequently in the economics literature as a public good that needed to be supplied by the government. However, Coase observed, privately owned lighthouses existed and were typically supported by a harbor tax or equivalent assessment against the vessels that benefitted from them. The real problem lay in developing an appropriate pricing mechanism and accounting for free riders -- in particular, ships that might pass without actually using the harbor, thus benefitting from the lighthouse without paying the tax. Later critics observed, however, that private lighthouses either did not exist at all or else were short-lived relatively unsuccessful ventures. (Bertrand, 2006; Barnett & Block, 2007). The harbor tax, if assessed by a public authority, was Pigouvian in any event.

Coase revisited many of the themes that defined his career in his Nobel Prize Lecture in 1991, entitled "The Institutional Structure of Production." (Coase, 1992). He reiterated the theme that transaction costs are what give the legal system its importance and called for further empirical study of the role of transaction costs in real world economies. He also lamented that his theories had been much less influential among economists than among lawyers -- a view that was largely undermined by Oliver Williamson's receipt of the Noble Prize in 2009. Coase's work remains as alive and controversial as ever, and has cast a long shadow on the disciplines of both economics and law.

BIBLIOGRAPHY

Bain JS (1959) *Industrial Organization*. Wiley, New York

Barnett W, Block W (2007) Coase and Van Zandt on lighthouses. *Public Finance Rev.* 35:710-733.

Baumol WJ (1972) On taxation and the control of externalities. *Am. Econ. Rev.* 62:307-322

- Bertrand E (2006) The Coasean analysis of lighthouse financing: Myths and realities. *Cambridge J. Econ.* 30:389-402
- Blaug M (2007) The fundamental theorems of modern welfare economics, Historically Contemplated. *Hist.Pol.Econ.* 39:2 185-207
- Blum WJ, Kalven, H(1964) Public law perspectives on a private law problem--auto compensation plans. *U. Chi. L. Rev.* 31:641-723
- Boulding KE(1942) The theory of the firm in the last ten years. *Am.Econ.Rev.* 32:791-802
- Brown DJ, Heller WP, Starr RM (1992) Two-part marginal cost pricing equilibria: Existence and efficiency. *J.Econ. Theory* 57:52-72
- Calabresi G (1970) *The cost of accidents: A legal and economic analysis.* Yale Univ. Press, New Haven
- Calabresi G, Melamed A (1972) Property rules, liability rules, and inalienability: One view of the cathedral. *Harv.L.Rev.* 85:1089-1128
- Cheung SNS (1983) The contractual nature of the firm. *J.L. & Econ.* 26:1-21
- Clark JM (1923) *Studies in the Economics of Overhead Costs.* Univ. of Chicago Press, Chicago
- Coase RH (1937) The nature of the firm. *Economica.* 4 (n.s.): 386-405
- Coase RH (1946) The marginal cost controversy. *Economica* 13:169-182
- Coase RH (1959) The federal communications commission. *J.L. & Econ.* 2:1-40
- Coase RH (1960) The problem of social cost. *J.L. & Econ.* 3:1-44
- Coase RH (1972) Durability and monopoly. *J.L. & Econ.* 15:143-149
- Coase RH (1974) The lighthouse in economics. *J.L. & Econ.* 17:357-376
- Coase RH (1988a) The nature of the firm: Origin. *J.L. Econ. & Org.*, 4:3-17
- Coase RH (1988) *The firm, the market and the law.* Univ. of Chicago Press: Chicago
- Coase RH (1992) The institutional structure of production. *Am.Econ.Rev.* 82:713-719
- Coase RH (1994) Duncan Black. In Ronald H. Coase, *Essays on economics and economists.* Univ. of Chicago Press, Chicago, pp 187-189.

- Coase (2000) The acquisition of fisher body by General Motors. *J.L. & Econ.* 43:15-32
- Ellickson RC (1973) Alternatives to zoning: Covenants, nuisance rules, and fines as land use controls. *U. Chi. L. Rev.* 40:681-781
- Hotelling H (1938) The general welfare in relation to problems of taxation and of railway and utility rates. *Econometrica* 6:242-269
- Hovenkamp H (1990) Marginal Utility and the Coase Theorem. *Cornell L. Rev.* 75: 783-801
- Hovenkamp H (2002) Bargaining in Coasean markets: Servitudes and alternative land use controls. *J.Corp.L.* 27:519-530
- Hovenkamp H (2011) Coase, institutionalism, and the origins of law and economics. 86 *Ind.L.J.* 86:499-542
- Hovenkamp H (2013). *The opening of american law: Neoclassical legal thought, 1870-1970.* Oxford Univ. Press: New York
- Jensen MC, Meckling WH (1976) Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Fin. Econ.* 3:305-360
- Kahneman D, et al (1990) Experimental Tests of the Endowment Effect and the Coase Theorem. *J.Pol.Econ.* 98: 1325-1346
- Klein B et al (1978) Vertical integration, appropriable rents, and the competitive contracting process. *J.L. & Econ.* 21:297-326
- Krier JE, Schwab SJ (1995), Property rules and liability rules: The cathedral in another light, *New York University Law Review*, 70:440-483
- Mankiw NG (2012) *Principles of economics (6th ed.)* Cengage Learning, Independence, Ky
- Marshall A (1890; 8th ed. 1920), *Principles of economics.* Macmillan, London
- Medema SG (2013) Rethinking market failure: 'The problem of social cost' before the 'Coase Theorem' (SSRN working paper, Jan. 25, 2013), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2188728
- Medema SG (2011) Of Coase and carbon: The Coase theorem in environmental economics, 1960-1979 (SSRN working paper, Dec. 20, 2011), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1929086
- Pigou AC (1928) An analysis of supply. *Econ. J.* 38:238-257

Pigou AC (1932) *The economics of welfare*. Macmillan, London (4th ed).

Polinsky MA (1980) Resolving nuisance disputes: The simple economics of injunctive and damage remedies. *Stanford Law Review* 32:1075-1112

Posner, RA (1972, 8th ed. 2010) *Economic analysis of law* little. Little, Brown, Boston; Aspen, New York

Robbins L (1928) The representative firm. *Econ. J.* 38:387-404

Robinson EAG (1931) *The structure of competitive industry*. Nisbet Co., London

Stigler, GJ (1966) *The theory of price*. (3d ed.)

Stigler, GJ (2003) *Memoirs of an unregulated economist*. Univ. of Chicago Press, Chicago

Sturges v. Bridgeman (1879) 11 Ch. D 852

Tirole J (1988) *The theory of industrial organization*. MIT Press, Cambridge

Williamson, OE (1975) *Markets and hierarchies: Analysis and antitrust implications*. Free Press, New York