

THE COASE THEOREM AND ARTHUR CECIL PIGOU

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In The Problem of Social Cost, Ronald Coase was highly critical of the work of Cambridge University Economics Professor Arthur Cecil Pigou, presenting him as a radical government interventionist. In later work, Coase's critique of Pigou became even more strident. In fact, however, Pigou's Economics of Welfare created the basic tools, including the transaction costs model, that Coase's later work employed. Much of what we today characterize as the Coase Theorem was either stated or anticipated in Pigou's work. Further, Coase's extreme faith in private bargaining blinded him to the problems of bargaining in two-person markets that Pigou saw quite clearly and that remain with us to this day.

INTRODUCTION

The modern law and economics movement originated with two highly creative marginalist thinkers whose lives more than spanned the twentieth century.¹ Much of the foundation was laid by Arthur Cecil Pigou, whose application of marginalist analysis to the economy was not particularly concerned with the legal system. Ronald H. Coase then built upon Pigou's work, turning it into a powerful argument about the relationship between transaction costs and the necessity of the legal system.

In 1996, Brian Simpson published a well-known article that was highly critical of Coase's use of Pigou.² Simpson essentially argued that Pigou was correct about many of his observations and Coase incorrect—that he misunderstood, at a fundamental level, the realities of land-use disputes between neighbors. This Essay takes a different approach. While highly appreciative of the Coase Theorem, I believe that Coase in fact built on Pigou's work and owes much more to Pigou than Coase has ever acknowledged. Most of the fundamental observations that collectively make up the Coase Theorem were, in fact, first made by Pigou.

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1. Arthur Cecil Pigou, 1877–1959; Ronald H. Coase, 1910– .

2. A.W. Brian Simpson, *Coase v. Pigou Reexamined*, 25 J. LEGAL STUD. 53 (1996). For Coase's severe response, see Ronald H. Coase, *Law and Economics and A.W. Brian Simpson*, 25 J. LEGAL STUD. 103 (1996) [hereinafter Coase, *Law and Economics*].

I. PIGOU

Understanding Arthur Cecil Pigou requires that one read him directly and not through Coase's texts. Coase was severely critical of Pigou, and his critiques obscure the extent to which Coase actually constructed his own position atop Pigou's work. Pigou was a student of Alfred Marshall at Cambridge University and succeeded Marshall as Professor of Political Economy in 1908. Pigou wrote a great deal but became best known for one very important book, which he put through several editions in his lifetime. Pigou's book was originally published as *Wealth and Welfare* in 1912, and substantially enlarged and published as *The Economics of Welfare* in 1920.³

Pigou is sometimes presented as a rather slavish follower of his teacher Alfred Marshall, whom he adored and defended against all critics.⁴ But while Alfred Marshall's principal concern was with *industrial* economics and the business firm in specific markets (what today we call partial equilibrium analysis), Pigou focused on the welfare effects of resource movement on the *general* economy. Marshall's own contemporary who studied the general economy was Leon Walras, a French economist who wrote mainly on the conditions of general equilibrium. Marshall and Walras never met. They corresponded occasionally but largely ignored one another.⁵

While Pigou did nearly all of his writing prior to the ordinalist revolution in welfare economics, Coase did all of his writing after. The ordinalist revolution adopted the view that interpersonal utility comparisons were empirically impossible and thus unscientific. It was a reaction to the wealth redistribution ideas explicit in the writings of the Cambridge neoclassicists, which included Marshall, Pigou, and Joan Robinson. Like all the early British marginalists, Pigou believed that human beings had utility functions that were more or less similar to one another and could thus be quantified and compared. This in turn led to the view that social value could be increased by transferring wealth from the rich, for whom the marginal value of a unit of money was presumably small, to the poor for whom it was regarded as much higher. By the 1940s, this idea was completely rejected by neoclassicist economists looking for a more positivist methodology and convinced that one could not make empirical interpersonal utility comparisons.⁶

3. ARTHUR CECIL PIGOU, *WEALTH AND WELFARE* (1912); enlarged as *THE ECONOMICS OF WELFARE* (1920) [hereinafter PIGOU, *ECONOMICS OF WELFARE*]. Unless otherwise stated, references here are to the Fourth Edition, published in 1932.

4. On this point, see Simpson, *supra* note 2, at 64.

5. See PETER D. GROENEWEGEN, *A SOARING EAGLE: ALFRED MARSHALL 1842-1924*, at 478, 778 (1994).

6. On Ordinalism, see Herbert Hovenkamp, *The First Great Law & Economics Movement*, 42 *STAN. L. REV.* 993, 1033 (1990); see also Robert Cooter & Peter Rappoport, *Were the Ordinalists Wrong About Welfare Economics?*, 22 *J. ECON. LITERATURE* 507 (1984). On Pigou and the Ordinalist revolution, see Pieter Hennipman, *Hicks, Robbins, and the Demise of Pigovian Welfare Economics: Rectification and Amplification*, 59 *S. ECON. J.* 88 (1992); see also Nahid Aslanbeigui, *On the Demise of Pigovian Economics*, 56 *S. ECON. J.* 616 (1990).

The ordinalist revolution made much of Cambridge neoclassicism obsolete, a result that was far more devastating to Pigou's work than to the others because Pigou wrote a great deal about welfare economics. In contrast, Marshall and Robinson made their reputations largely in competition economics and price theory, areas that did not involve interpersonal utility comparisons because they focused mainly on the behavior of business firms.

Pigou's reputation also suffered from the harsh way that Coase treated his thought, first in *The Problem of Social Cost*,⁷ but also in later writings that were even more critical.⁸ Rather than acknowledging that he was building on Pigou's own highly creative and important work, Coase treated Pigou as someone who was ignorant of the law, enthusiastic about government intervention, and naive about the economic world. But Pigou, in fact, laid the essential groundwork for Coase, who could not have done what he did without Pigou's work. Many of the observations that collectively make up what is known today as the "Coase Theorem" were made in the first instance by Pigou.

Pigou and Coase looked at the economy from two different perspectives and set out to address two very different kinds of questions. Pigou's basic concern was with the ways by which the economy might move to an efficient, steady state. Pigou presented the problem of welfare in the general economy in this way: general equilibrium, or the state of the economy creating the greatest value, occurs when the marginal utilities of every factor of production are equalized. Whenever any use produces a greater "marginal social net product" than some other use, resources will flow from the use with a smaller marginal social net product until the uses are equalized.⁹ Pigou distinguished "marginal social net product" from "marginal private net product."¹⁰ The former refers to the value that accrues to society as a whole when a resource is moved from one spot in the economy to another. Pigou spoke of the value of resources to society as a whole as the "national dividend."¹¹ By contrast, the term "marginal private net product" referred to the value that accrues to some small portion of the economy, such as two neighbors bargaining over the need that one build a fence to enclose his rabbits which threaten to overrun his neighbor's garden.¹² This measure largely ignores changes in value that accrue to anyone else.

Coase uses the term "externality" to signify the difference between marginal social and marginal private net product. An externality arises when someone, who is not a part of the bargaining microcosm, is also affected either negatively or positively by the movement of the resource in question. Coase's discussion of "externalities" in fact built on Pigou's discussion of "divergence[s]"

7. R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960) [hereinafter Coase, *Social Cost*].

8. See, e.g., Coase, *Law and Economics*, *supra* note 2.

9. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 3, § 1.

10. *Id.* pt. II, ch. 2. Pigou's terminology changed somewhat in successive editions of *The Economics of Welfare*. In earlier editions he spoke of "marginal social" net product vs. marginal "trade" net product or marginal "individual" net product. See *id.* at 149-96 (1st ed. 1920).

11. *Id.* pt. I, chs. 3, 5.

12. See *id.* pt. II, ch. 9, § 12.

between marginal social and marginal private net product. Pigou devoted all of one chapter and portions of several others to the causes, as well as some suggested cures, for these divergences.¹³ Social value, or the “national dividend,” was maximized only when the marginal value of all uses was equalized across the entire economy. At that point, the economy would be in equilibrium, and no further movement of resources could increase wealth.

In *The Economics of Welfare*, Pigou focused heavily on the types of “hindrances” that prevented the general economy from moving to an equilibrium that would maximize the national dividend. By contrast, Coase’s *Problem of Social Cost* paid scant attention to general equilibrium and was concerned mainly with the effects of private bargaining in discrete markets, often between two economic actors who were locked into a particular situation. Both Pigou and Coase saw resources as moving naturally from lower-valued to higher-valued uses unless there were hindrances to their movement.¹⁴ Significantly, both believed that markets were better than governments at redeploying resources from less valuable to more valuable uses, although Pigou was certainly not as hostile toward government intervention as Coase.

Pigou did not separately consider the “internal” costs of decision-making, or of mobilizing resources within a firm. This issue became the focus of Coase’s inquiry in *The Nature of the Firm*,¹⁵ which was published in 1937, five years after Pigou’s *The Economics of Welfare* had come out in its final fourth edition. Lest this should be regarded as Pigou’s oversight, it is important to remember that formally the “cost” of decision-making, or of moving a resource from point *A* to point *B* within the firm, is incorporated completely into that firm’s cost function, just as is any other cost. For example, economists do not typically trouble themselves with the engineering details of a firm’s choice to purchase a more durable repair part at a higher price, a less durable one at a lower price, or to maintain a machine shop for refurbishing old parts. One simply assumes that the firm will be driven to the optimal decision by applying its knowledge to the relative costs and benefits of each choice. Indeed, one important insight of Coase’s *Nature of the Firm* was that it treated the costs of using the market as simply internalized into the firm’s cost function. The firm simply chose the profit-maximizing alternative.

II. PIGOU AND TRANSACTION COSTS

One of Pigou’s great insights, unmentioned by Coase, was Pigou’s rather full development of the problem of “transaction costs” long before *The Nature of the Firm* was published, and nearly a half-century prior to *The Problem of Social Cost*. But Pigou did not use the term “transaction costs,” and his meaning was somewhat different.

Pigou spoke of the “costs of movement” in discussing how the economy pursues efficiency by re-allocating resources to uses with a marginally higher value. If resources could be moved costlessly from one use to another, then

13. *Id.* pt. II, ch. 9.

14. See discussion *infra* notes 16–28 and accompanying text.

15. R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* (n.s.) 386, 404 (1937).

attaining the largest national dividend would come rather easily. However, "in real life costs are often involved in moving resources from one place or occupation to another."¹⁶ He observed:

Suppose that between two points A and B the movement of a unit of resources can be effected at a capital cost equivalent to an annual charge of n shillings for every year during which a unit that is moved continues in productive work in its new home. In these circumstances the national dividend will be increased by the movement of resources from A to B, so long as the annual value of the marginal social net product at B exceeds that at A by more than n shillings; and it will be injured by any movement of resources which occurs after the excess of the value of the marginal social net product at B has been reduced below n shillings.¹⁷

Long before Coase, Pigou observed that if the "costs of movement" are greater than the difference in value between two outcomes, then the movement will not occur. This was, in fact, equivalent to the Coasian observation that parties will not be able to reach an efficient bargain if transaction costs are greater than the "surplus," or the increase in value that occurs when a resource is moved to the person who places a higher value on it. Thus costs of movement, or transaction costs, make the initial assignment of resources relevant. Pigou wrote:

If the initial distribution of resources between A and B is such that the value of the marginal social net product at B exceeds (or falls short of) the value of the marginal social net product at A by any number of shillings less than n , say by $(n - h)$ shillings, the existing arrangement—that under which the values of the marginal social net products at the two points differ by $(n - h)$ shillings—is the best arrangement, not indeed absolutely, since, if there were no costs, a better arrangement would be possible, but relatively to the fact of the initial distribution and the existing costs of movement. It is not, be it noted, the best arrangement relatively to the existing costs of movement alone. We cannot say that, when the costs of movement are equivalent to n shillings, the national dividend is best served by a distribution under which the values of the marginal social net products at A and B differ by such and such a defined number of shillings. The only accurate statement is: when the costs of movement between A and B are equivalent to n shillings, the national dividend is best served by the maintenance of the existing distribution, whatever that may be, provided that this distribution does not involve a divergence in the values of marginal social net products greater than n shillings; and, if the existing distribution does involve a divergence greater than n shillings, by a new distribution brought about by the transference of sufficient resources to bring the divergence down to n shillings.¹⁸

16. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 3, § 3.

17. *Id.*

18. *Id.* (emphasis added).

What Coase added to this was that in cases of high costs of movement (that is, high “transaction costs”) a legislature, government agency, or court could assign the initial allocation to the highest value user so that movement would not have to occur.

Pigou found that several phenomena hindered the movement of resources from less valuable to more valuable uses. One was “imperfect knowledge,” which occurs when people lack good information about either the value of a resource when deployed in a certain use, or the cost of moving the resource from one place to another.¹⁹ Pigou devoted an entire chapter of *The Economics of Welfare* to “Hindrances to the Equality of Returns Due to Imperfect Knowledge.”²⁰ The literature on the Coase Theorem continues to treat imperfect information as one of the more serious causes of high transaction costs that hinder bargaining.²¹ Pigou’s solution to the problem of imperfect knowledge was, if anything, more “private” than Coase’s. Coase would have used the state to assign the right to the person who placed the higher value on it; Pigou would have used education and information to reduce this particular cost of movement.

Pigou also devoted an entire chapter of *The Economics of Welfare* to “The Effect of Eliminating Obstacles to Movement” of resources from one point to another.²² He concluded that once movement costs are considered, it is sometimes actually better to leave resources in an “inferior” position because the costs of re-assigning them are greater than the incremental value that results. Of course, this observation is the same as Coase’s—that high transaction costs interfere with the movement of resources to a superior position when these costs exceed the surplus, or the value that results from the re-assignment.

One difference between Coase’s position and Pigou’s was that Coase focused mainly on one particular cost of movement, namely, bargaining as between the prospective purchaser and seller of a property right or other alienable legal entitlement. Pigou spoke of costs of movement more comprehensively, as including:

[P]ayments that have to be made to various agents in the capital market, promoters, financing syndicates, investment trusts, solicitors, bankers, and others, who, in varying degrees according to the nature of the investment concerned, help in the work of transporting capital from its places of origin to its places of employment.²³

The term “solicitors” is a reference to lawyers, but it is clear that Pigou is talking about what we might refer to as bargaining writ large, or the full range of

19. *Id.* pt. II, ch. 5, § 4.

20. *Id.* pt. II, ch. 6.

21. See, e.g., Joseph Farrell, *Information and the Coase Theorem*, J. ECON. PERSP., Fall 1987, at 113; Steven G. Medema & Richard O. Zerbo, Jr., *The Coase Theorem*, in 1 ENCYCLOPEDIA OF LAW AND ECONOMICS 836–92 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000); Peter J. Boettke, Comment, *Information and the Coase Theorem*, J. ECON. PERSP., Spring 1989, at 195.

22. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 5.

23. *Id.* ch. 7, § 1.

agents whose purpose it is to facilitate transactions in the economy. Any agency cost that is necessary to re-assign a property right is included in Pigou's conception of "cost of movement."

Pigou gave numerous examples of strictly private-market correctives for misallocations of resources in markets where redeployment of resources is costly. For example, the practice of those in overly taxed industries giving out short-time commission work to those in industries with excess capacity increases welfare by equating the marginal product as between firms subject to overproduction and those subject to underproduction.²⁴ Pigou also observed that mergers could have this effect, by permitting a larger firm to switch its production from overtaxed to underutilized facilities.²⁵ As a result, he supported government policies eliminating "obstacles to movement" from one resource use to another.²⁶

The Coasian literature drew the corollary that, where movement is costly, the optimal state policy is to put the resource in its best use initially, making movement unnecessary. Pigou anticipated this approach as well, although at a more macro level. He wrote at some length about the problem of ignorance, or imperfect knowledge, which he believed led society to produce an initial distribution of the workforce that was socially inefficient. For example, ignorance operates "by impairing the initial distribution of new generations of workpeople as they flow into industry."²⁷ Pigou's argument was that once people were committed to and trained in an occupation where the supply was too great in relation to other occupations, the cost of redeployment could be very high. He gave as an example the market for handmade nails, which had been in decline for decades, but where

24. *Id.* ch. 8, § 4.

25. *Id.*

26. *Id.*

27. *Id.* pt. III, ch. 9, § 5. *See also id.* § 7:

When the initial distribution of new generations of workpeople among the various occupations open to them has been wrong for some little time, the aggregate distribution of the whole existing body of workpeople must also be wrong. The error may, of course, be corrected without any actual movement among established workpeople by a redirection of the flow of new recruits. This correction acts more rapidly in industries where the proportion of annual recruitment to total numbers is large than in those where it is small. It thus acts especially rapidly in women's industries, because the obligations of marriage make the average length of a woman's stay in industry especially short. Though, however, errors due to failures in the initial distribution of workpeople may be corrected without the need for movement, plainly they may also be corrected with the help of it. Moreover, even where there has been no error in initial distribution, maladjustment may come about because a man, who was fitted for a particular post when he first entered it, becomes either too good for it or too bad; either fitted for promotion to a higher grade or ripe for removal to less responsible work. Yet again, the distribution of labour, not only between occupations but also between places, may be made wrong from time to time by temporary fluctuations in the demand for and supply of different things, even though the initial direction given to new generations of workpeople was guided by perfect wisdom.

parents continued to commit their children to apprenticeships in these very failing firms.²⁸

III. PIGOU, THE COASE THEOREM, AND BILATERAL MONOPOLY

Pigou was not nearly as hostile toward private bargaining as Coase believed, nor as inclined toward aggressive state intervention. Pigou was significantly more troubled than Coase, however, about bargaining problems in bilateral-monopoly markets.

Coase spoke facetiously of Pigou's hostility toward bargaining, which Pigou allegedly regarded as yielding "no net product to the community as a whole."²⁹ Coase even suggested that Pigou advocated imposing a tax on such bargaining, although Pigou in fact proposed nothing of the kind. Mainly, he concluded that bargaining is unavoidable unless some omniscient government agency determines all prices and terms of contracts. But he did not advocate this.³⁰ Like Coase, Pigou would prefer to see property rights assigned to their most efficient use *ex ante*, making subsequent bargaining unnecessary. But of course, making such assignments requires regulatory action. In fact, both Pigou and Coase saw bargaining as an essential mechanism by which resources are moved from one use to another, and both preferred that the associated costs—just as the costs of anything else—be minimized.

Coase asserted that Pigou felt "there [was] nothing more to be said" on the subject of bargaining aside from the fact that it was not a valuable activity.³¹ In fact, Pigou gave bargaining a great deal of thought. Pigou was particularly interested in the same case that most interested Coase—namely, bilateral monopoly, or situations where two bargainers are thrust into a position where they can realistically deal only with each other.

Coase's microscopic view of the world involved bilateral monopoly in most of the now famous examples that he used. For example, the doctor and the confectioner in *Sturges v. Bridgeman*, well-known characters from *The Problem of Social Cost*, are conventional bilateral monopolists.³² While neither likely had a monopoly in the outside market where medical services or confectioneries were sold, their previously made commitments to a common building with a party wall made each a seller of something that only the other could buy. As far as we know, only the physician placed value on being free of the confectioner's mortar and pestle, and only the confectioner placed value on being able to use it. As a result, they were forced to negotiate with each other. Depending on the values that the parties assign and the transaction costs, there may be a reallocation of resources in such a process. In this case, there would have been a reallocation had the physician paid the confectioner to shut down his equipment. While the confectioner's use

28. *Id.* § 7.

29. *Id.* pt. II, ch. 9, § 16 *see* Ronald H. Coase, *The 1987 McCorkle Lecture: Blackmail*, 74 VA. L. REV. 655, 671–72 (1988) [hereinafter Coase, *Blackmail*].

30. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 9, § 16.

31. *See* Coase, *Blackmail*, *supra* note 29, at 672.

32. *Sturges v. Bridgeman*, 11 Ch.D. 852 (1879). On the facts, *see* Simpson, *supra* note 2, at 54–59.

had preceded the physician's arrival by many decades, the physician's use may well have been more valuable, and in a well-functioning market for property rights he would have bid it away from the confectioner.

A frequent criticism of the Coase Theorem is that it glosses over the many problems of indeterminacy inherent in bilateral-monopoly markets.³³ Pigou, like most economists of his day and ever since, was troubled by the "theoretical indeterminateness" of bilateral monopoly.³⁴ He gave bilateral monopoly, however, a quite "Coasian" definition—as a set of "conditions under which the relations between individual buyers and sellers are not rigidly fixed by a surrounding market."³⁵ Two residential neighbors who share a fence are in a bilateral-monopoly relationship if the costs of selling out are higher than the costs of coming to some kind of agreement about how the fence should be maintained. Pigou continued:

The presence of bilateral monopoly in this sense implies an element of theoretical indeterminateness, and, therefore, opens up the way for the employment of activities and resources in efforts to modify the ratio of exchange in favour of one or other of the "monopolists."³⁶

Pigou's comments on "bargaining," which Coase cited as expressing Pigou's negative attitude on the subject,³⁷ were made entirely in the context of Pigou's discussion of bilateral monopoly. There is nothing in *The Economics of Welfare* to suggest that Pigou was generally hostile toward the contract process in the economy. In his subsequent discussion on industry and labor, he assumed that bargaining would work well except when there is "an element of bilateral monopoly," which could drive even "ordinary commercial businesses and their customers, respectively . . . to expand energy, if not money" in costly bargaining.³⁸

33. See generally Herbert Hovenkamp, *Rationality in Law & Economics*, 60 GEO. WASH. L. REV. 293, 306–13 (1992). See also John Cirace, *A Synthesis of Law and Economics*, 44 SW. L.J. 1139, 1165–68 (1990); Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1, 23 (1982). For a summary of the alternative neoclassical positions on bilateral monopoly, see Roger D. Blair et al., *A Pedagogical Treatment of Bilateral Monopoly*, 55 S. ECON. J. 831 (1989).

34. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 9, § 15.

35. *Id.* pt. II, ch. 9, § 15.

36. *Id.*

37. See discussion *supra* notes 29–31 and accompanying text.

38. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 19, § 8. Pigou's subsequent discussion of price discrimination makes this clear. Within the Pigouvian framework, first-degree price discrimination exists when the seller is able to sell to each individual customer at the highest price that customer is willing to pay. Pigou notes that first-degree price discrimination very likely does not exist anywhere because of the enormous transaction costs required to get each customer to pay his reservation price and suggests that this would produce fraud in bargaining. See *id.* ch. 16, § 6; see also *id.* ch. 6, § 2 (suggesting that in a market in which neither employers nor employees are organized, wages will move toward a determinate rate, but that organization on both sides will lead to a bilateral-monopoly position in which the wages will become indeterminate).

Bargaining behavior in bilateral-monopoly situations had been a vexing problem for the early neoclassicists. Jevons, the first serious British marginalist, simply assumed the problem away, concluding that bargaining in a bilateral monopoly would yield a result that was determinate as to the quantity of any goods being exchanged as well as the price.³⁹ Edgeworth then responded with what, through later formulations, became the well-known contract box, showing the indifference curves of two persons—Robinson Crusoe and Friday on an isolated island—forced to bargain with each other over two commodities that each of them has. He illustrated that if their preferences overlapped, they would be able to complete a joint-maximizing trade but the price would be indeterminate.⁴⁰

Alfred Marshall was also concerned about the problem of indeterminacy in bilateral monopolies, which he believed occurred frequently in the industrial economy. He was frustrated by the relative ease with which equilibrium could be determined in a conventional monopoly market,⁴¹ where a single firm dealt with a group of competitively structured buyers, in contrast to bilateral monopoly. In the first, the monopoly output and price were readily computed, while equilibrium in bilateral monopoly seemed elusive and indeterminate. Having a more practical and business bent, Marshall substituted Edgeworth's illustrations of barter exchange with situations in which one trading partner had money and the other had a product to sell. Marshall assumed that by engaging in repeated explicit bargaining with enforceable contracts, the parties would reach an agreement on a determinate amount of the product, provided that the marginal utility of money was constant.⁴² He also believed that Edgeworth's "barter" problems that involved two parties with two different commodities or services tended to make the situations less determinate, and that most of these problems would go away if one considered exchanges of money for a single product or service. Further, Marshall believed that for the relatively small amounts of money involved in most exchanges, the relevant marginal utility of money would be very close to constant, yielding a determinate result as to the quantity being exchanged.⁴³

39. See WILLIAM STANLEY JEVONS, *THE THEORY OF POLITICAL ECONOMY* 88–98 (5th ed. 1957); see also HENRY WILLIAM SPIEGEL, *THE GROWTH OF ECONOMIC THOUGHT* 520 (3d ed. 1991).

40. Francis Ysidro Edgeworth, *Mathematical Psychics: On the Application of Mathematics to the Moral Sciences* (1881), reprinted in 3 *THE FOUNDATIONS OF MATHEMATICAL ECONOMICS* 27–30, 55 (G. L. Clark ed., 1995). Pareto followed the same reasoning in 1906. VILFREDO PARETO, *MANUAL OF POLITICAL ECONOMY* 138 (Ann S. Schwier trans., American Economic Association ed. 1971) (1906).

41. See ALFRED MARSHALL, *PRINCIPLES OF ECONOMICS* bk. 5, ch. 14 (8th ed. 1920) [hereinafter MARSHALL, *PRINCIPLES*].

42. Marshall showed that declining marginal utility of two goods in an Edgeworth box would yield multiple equilibria from which no further trading would occur. There would be a single determinate equilibrium, however, if the marginal utility of one of the goods was constant. See *id.* at 793.

43. On Marshall's debates with Edgeworth, see M. Dobb, *A Sceptical View of the Theory of Wages*, 39 *ECON. J.* 506 (1929), reprinted in 5 *ALFRED MARSHALL: CRITICAL ASSESSMENTS* 24, 29 (John Cunningham Wood ed., 1996). On Marshall's argument for using money and a single commodity as the two objects of trade, rather than two commodities, see Alfred Marshall, *Review of F.Y. Edgeworth's Mathematical Psychics*, *THE*

Prior to *The Economics of Welfare*, Pigou made two contributions to the bilateral-monopoly literature. The first, Pigou's 1905 book on labor negotiation and arbitration, generally compared the results of a competitive labor market with a market in which both labor and management were organized into a single unit, and a market in which labor, but not management, was organized.⁴⁴ Pigou advocated organization as producing a better wage system, even though this tended to create a bilateral-monopoly situation in which wages were indeterminate. He concluded that open competition was conducive to situations in which workers received less than the marginal value of their labor to their employer. This was largely because labor was not very mobile and employers held most of the market power.⁴⁵ By contrast, if labor was organized, it would generally force wages up to the value of their net marginal productivity, but not higher, for that is all employers would be willing to pay.

Pigou's second contribution to bilateral-monopoly theory was a 1908 article that examined the possibilities for equilibria in bilateral-monopoly bargaining.⁴⁶ Like Edgeworth, Pigou began with the model of two traders who have two different goods to exchange. But following Marshall, Pigou chose money as one of the two goods. Pigou illustrated that if the marginal utility of one of the objects was constant—as Marshall had assumed of money—then the questions concerning whether an exchange would occur and how much would be exchanged were determinate, but the price was indeterminate.⁴⁷ That is, there would be a single equilibrium, but at an unknown price that lay somewhere between the buyer's willingness to pay and the seller's willingness to accept.

In *The Problem of Social Cost*, Coase largely ignored the problem of equilibria in bilateral monopoly. The article never cites either Edgeworth or Marshall, even though their analyses were fundamental to the neoclassical treatment of markets.⁴⁸ Coase may have been acting with good reason. According to his own opening statement, *The Problem of Social Cost* is concerned with the relations of business firms, not with natural persons.⁴⁹ We generally assume that business firms are interested in maximizing value, not utility. As a result, the

ACADEMY 547 (1881) (book review), *reprinted in* 2 THE EARLY ECONOMIC WRITINGS OF ALFRED MARSHALL, 1867-1890, at 267-68 (John K. Whitaker ed., 1975).

On Marshall's rationale for assuming the constant marginal utility of money for this purpose, see MARY ANN DIMAND & ROBERT W. DIMAND, A HISTORY OF GAME THEORY 69 (1996).

44. A. C. PIGOU, PRINCIPLES AND METHODS OF INDUSTRIAL PEACE (1905).

45. See DONALD R. STABILE, WORK AND WELFARE: THE SOCIAL COSTS OF LABOR IN THE HISTORY OF ECONOMIC THOUGHT 127-29 (1996).

46. A. C. Pigou, *Equilibrium Under Bilateral Monopoly*, 18 ECON. J. 205 (1908) [hereinafter Pigou, *Equilibrium*].

47. See *id.* at 209 (noting that if the quantity of one commodity was subject to constant marginal utility, then "the quantity of the other commodity that is exchanged will be determinate, and equilibrium will be indeterminate only in respect of the quantity of money given in exchange for it" (citing MARSHALL, PRINCIPLES, *supra* note 41, at 845 ("mathematical note on barter"))).

48. See Coase, *Social Cost*, *supra* note 7, at 8.

49. See *id.* at 1; see also Coase, *Law and Economics*, *supra* note 2, at 103-04.

assumption of constant marginal utility of money is probably justified.⁵⁰ Further, Coase was not particularly interested in determining the specific price of a bargain, but only in whether an efficient bargain would be reached.

Pigou devoted some attention in his 1908 article to examining the bilateral-monopoly price, which by this time was viewed as the most poorly behaved variable in bilateral-monopoly bargaining. While both Edgeworth and Marshall could show the existence of one or multiple trading equilibria, the price still hovered indeterminately between the seller's willingness to accept and the buyer's willingness to pay. Pigou also observed that multiple agreement positions were possible, but "the forces of demand and supply are not sufficient to determine upon which of the points embraced within it the exchange index will fall"—that is, the agreement would be advantageous to both parties but the price would be indeterminate.⁵¹ Pigou was unable to find a solution to the price problem within the bilateral-monopoly model,⁵² and concluded that the determination of price rested on exogenous factors, such as:

[C]omparative strength of character, capacity, and other personal qualities; comparative wealth, which involves the ability to endure a conflict such as a strike or a rate war without bankruptcy; comparative opportunity to obtain aid from others, either voluntarily or under compulsion, such as contributions of funds, a strike in sympathy, a boycott of the enemy by consumers, the exercise of pressure upon him by some financial ally or our own; comparative solidarity, . . . [a]nd, lastly, the attitude of the law towards the employment of various methods of "clubbing."⁵³

Pigou also suggested a kind of probability index, with a "draw" being the highest probability, and other points diminishing in both directions. Without knowledge about external conditions pertaining to the bargainers, however, it was impossible to know more about where an equilibrium would occur.⁵⁴ He concluded that "[w]hen the personal situations are equal, this position is that of drawn contest; when they are unequal, it is some point on the part of the equilibrium locus favourable to the stronger contestant."⁵⁵

Finally, Pigou recognized as early as 1908 the very important difference between bargaining in a "Coasian" market with two agents and bargaining in a "neoclassical" market with numerous agents with separate volition.⁵⁶ A neoclassical market is one where an exchange typically requires no more than an agreement between one seller and one buyer. The market for milk is neoclassical in this sense. Although milk has numerous buyers and sellers, only one seller and

50. On the importance of the issue when the bargaining is between natural persons, such as home owners, see Herbert Hovenkamp, *Marginal Utility and the Coase Theorem*, 75 CORNELL L. REV. 783 (1990).

51. Pigou, *Equilibrium*, *supra* note 46, at 205.

52. On the continuation of this problem, see Blair et al., *supra* note 33.

53. Pigou, *Equilibrium*, *supra* note 46, at 218.

54. *Id.* at 217.

55. *Id.* at 218.

56. *Id.* at 210–11.

one buyer need agree with each other in order for a unit of milk to move from a lower to higher value. Many others are in the market, but they are busily making transactions of their own, and in general no one is affected by someone else's transaction.

A Coasian market, by contrast, is one in which no agreement can occur unless all the market participants agree with one another. The simplest Coasian market is a bilateral monopoly, and the problems of reaching equilibrium there are severe enough. As the market has more participants, the instability problem can increase dramatically, leading to endless rounds of bargaining, coalition formation and re-formation, and the like. The classical example is land-use agreements among multiple homeowners. Obtaining unanimous consent for release from a covenant may be impossible even though virtually no one in the subdivision benefits any longer from the covenant, but there are side payments to be had in exchange for one's release.⁵⁷ Economic theorems about general equilibrium, such as the First Welfare Theorem,⁵⁸ generally do not apply to Coasian markets because they require price-taking behavior, a condition that does not obtain in a Coasian market where every trader can hold out in prospect of a bigger surplus.⁵⁹

Pigou approached the problem by finding three types of bilateral-monopoly markets. First was the traditional bilateral monopoly of two individuals bargaining on their own behalf. Second was the situation in which one bargainer was an agent acting on behalf of a group but with authority to offer a single price that was binding on the group. An example of this would be someone authorized to bargain on behalf of a corporation or labor union. In these, the problems were the same as in the traditional bilateral monopoly. In the final set, however, the agent was bargaining on behalf of "persons possessed of independent volition, and subject to the condition that any one of them, to whom the contract agreed upon

57. Three or more bargaining parties may create a Coasian market with an empty "core," which means that any agreement reached by two participants can be defeated by a counterproposal by the third, leading to endless rounds of indeterminate bargaining. For a discussion of some of the issues, see Varouj A. Aivazian & Jeffrey L. Callen, *The Coase Theorem and the Empty Core*, 24 J.L. & ECON. 175 (1981). See also Varouj A. Aivazian & Jeffrey L. Callen, *The Core, Transaction Costs, and the Coase Theorem*, 14 CONST. POL. ECON. 287 (2003). Of course, knowing this, intelligent bargainers might reach an agreement among the three, anticipating that reaching a surplus-creating bargain is better than using up all of their resources in transaction costs. See Ronald H. Coase, *The Coase Theorem and the Empty Core: A Comment*, 24 J.L. & ECON. 183 (1981) [hereinafter Coase, *Empty Core*]. For a specific application to private land-use control restrictions (servitudes), see Herbert Hovenkamp, *Bargaining in Coasian Markets: Servitudes and Alternative Land-Use Controls*, 27 J. CORP. L. 519 (2002).

58. The First Welfare Theorem states that a perfectly competitive equilibrium leads to a Pareto optimal allocation of resources. That is, if an economy is currently in a perfectly competitive equilibrium no re-assignment of resources could make one person better off without making at least one other person worse off. See ROSS M. STARR, *GENERAL EQUILIBRIUM THEORY: AN INTRODUCTION* 144-48 (1997).

59. E.g., Kenneth J. Arrow & Gerard Debreu, *Existence of an Equilibrium for a Competitive Economy*, 22 *ECONOMETRICA* 265 (1954). See also FISCHER BLACK, *EXPLORING GENERAL EQUILIBRIUM* (1995).

appears less favourable than no contract at all, will not carry it out.”⁶⁰ From this observation Pigou would later conclude that collective bargaining agreements in labor disputes where the bargainer had the authority to make a binding agreement were essential to the functioning of the labor market.⁶¹

In short, Pigou had a complex and very “Coasian” understanding of bargaining relationships and how they should be organized. What Coase later characterized as Pigou’s hostility toward or ignorance of bargaining behavior was in fact a set of well-analyzed observations about the indeterminacy of price in bilateral-monopoly situations, which was very well established within the neoclassical tradition. That problem, incidentally, was one that Coase refused to confront himself, except in his protest in much later writing that the parties thrust into a Coasian bargain might agree to split the difference because by doing so they would collectively be better off than if they were not able to reach a bargain at all.⁶²

Of course, the problem of bilateral monopoly did not go away with the publication of *The Problem of Social Cost*. To the contrary, Coase’s article highlighted the extent to which private law—everything from landlord-tenant, shareholder disputes, divorce law, disputes among neighbors, and litigants involved in a lawsuit—is concerned with some variation of the bilateral-monopoly problem. Survey books such as Judge Posner’s *Economic Analysis of Law* are quite preoccupied with bilateral-monopoly issues.⁶³

This problem illustrates both the extent to which the Coase Theorem is sometimes misunderstood, even by prominent economists, and the extent to which Coase did not address the problem himself in any serious way. For example, in 1966, George J. Stigler gave his well-known definition of the Coase Theorem as asserting that “under perfect competition private and social costs will be equal.”⁶⁴ The definition is completely off point since private and social costs are clearly equal under “perfect” competition; the First Welfare Theorem was known to say as much many years before *The Problem of Social Cost* was published.⁶⁵ The utility of the Coase Theorem lies in its conclusions about bargaining in conditions of *much less-than-perfect* competition. Coase himself rewrote Stigler’s definition to say “with zero transaction costs private and social costs will be equal.”⁶⁶ Coase’s entire point was that transaction costs gave rise to the need for a legal system to assign entitlements. What he glossed over was the fact that bilateral monopolies, a

60. Pigou, *Equilibrium*, *supra* note 46, at 210.

61. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. III, ch. 8, §§ 10, 13.

62. Coase, *Empty Core*, *supra* note 57, at 184 (replying to Aivazian & Callen, *supra* note 57).

63. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 55, 60–61, 117–20, 132, 251, 259, 336–37, 343, 403, 567 (6th ed. 2003).

64. GEORGE J. STIGLER, *THE THEORY OF PRICE* 113 (3d ed. 1966) (“The Coase theorem thus asserts that under perfect competition private and social costs will be equal.”).

65. See *supra* note 58 and accompanying text; see also A.P. Lerner, *The Concept of Monopoly and the Measurement of Monopoly Power*, 1 *REV. ECON. STUD.* 157 (1934) (graphical illustration of First Welfare Theorem).

66. RONALD H. COASE, *THE FIRM, THE MARKET AND THE LAW* 158 (1988).

common environment for common law disputes, were characterized by significant transaction costs.

After a half-century of thinking about the problem of bilateral monopoly in Coasian terms, we generally view it today as presenting a problem in the transaction costs of bargaining. For example, a bilateral-monopoly case like the dispute between the physician and the confectioner is concerned with whether the parties will be able to agree, and with what default rule the law should adopt in the case of high transaction costs: it should give the entitlement to the person who would have won it in a market in which bargaining worked well. We more or less assume that no externality exists because no one else is affected by the arrangement. Further, since Edgeworth, the wisdom has been that which is reflected in the Coasian literature: namely, if the parties' preferences overlap—that is, if there is a surplus to be divided—the parties will come to an agreement assuming that transaction costs do not hinder them, but the price will be indeterminate.

Interestingly, nearly all of Pigou's discussions of bilateral monopoly fell within his discussion of externalities rather than transaction costs. As noted previously, Pigou's term for transaction costs was "costs of movement," and his term for externalities was "divergence" between private and social marginal net product. Pigou generally treated bilateral monopoly as a divergence problem rather than a movement problem. This was in fact a significant departure from his 1908 article, which had been preoccupied mainly with the question of how the surplus would be divided.⁶⁷

For example, one bilateral-monopoly market where Pigou found a divergence between private and social net product was the landlord-tenant relationship, particularly as it existed in Ireland at his time. He observed that landlords were typically impecunious, and as a result they tended to rent undeveloped land, requiring tenants to develop buildings or other improvements insofar as they desired them. Under the law of fixtures, however, these improvements became the landlord's property when the tenancy ended. As a result, tenants lacked the incentive to invest at optimal levels because they could not capture the full returns of their investment, creating a negative "divergence" or externality.⁶⁸ Further, tenants lacked the incentive to maintain improvements that had to be surrendered at the end of the lease term. Pigou proposed a thoroughly Coasian solution. He observed that careful contracting could reduce the problem because the divergence between private and social net product "is larger or smaller in extent according to the terms of the contract between lessor and lessee."⁶⁹ He speculated at some length about various solutions, both contractual and legislative, and noted that in repeated contracts, the reputation of the parties might lead to more efficient agreements. He also observed that the parties could enter into contractual stipulations about the conditions of capital investments upon surrender of the lease.⁷⁰

67. See discussion *supra* notes 51–56 and accompanying text.

68. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 9, §§ 4–5.

69. *Id.* § 4.

70. *Id.* § 6 and particularly § 7.

Pigou also observed that both contractual and statutory compensation requirements designed to correct the problem changed the stakes of the game, because parties renegotiated based on the new provisions.⁷¹ As a result, such arrangements were also highly imperfect.⁷² Pigou briefly discussed a more radical solution: security of tenure plus legal regulation of "fair rents," but found this highly problematic on both issues. Security of tenure would not protect the landlord against poor tenants or reassignment of the land to better uses and only an omniscient tribunal could regulate rents.⁷³ For example, he noted with considerable prescience that one problem with regulation is that it is backward looking, while market behavior is always forward looking. In this case, the factual basis for fair rents in a regulatory proceeding would be "production" and not "productivity." As a result, a deficient tenant could obtain a lower rent simply by showing smaller earnings. Pigou decided against government regulation of rents.⁷⁴ The only thing that would correct the divergence, Pigou concluded, was a merger of the landlord's and tenant's enterprises into a single firm.⁷⁵

Pigou's discussion was prophetic, and he correctly saw that this particular problem of bilateral monopoly was concerned not merely with price but also with efficiency. Appropriation of quasi-rents and distortions of investment incentives in such circumstances remains a problem that seriously troubles Coasian thinkers, such as Oliver Williamson in his well-known essay on cable-television franchises. Williamson analyzed the problem in much the same way that Pigou did and came to largely similar conclusions.⁷⁶ The one element in the Williamson discussion that was not present in Pigou's was the possibility that bidding for the franchise by multiple potential franchisees might produce a competitive equilibrium; Williamson's own pessimistic conclusion, however, was that "unassisted franchise bidding" does not "work well" and cannot be shown to be superior to traditional rate-of-return price regulation.⁷⁷

Indeed, Pigou noted that a version of the same problem, which he analogized to the landlord-tenant issue, occurred in the franchises of public transportation, gas, and electric companies of his day. The charters for such companies often provided that the physical plant and lines of the company pass

71. *Id.* § 8.

72. *Id.*

73. *Id.* § 9.

74. *Id.*

75. *Id.*

It is not, therefore, by any means obvious that the policy of fixity of tenure and judicial rents will really bring marginal private net product and marginal social net product more closely together than they are brought by simple compensation laws. *The gap between the two marginal net products can only be completely closed if the person who owns the land and the person who makes investments in it are the same.*

Id. (emphasis added).

76. See Oliver E. Williamson, *Franchise Bidding for Natural Monopolies—in General and with Respect to CATV*, 7 BELL J. ECON. 73 (1976).

77. *Id.* at 74.

without compensation to the chartering town when the charter expired.⁷⁸ He also observed that British legislation governing tramways and electric utilities required compensation based on historical cost when charters terminated, and speculated that this generally provided undercompensation because historical cost was less than replacement cost.⁷⁹ Like Williamson, Pigou was unable to produce a solution.

Contrary to Coase's representation, Pigou in fact gave a great deal of thought to the many and varied problems of bargaining in bilateral monopolies, particularly those in which specialized investment and sunk costs lead to problems of creating appropriate incentives to invest or develop for the future. While Coase himself paid scant attention to the problem, some of Coase's followers have searched for contractual solutions and, where necessary, more interventionist alternatives, just as Pigou did.

CONCLUSION

Coase's *Problem of Social Cost* is not merely one of the great classics in the economics literature. It also has had more policy influence than almost any other economic text. Coase, like other economists both before and after him, was standing on the shoulders of his predecessors. But he was much less appreciative than most of them and never gave proper credit to the one person to whom he owed a great deal. To be sure, Pigou was less opposed to state intervention than Coase would become. But he lived in an earlier time and wrote with great prescience about both transaction costs and externalities, often casting his images against a much larger horizon than did Coase. Pigou deserved better.

78. PIGOU, *ECONOMICS OF WELFARE*, *supra* note 3, pt. II, ch. 9, § 6. Pigou referred to the Berlin tramway charter:

Such an arrangement at one time governed the Berlin Tramways. The Company's charter provided that, "at the end of the contract, all property of the road located in the city streets, including poles, wires, any waiting-rooms built on city property, and patents, come into the possession of the city without charge."

Id.

79. *Id.*
