

THE COASE THEOREM AND ARTHUR CECIL PIGOU

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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 operation of the legal system. Ronald H. Coase then turned Pigou's work 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 generally argued that Pigou was correct about many of his observations and Coase incorrect, and that at a fundamental level Coase misunderstood 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 ever acknowledged. Most of the fundamental observations that collectively make up what we now call the Coase Theorem were in fact made in the first instance by Pigou.

Pigou

Understanding Arthur Cecil Pigou requires that one read him directly and not through Coase's texts. Coase was severely critical of Pigou, and the critique has served to 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.

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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).

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 follow of his teacher Alfred Marshall, whom he adored and defended from all critics.⁴ But Pigou's focus was much more on the welfare effects of resource movement on the general economy. Alfred Marshall's principal concern had been industrial economics and the business firm in specific markets, or what we today would call partial equilibrium analysis. 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

One important difference between Pigou and Coase is that Pigou did nearly all of his writing prior to the ordinalist revolution in welfare economics, while Coase did all of his writing after. The ordinalist revolution, which adopted the view that interpersonal utility comparisons were empirically impossible and thus unscientific, was a reaction toward 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, and 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 C. Pigou, *Wealth and Welfare* (1912); enlarged as *The Economics of Welfare* (1920). Unless otherwise stated, references here are to the Fourth Edition, 1932.

⁴ On this point, see A.W. Brian Simpson, *Coase v. Pigou Reexamined*, 25 *J.Legal Stud.* 53, 64 (1996).

⁵ See Peter D. Groenewegen (1995), *A Soaring Eagle: Alfred Marshall 1842-1924*, at 478, 778 (Cheltenham, England: Edward Elgar 1995).

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

But 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 who had very little idea about how the economic world works. The fact is that Coase could not have done what he did had Pigou not laid the groundwork, and 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 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 is currently producing a greater

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

⁷ Ronald H. Coase, *The Problem of Social Cost*, 3 *J.L.&Econ.* 1 (1960).

⁸ E.g., Ronald H. Coase, *Law and Economics* and A.W. Brian Simpson, 25 *J.Legal Stud.* 103 (1996).

“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, who threaten to overrun his neighbor’s garden.¹² This interaction largely ignores changes in value that accrue to anyone else.

An “externality” in the Coasian terminology is a divergence between marginal social and marginal private net product that occurs when someone who is not a part of the little bargaining microcosm is also affected either negatively or positively by the movement of the resource in question. While Coase spoke of “externalities,” Pigou spoke of “divergence” of marginal social and marginal private net product. He 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.

⁹ Part II, Chapter 3, §1.

¹⁰ Pigou, *Economics of Welfare*, Part 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 *The Economics of Welfare* 149-188, and 189-196 (1st ed. 1920).

¹¹ Pigou, *id.* Part I, ch. 3, 5.

¹² See *Id.*, Part II, ch. 9, §12.

¹³ *Id.*, Part II, ch. 9.

In the *Economics of Welfare* Pigou focused heavily on the types of “hindrances” that prevented the economy from moving to an equilibrium that would maximize the size of 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 to higher value uses unless there were hindrances to their movement.¹⁴ Significantly, both Pigou and Coase 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 intervention as Coase.

In addition, 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 *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 completely incorporated into that firm’s cost function, just as any other cost is. For example, an economist does not typically trouble herself about 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 one of the things that must be internalized into the firm’s cost function and which is thus subject to minimization by comparison with the costs of internal production.

¹⁴ See discussion *infra*, text at notes ___.

¹⁵ Ronald H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* (N.S.) 386, 404 (1937).

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 before "The Nature of the Firm" was published, and nearly a half century prior to "The Problem of Social Cost." Pigou did not use the term "transaction costs," and his meaning was somewhat different.

In discussing how the economy pursues efficiency by re-allocating resources to uses with a marginally higher value, Pigou spoke of the "costs of movement." If resources could be moved costlessly from one use to another, then 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 had 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 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 occur when a resource is moved to the person who places a higher value on it. Thus costs of movement, or transactions costs, make the initial assignment of resources relevant. Pigou had written:

¹⁶Pigou, *Economics of Welfare*, Part II, Ch. 3, § 3.

¹⁷ *Ibid.*

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

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 the movement of resources from less valuable to more valuable uses was hindered by several phenomena. 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

¹⁸Ibid. (emphasis added).

¹⁹Pigou, *Economics of Welfare*, Part II, Ch.5, §4.

to Imperfect Knowledge.”²⁰ The literature on the Coase Theorem continues to see imperfect information as one of the more serious causes of high transaction costs that hinder bargaining.²¹ In fact, Pigou’s solution to the problem of transaction costs resulting from 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 dealt with some of the implications of his conclusion 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 is greater than the incremental value that results. This observation is of course 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 or a property right or other alienable legal entitlement. Pigou spoke of costs of movement more comprehensively, as including

payments 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

²⁰Id., Part II, Ch. 6.

²¹ See, e.g., S.G. Medema and R.O. Zerbe, Jr., *The Coase Theorem*, 836-892, in 1 *Encyclopedia of Law and Economics* (Northampton, MA: Edward Elgar 2000); Joseph Farrell, *Information and the Coase theorem*, 1 *J. Econ. Persp.* 113 (1987); Peter J. Boettke, *Information and the Coase Theorem: Comment*, 3 *J.Econ.Persp.* 195 (1989).

²²Pigou, *Economics of Welfare*, Part II, Ch.5.

²³ Id., Ch. 7, §1.

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 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 market correctives for misallocations of resources in markets where redeployment is costly. For example, the practice of those in overly taxed industries of giving out short-time commission work to those in industries with excess capacity served to increase 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 of 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, so that movement becomes 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

²⁴ II, Ch.8 §4.

²⁵ Ibid.

²⁶ Ibid.

²⁷Id., Part 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,

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

Pigou, the Coase Theorem, and Bilateral Monopoly

Coase would speak 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 should determine all prices and terms of contracts. But he did not advocate that either.³⁰ Coase would prefer to see property rights assigned to their most efficient use ex ante, thus making subsequent bargaining unnecessary, and clearly Pigou would have preferred the same. But of course, making such assignments requires regulatory action as well. 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 these costs – just as the costs of anything else – be minimized.

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.

²⁸ Ibid.

²⁹ Pigou, *Economics of Welfare*, Part II, ch. 9, § 16. See Ronald H. Coase, *Blackmail*, 74 *Va.L.Rev.* 655, 671-672 (1988).

³⁰ Pigou, *Economics of Welfare*, Part II, ch. 9 §16.

Coase asserted that except for saying that bargaining was not a valuable activity, Pigou “evidently feels that there is nothing more to be said on this subject.”³¹ In fact, Pigou had given bargaining a great deal of thought. Indeed, he 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.

Like most economists of his day and ever since, Pigou was troubled by the “theoretical indeterminateness” of bilateral monopoly.³² Coase’s much more microscopic view of the world also 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.³³ While neither likely had a monopoly in the outside market where medical services or confectionaries were sold, their previously made commitments to a common building with a party wall made each a seller of one thing 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 assigned and the amount of transaction costs, there may be a reallocation of resources in the process, which in this case would have occurred had the physician paid the confectioner to shut down his equipment. While the confectioner’s use had preceded the physician’s arrival by many decades, the physician’s use may well have been the more valuable one, and in a well functioning market for property rights he would have bid it away from the confectioner.

One frequent criticism of the Coase Theorem is that it glosses over the many problems of indeterminacy inherent in bilateral monopoly markets.³⁴ Pigou himself had thought about the matter a

³¹ See Coase, *Blackmail*, 74 Va.L.Rev. at 672.

³² Pigou, *Economics of Welfare*, Part II, ch. 9, §15.

³³ *Sturges v. Bridgeman*, 11 Ch.D. 852 (1877). On the facts, see A.W. Brian Simpson, *Coase v. Pigou Reexamined*, 25 J.Legal Stud. 53 (1996).

³⁴ See generally Herbert Hovenkamp, *Rationality in Law and Economics*, 60 Geo.Wash.L.Rev. 293, 306-313 (1992); and see Robert D. Cooter, *The Cost of Coase*, 11 J. Legal Stud. 1, 23 (1982); John Cirace, *A Synthesis of Law and*

great deal, and had given bilateral monopoly 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 hostile toward the contract process in the general 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

Economics, 44 Sw.L.J. 1139, 1165-1168 (1990). 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).

³⁵Pigou, *Economics of Welfare*, Section II, Ch. 9, §15.

³⁶ *Ibid.*

³⁷ See discussion *supra*, text at notes ____.

³⁸Pigou, *Economics of Welfare*, Part 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 that would attend getting each customer to pay his reservation price, and suggests that this would produce fraud in bargaining. See Pigou, *Economics of Welfare*, Part II, 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, had 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

³⁹See William Stanley Jevons, *Theory of Political Economy* 87 - 96 (1871). See also Henry William Spiegel, *The Growth of Economic Thought* 520 (Duke Univ. Press, 1991).

⁴⁰Francis Ysidro Edgeworth, *Mathematical Psychics: An Essay on the Application of mathematics to the Moral Sciences* 27-30, 55 (1881). Pareto followed the same reasoning in 1906. Vilfredo Pareto, *Manual of Political Economy* 138 (1906).

⁴¹ See Alfred Marshall, *Principles of Economics*, Book V, ch. 14 (1890; 8th ed. 1920).

⁴² Marshall showed that under declining marginal utility of two goods in an Edgeworth box would yield multiple equilibria from which no further trading would occur. However, if the marginal utility of one of the goods was constant then there would be a single determinate equilibrium. See Marshall, *Principles of Economics*

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

Prior to *The Economics of Welfare* Pigou's own contributions to the bilateral monopoly literature were published in 1905 and 1908. The first, Pigou's book on labor negotiation and arbitration, generally compared the results of a competitive labor market with one in which both labor and management were organized into a single unit, and also when labor but not management was organized.⁴⁴ Pigou advocated organization as producing a better wage system notwithstanding that organization tended to create a bilateral monopoly situation in which wages were indeterminate. By contrast, 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 so largely because labor was not very mobile and most of the market power was held by employers.⁴⁵ By contrast, if labor was organized they would generally force wages up to the value of net marginal productivity but not higher, for that is all that employers would be willing to pay.

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⁴³On Marshall's debates with Edgeworth, see John Cunningham Wood, Alfred Marshall: Critical Assessments 29 (Routledge, 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 Academy, June 18, 1881, p. 457; reprinted in 2 John K. Whitaker (1975), editor, *Early Economic Writings of Alfred Marshall, 1867-90 at 267-268* (London: Macmillan 1975).

On Marshall's rationale for assuming the constant marginal utility of money for this purpose, see Mary Ann Dimand and Robert W. Dimand, *A History of Game Theory* 69 (Routledge, 1996).

⁴⁴ Arthur C. Pigou, *Principles and Methods of Industrial Peace* (London: Macmillan 1905).

⁴⁵ See Donald R. Stabile, *Work and Welfare: the Social Costs of Labor in the History of Economic Thought* 126-128 (Greenwood, 1996)

Pigou's second contribution to bilateral monopoly theory was a 1908 article which examined the possibilities for equilibria in bilateral monopoly bargaining.⁴⁶ As Edgeworth, Pigou began with the model of two traders who have two different goods to exchange; but following after Marshall, he then made money one of the two goods. Pigou illustrated that if the marginal utility of one of the objects was constant, such as Marshall had assumed of money, then the questions 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 willing 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 analysis was fundamental to the neoclassical treatment of markets such as the one involving Sturges and Bridgeman, the confectioner and the physician.⁴⁸ Coase may have been acting with good reason. By 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 assumption of constant marginal utility of money is probably justified.⁵⁰ Further, Coase was not

⁴⁶ Arthur C. Pigou, Equilibrium Under Bilateral Monopoly, 18 *Econ. J.* 205 (1908).

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's principles, "mathematical note on barter, at 845.

⁴⁸ *Sturges v. Bridgman*, 11 Ch.D. 852 (1879); see Coase, Problem of Social Cost, 3 *J.L.&Econ.* 1 at 8.

⁴⁹ See Ronald H. Coase, The Problem of Social Cost, 3 *J.L. & Econ.* 1,1 (1960); and see Ronald H. Coase, Law and Economics and A.W. Brian Simpson, 25 *J.Legal Stud.* 103, 103-104 (1996).

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).

particularly interested in determining the price, 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 Edgeworth and Marshall had both been able to show the existence of one or multiple trading equilibria, the price still hovered indeterminately between the seller's willing 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

comparative strength of character, capacity, and other personal qualities; comparative wealth, under which is involved ability to endure a conflict such as a strike or a rate-war without bankruptcy; comparative opportunity to obtain, voluntarily or under compulsion, aid from others, 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,.... And, 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. However, without knowledge about external conditions pertaining to the bargainers it was impossible to know more about where an equilibrium would occur.⁵⁴ He concluded that "When the

⁵¹Pigou, *Equilibrium under Bilateral Monopoly*, note ___ at 205.

⁵² On the continuation of this problem see Roger D. Blair, David L. Kaserman and Richard E. Romano, *A Pedagogical treatment of Bilateral Monopoly*, 55 *S.Econ.J.* 831 (1989).

⁵³Pigou, *Equilibrium under Bilateral Monopoly*, 218.

⁵⁴ *Id.* at 217.

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 market with numerous agents with separate volition.⁵⁶ Today we define a “Coasian” market as one in which no agreement can come into existence unless all the market participants agree with one another. By contrast, 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 while the market for land use in a suburb is more likely to be Coasian. Although milk has numerous buyers and sellers only one seller and one buyer need agree with each other to exchange 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 everyone agrees with everyone else. 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 – for example, getting unanimous consent for release from a covenant may be impossible even though virtually no one in the subdivision any longer benefits from the covenant but there are side payments to be had in exchange for one’s release.⁵⁷ Economic theorems about general

⁵⁵ Id. at 218.

⁵⁶ Id. at 210-211

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 some of the issues, see Varouj A. Aivazian and Jeffrey L. Callen, *The Coase Theorem and the Empty Core*, 24 *J.L.&Econ.* 175 (1981). See also Varouj A. Aivazian and Jeffrey L. Callen, *The Core, Transaction Costs, and the Coase Theorem*, 14 *Constitutional Pol.Econ.* 287 (2003). Of course, knowing this, intelligent bargainers might reach an agreement among the

equilibrium, such as the First Welfare Theorem, 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.⁵⁸

Pigou approached the problem by finding three types of bilateral monopoly markets. First was the traditional bilateral monopoly of two individuals bargaining in their own behalf. Second was the situation in which one bargainer was an agent acting in behalf of a group but with authority to offer a single price that was binding on the group. An example of this would be somebody authorized to bargain in behalf of a corporation. In these the problems were the same as in the traditional bilateral monopoly. In the final set, however, the agent would be bargaining in behalf of "persons possessed of independent volition, and subject to the condition that any one of them, to whom the contract agreed upon appears less favourable than no contract at all, will not carry it out...."⁵⁹ 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.⁶⁰

In sum, what Coase characterized as Pigou's hostility toward or ignorance of bargaining behavior was in fact a set of very well thought through observations about the indeterminacy of price in bilateral monopoly situations, and which was very well established within the neoclassical tradition. That problem, incidentally, was one that Coase refused to confront himself, except in his own protest in much later writing that the parties thrust into a Coasian bargain might

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). For a specific application to private land use control restrictions (servitudes), see See Herbert Hovenkamp, *Bargaining in Coasian Markets: Servitudes and Alternative Land-Use Controls*, 27 *J.Corp.L.* 519 (2002).

⁵⁸E.g., Kenneth J. Arrow and Gerard Debreu, *The Existence of an Equilibrium for a Competitive Economy* 22 *Econometrica*, 265 (1954). See also Fischer Black, *Exploring General Equilibrium* (Cambridge Mass: MIT Press 1995).

⁵⁹Coase, *Equilibrium under Bilateral Monopoly*, note ___ at 210.

⁶⁰ Pigou, *Economics of Welfare*, Part III, Ch. 8, §§10, 13.

agree 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.⁶¹

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.⁶²

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."⁶³ That definition is odd, because clearly under "perfect" competition private and social costs are equal. The First Welfare Theorem was known to say as much many years before *The Problem of Social Cost* was published.⁶⁴ 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."⁶⁵ Coase's entire point was that transaction costs gave rise to the need for a legal system to assign entitlements. What he

⁶¹ Ronald H. Coase, *The Coase Theorem and the Empty Core: A Comment*, 24 *J.L. & Econ.* 183, 184 (1981), replying to Varouj A. Aivazian & Jeffrey L. Callen, *The Coase theorem and the Empty Core*, 24 *J.L. & Econ.* 175 (1981).

⁶² See Richard A. Posner, *Economic Analysis of Law* 55, 60-61, 117-118, 119-120, 132, 251, 259, 336-337, 343, 403, 567 (6th ed. 2003).

⁶³ George J. Stigler, *The Theory of Price* 110-114 (3d ed. 1966) ("The Coase theorem thus asserts that under perfect competition private and social costs will be equal").

⁶⁴ See citations in note __; and see Abba Lerner, *The Concept of Monopoly and the Measurement of Monopoly Power*, 5 *Rev. Econ. Studies* 157 (1934) (graphical illustration of first welfare theorem).

⁶⁵ Ronald H. Coase, *The Firm, the Market and the Law* 158 (Univ. of Chicago Press, 1988).

glossed over is the fact that bilateral monopolies, a 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 such as the dispute between the physician and the confectioner is concerned with the question whether the parties will be able to come to an agreement, 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 one else is affected by the arrangement. Further, ever 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, while Pigou's discussions of bilateral monopoly in *The Economics of Welfare* are lengthy, nearly all of them fall under the rubric 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.⁶⁶

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, which tenants were then required to develop with buildings or other improvements insofar as they desired them. However, under the law of fixtures these improvements became the property of the landlord once the tenancy was terminated. This created the negative "divergence," or externality that tenants lacked the incentive to invest at optimal levels

⁶⁶ See discussion *supra*, text at notes ____.

because they could not capture the full returns of their investment.⁶⁷ Further, tenants would tend not to maintain improvements that had to be surrendered at the end of the lease term. Pigou observed that careful contracting could reduce the problem, noting that 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.”⁶⁸ 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.⁶⁹

Pigou also observed that both contractually created and legislatively created compensation requirements designed to correct the problem changed the stakes of the game, because parties renegotiated based on the new provisions.⁷⁰ As a result, such arrangements were also highly imperfect.⁷¹ 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; second, none but an omniscient tribunal could be entrusted with the job of regulating rents.⁷² 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 came out against government regulation of rents⁷³ The only thing that would

⁶⁷Pigou, *Economics of Welfare*, Part II, Ch. 9, §§ 4-5.

⁶⁸ *Id.* § 4.

⁶⁹ *Id.* at § 6, and particularly § 7.

⁷⁰ *Id.*, §8.

⁷¹ *Id.*, §8.

⁷² *Id.*, § 9.

⁷³ *Id.* §9.

solve the problem, Pigou concluded, was a merger of the landlord's and tenant's enterprises into a single firm.⁷⁴

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 troubles seriously 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.⁷⁵ 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; however, Williamson's own pessimistic conclusion was that "unassisted franchise bidding" does not "work well" and cannot be shown to be superior to traditional rate-of-return price regulation.⁷⁶

Indeed, Pigou noted a version of the same problem, which he analogized to the landlord-tenant issue, that 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 without compensation to the chartering town when the charter expired.⁷⁷ He also observed

⁷⁴Ibid:

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.*

(emphasis added).

⁷⁵See Oliver E. Williamson, Franchise Bidding for natural Monopolies—in General and with Respect to CATV, 7 Bell J. Econ. (now Rand Journal) 73 (spring, 1976).

⁷⁶ Id. at 74.

⁷⁷ Pigou, Economics of Welfare, Part II, Ch. 9, § 6. Pigou referred to the Berlin tramway charter:

Such an arrangement at one time governed the Berlin Tramways. The

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.⁷⁸ Just as Williamson, he was unable to produce a solution.

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 the one person to whom he owed a great deal the credit he deserved. 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 Coase did. Pigou deserved better.

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."

⁷⁸ *Id.*, § 6.