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THE LEGACY OF RONALD COASE: COMMERCIAL IMPLICATIONS AND POLICY CONSEQUENCES

The work of Ronald Coase influences how we think about regulation, monopolies and the provision of public goods, says **Alex Robson**

In my office I have a coffee cup on which is printed a quote from a famous economist: ‘Without the appropriate institutions no market economy of any significance is possible.’ The message is a constant but welcome reminder of the importance of institutions—the traditions, customs and other features of our economic system that many of us tend to take for granted, but which play a salutary role in influencing long-run economic progress through changes in areas such as rule of law and private property rights.

The quote is also a reminder of the staggering professional contribution of Professor Ronald Coase, who passed away on 2 September 2013, just three months short of what would have been his 103rd birthday. It is no exaggeration to say that Coase was one of the most important economists of the twentieth century, having revolutionised a number of fields in economics and fathered several completely new fields of inquiry.

The message on my coffee cup comes directly from Coase’s ‘The Institutional Structure of Production.’¹ In 1991, Coase received the Nobel Memorial Prize in Economics for his ‘discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy.’² The Nobel committee specifically cited two of his articles, ‘The Nature of the Firm’ and ‘The Problem of Social Cost.’³ With these two articles alone, Coase began what has turned out to be two of the most fruitful research agendas in economics.

Although the two papers cited by the Nobel committee were remarkable in their own right, Coase made a number of other fundamental contributions to economics. This article celebrates Coase’s contributions to economics by exploring five of his most well-known papers, including the two cited by the committee, that have influenced how we think about regulation and marginal cost pricing, the private provision of public goods, and the behaviour of a monopolist selling a durable good.

Although Coase’s writings continue to be of great interest to economic theorists, he was primarily motivated by ‘real world’ commercial and policy phenomena, which is why this article focuses on the implications of Coase’s work for commercial decisions and their impact on modern economic policy.

Why do firms exist?

To the entrepreneur or business owner, ‘Why do firms exist?’ is obviously a silly question. But it had received remarkably little rigorous attention before ‘The Nature of the Firm.’⁴ Coase tried to explain why ordinary businesses would develop as separately identifiable economic entities within the standard classical paradigm of microeconomic theory. In framing



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his analysis, Coase paid particular attention to one of the key characteristics of a firm: the tendency to internally allocate resources via non-price or ‘command’ mechanisms and hands-on planning, rather than by using relative price signals, which are one of the defining features of the modern market economy.

Drawing on F.A. Hayek’s work on economic planning and the role of prices in guiding the allocation of resources towards their highest valued uses,⁵ Coase took the usual assumption of frictionless market exchange to its logical conclusions. He argued that if the price system was so successful in providing informative signals to producers and consumers, then it was logical that there would be no economic rationale for firms as separate economic entities. Nor, for that matter, would there be a need for managers or entrepreneurs to direct economic activity within firms. Instead, the price system would act as a coordinating device for business inputs as it did for other resources, so that factors of production could be allocated to productive tasks using the familiar mechanism of relative prices and exchange on spot markets. In particular, there would be no need for long-term contracts (quasi-vertical integration)—let alone full vertical integration.

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Given the powerful role of the price system in allocating resources efficiently, Coase set out to solve the puzzle why economists observed firms, managers and entrepreneurs at all. Why wouldn’t the market price system evolve and render the role of firms and managers obsolete? Setting aside the potentially distorting effect of certain government policies (which he conceded may affect some internal business organisational decisions at the margin—for example, tax policy or labour market regulations), Coase argued that the answer lay in the assumption of frictionless markets and the concept of *transaction costs*—the

costs associated with using the market system, haggling, negotiating agreements, drawing up contracts, settling disputes, and so on.

Coase’s focus on these costs in ‘The Nature of the Firm’ laid the foundations for much of his later work. His basic idea was stunningly (and frustratingly, for us mere mortals) simple—but it also had a number of profound economic implications. If, at various stages of production, the costs of using the market price system—the transaction costs associated with negotiating on spot markets—were sufficiently high, then, Coase argued, economic agents would be more likely to avoid those costs and instead rely on an alternative set of arrangements for allocating resources. The alternative arrangements were, of course, non-price mechanisms used by modern firms. In other words, transaction costs could explain why firms and entrepreneurs played such a vital economic role.

In Coase’s analysis, the existence of transaction costs had two important consequences. Not only did these costs determine the boundaries of the firm (for example, the extent to which the firm would vertically integrate along the supply chain), but they also influenced the overall costs of production, and ultimately, consumer prices. The interaction between transaction costs, profit maximisation, and the forces of competition would mean the emerging forms of business organisation would be those that organised internal and market transactions to minimise the overall costs of production, including transaction costs. These cost-minimising decisions would differ among industries and among firms within the same industry—and would obviously change as technology evolved.

Economists love to talk about the ‘policy implications’ of their work—but Coase’s 1937 paper hardly mentioned *any* direct policy implications. On the other hand, its implications for commercial decision-making and economic theory were profound. To understand the commercial implications, consider, for example, a miner who requires the services of a downstream processor or port owner. The transaction costs to the miner of ‘using the market’—that is, the costs of repeatedly searching for new downstream

partners and repeatedly negotiating new sets of prices, terms and conditions—are likely to be prohibitive. Unanticipated outcomes and non-diversifiable risks—both common in mining—are likely to be further sources of transaction costs. In a perfect world (or what Coase pejoratively called a ‘blackboard economics’ world), firms along different points of the supply chain would write complete contingent contracts specifying their obligations in every possible state of the world. But some contingencies cannot be foreseen, and so complete contracts are not feasible—and this can lead to costly conflict. An alternative set of commercial arrangements is needed.

Asset specificity—also common in mining—can exacerbate these problems. Depending on how much firms have invested in the specific relationship and the outside market value of specific assets, in the absence of a complete contingent contract, one firm may be able to behave opportunistically and increase its profits by threatening to contract with a third party. But the possibility that such threats might eventually be made means that firms may be reluctant to invest in relationship-specific capital in the first place. This in turn reduces the likelihood of efficient resource exploitation.

Such conflicts can be resolved by simple customs or rules, which the parties might implicitly agree to at the outset; costly renegotiation; or costly conflict in a court of law or via some other arbitration mechanism. Alternatively, firms might be able to avoid these costs altogether by vertically integrating at the outset—exactly as Coase predicted. Any risks of unanticipated costs are then shared within the joint entity so that formal contingent contracts and other costly mechanisms such as renegotiation or formal arbitration may not be required.

In other words, Coase’s analysis predicts that vertical and quasi-vertical integration is likely to be widely observed in a sector such as mining because such arrangements avoid the large transaction costs associated with alternative commercial arrangements, and are therefore likely to be both profitable and economically efficient. Indeed, recent Australian experience in mining

demonstrates that if businesses are prevented from vertically integrating when it is efficient and profitable to do so, lengthy delays can ensue, with users of downstream infrastructure tending to ‘focus more on shifting slices of the pie than on ensuring that the pie expands to meet competing demands.’⁶ This is exactly the kind of conclusion that Coase’s analysis would predict, and the policy implications are equally clear: Horizontal or vertical mergers that seek to avoid or minimise the effect of transaction costs are likely to enhance efficiency, and these welfare gains should be carefully considered and weighed against any possible detrimental effects to consumers from greater market concentration.⁷

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When do legal rules matter for economic efficiency?

In ‘The Problem of Social Cost,’ Coase built on ‘The Nature of the Firm’ and established a new field of inquiry: law and economics. The main result, known as ‘The Coase Theorem,’ is one of the most well-known and controversial results in economics. Most find the idea strikingly simple and obvious once presented to them, and yet some of the theory’s implications remain elusive to many economists.

Coase’s analysis again focused on the role of transaction costs: If these costs are sufficiently low (not necessarily zero), then it is reasonable to expect that parties would freely bargain around existing common law rules (such as rules governing liability for the harm caused by pollution, for example). In a world of low transaction costs, these legal rules will therefore have no bearing on the economic efficiency of the final allocation of resources (although they will affect the distribution of wealth).⁸

For example, a collection of households negatively affected by pollution could simply

negotiate with the polluting firm and pay it to reduce or completely cease production; alternatively, the firm could negotiate with households to allow the pollution to continue in exchange for suitable financial compensation. The lesson of the Coase Theorem is that in a world of low transaction costs, as long as *some* legal rule is initially in place, the final outcome will be invariant to the initial legal rule, and will also be efficient.

Coase's result has often been interpreted as 'legal rules don't matter'—but that is exactly the *opposite* conclusion he encourages us to draw from his analysis. Indeed, an important corollary of the standard 'Coase Theorem' is that if transaction costs are sufficiently *high*, then parties will *not* be able to bargain around legal rules, and so such rules *will* determine the allocation of resources—and the design of legal rules will therefore matter a great deal for economic efficiency. Simply put, some legal rules will be better than others—that is, *legal institutions matter for economic efficiency*. Thus was born the field of law and economics, which analyses the incentive effects and efficiency properties of negligence law, contract law, property law, criminal law, and so on.

Mergers that seek to internalise positive or negative externalities are likely to lead to welfare gains, and these need to be considered carefully along with other factors.

The Coase Theorem has a number of interesting commercial implications. For example, if one firm's actions positively or negatively affect the profit of another, the natural business strategy would be not to file a lawsuit but to exploit the gains from trade—that is, merge and internalise those externalities. Indeed, Coase's analysis suggests that such mergers or takeovers should be expected as a profit maximising (and economically efficient) response to an alternative set of commercial arrangements in which unpriced external effects would persist or be dealt with via regulation or costly lawsuits. The business world is replete with examples of commercial deals that seek to exploit potential 'positive synergies' between

parties to a possible merger or takeover—but these 'synergies' are of course nothing more than positive externalities that the parties are seeking to internalise and profit from via an appropriately designed Coasean bargain. And, just as it did in 'The Nature of the Firm,' once the potential for Coasean bargaining over externalities is recognised, the implications for competition policy and other business regulations become clear: Mergers that seek to internalise positive or negative externalities are likely to lead to welfare gains, and these need to be considered carefully along with other factors.

Of course, the Coase Theorem has a number of broader policy implications as well. Chief among them is the vital economic role played by a well-defined system of property rights and legal rules. To the extent that transaction costs are low, well-defined property rights would allow individuals to use the price system and bargain. Moreover, Coase's analysis supports the proposition that if transaction costs are sufficiently low, there is no efficiency justification for Pigouvian taxes that seek to address the economic problems associated with pollution or other environmental problems.

The pollution problem is one of missing markets and ill-defined property rights or legal rules, not inadequate levels of taxation. If transaction costs are low and property rights are well defined, then interventions like Pigouvian taxes can only lead to welfare losses, distorting the allocation of resources resulting from efficient Coasean bargaining. If, on the other hand, transaction costs are sufficiently *high* to justify introducing artificial 'market mechanisms' (such as a cap and trade scheme), then Coasean considerations suggest that the way permits are initially allocated to firms within such a system is likely to matter a great deal for efficiency. Such considerations remain largely unaddressed and unexplored in recent discussions of environmental policy in Australia.

At a more general level, Coase's analysis influenced how economists approach many of the economic issues associated with negative externalities in general, and pollution in particular. Attention has shifted away from the now

discredited Pigouvian idea that pollution is ‘caused’ by a ‘polluter’ who is at ‘fault’ and needs to compensate a ‘victim.’ Instead, Coasean analysis suggests that the economic costs of pollution are created by the co-location of the ‘polluter’ and the ‘victim.’ In other words, *social costs really are social*. A natural conclusion is that depending on the situation, in a world of high transaction costs it may be efficient for the legal system to allow ‘polluters’ to continue their activity, and force ‘victims’ to either endure the costs of pollution or relocate.

Economists have extended Coase’s analysis in many directions—for example, the political system—and argued that in a world of low transaction costs, exchanges of votes (i.e. logrolling) between minorities and the majority may result in efficient outcomes.⁹ On the other hand, if transaction costs are high, then very different conclusions may follow.

To take another example, Coase’s original analysis features only two parties. Varouj A. Aivazian and Jeffrey L. Callen showed that when there are more than two parties, even a world of low transaction costs can become complicated.¹⁰ *Instability problems* may cause the Coase Theorem to fail, even when other, more direct impediments to bargaining are low.

Intuitively, it is possible that agreements between two parties that exclude a third party are so profitable that the individual opportunity cost of each of the two parties entering an agreement with the third party may exceed the benefits. Hence, any agreement between all three parties will be susceptible to coalitions of two players breaking away, and the Coase Theorem can break down even if there are no direct transaction costs. This is the *empty core* phenomenon. However, I have formally derived two novel and surprising results.¹¹ First, if all possible payoffs are equally likely, then this empty core phenomenon is relatively rare—in fact, the Coase Theorem will hold most of the time. Second, when direct transaction costs are present, the theorem can hold in cases where, in the absence of those direct transaction costs, it would fail to hold because of instability problems. So when there are three parties, transaction costs can *encourage* Coasean

bargaining. These and other recent results show that the Coase Theorem remains a highly active area of research in economics.

What price will a durable goods monopolist charge?

A standard answer in high school economics to the question, ‘What price will a durable goods monopolist charge?’ is that a single seller of a good—a monopolist—will tend to have a strong incentive to charge a price exceeding his marginal cost, leading to unexploited gains from trade and an inefficient allocation of resources. In more advanced courses, students learn that if the monopolist can perfectly price discriminate (charging different prices for different units of a good to different consumers), then the gains from trade can be fully exploited, and inefficiency disappears. However, in such situations the monopolist captures all the gains from trade. In other words, monopoly can produce efficient outcomes—but may also raise equity concerns.

Coase argued that in certain situations neither of the standard monopoly pricing results would apply.¹² On the contrary, a monopoly could simultaneously produce efficient and ‘equitable’ outcomes—in fact, a monopoly would produce exactly the same outcome as perfect competition.

How can this be? Coase considered the profit maximisation problem faced by a monopoly owner of a stock of a perfectly durable good (land was a concrete example of such a good). He argued that it was reasonable to expect that such a monopolist would engage in *intertemporal price discrimination* by charging a high price today to consumers who placed a high value of the good; but given the good’s assumed durability, the monopolist could go back to the market tomorrow and sell some of the remaining stock to other customers at a slightly lower price. The monopolist could continue to do this, but would eventually stop selling once there was no more profit from doing so—that is, where price equalled marginal cost. But this is the efficient outcome! Hence, Coase argued, with a durable good monopolist there was little reason to expect the standard inefficiency result.

But this is not the only remarkable conclusion of Coase’s analysis. Consider the response of

buyers to the monopolist's pricing strategy. Anticipating that the monopoly will sell the good for a lower price tomorrow, marginal consumers might gain by delaying consumption. That is, depending on how impatient potential buyers of land are, they might be reluctant to buy today if they know the price tomorrow will be lower. If all consumers are sufficiently patient and all trading happens in an instant, then the only consumer response consistent with the monopolist's strategy is that all would wait until the monopolist lowers his price to the competitive level! In other words, Coase's economic reasoning led to the seemingly counterintuitive result that not only is the monopoly outcome efficient but also that consumers capture *all* the gains from trade!

A key insight for commercial decisions is that a durable good monopolist may face the prospect of competing against himself.

This result, known as the 'Coase Conjecture' in economics literature, could not be verified formally until the tools of dynamic game theory were invented several years later.¹³ Once again, Coase's analysis has commercial implications and policy consequences. A key insight for commercial decisions is that a durable good monopolist may face the prospect of competing against himself, and have a profound effect on pricing decisions. The policy implications are also interesting: The behaviour of a durable good monopolist may differ in important ways from other monopoly suppliers, creating the need for a different set of competition policy laws for durable goods.

When will the private sector supply public goods?

Lighthouses have long been used as a prototypical example of a good that can only be supplied by governments, never by the private sector.¹⁴ Consider the economic properties of lighthouse services: once provided, they are automatically available to all ships (non-excludability), and consumption of lighthouse services by one ship

does not reduce the benefits of consumption to other ships (non-rival consumption). In other words, lighthouses fit the modern definition of a pure public good.

On this basis, most economics textbooks conclude that private sector suppliers would be reluctant to build lighthouses—after all, if lighthouse owners cannot exclude anybody from consuming their services, how are they supposed to charge consumers a price for their services? And if consumers cannot be made to pay a charge for a provider's lighthouse services, how would such a business earn any revenue? Hence, the textbooks argue, unless governments levied general taxes to pay for lighthouses, no lighthouse services (or not enough of them) would be provided.

In 'The Lighthouse in Economics,' Coase demonstrated that this standard conclusion did not reflect historical reality.¹⁵ He traced the history and evolution of the British lighthouse system over several centuries, and observed that private individuals began building lighthouses and levied private tolls on a cost-recovery basis in the seventeenth century. Coase also found that by 1820, 75% of all lighthouses had been built by the private sector. Governments established an enforceable system of property rights in lighthouse services that encouraged private production:

The method used by private individuals to avoid infringing Trinity House's statutory authority was to obtain a patent from the Crown which empowered them to build a lighthouse and to levy tolls on ships presumed to have benefitted from it. The way this was done was to present a petition from ship-owners and shippers in which they said that they would greatly benefit from the lighthouse and were willing to pay the toll ... The tolls were collected at the ports by agents (who might act for several lighthouses), who might be private individuals but were commonly customs officials. The toll varied with the lighthouse and ships paid a toll, varying with the size of the vessel, for each lighthouse passed.

Hence, even though the lighthouse satisfied the formal definition of a public good, Coase showed that the commonly reached theoretical conclusion did not fit reality well. Although Coase's paper is rich in historical detail, it also provides a number of important lessons for economists and modern economic policymakers. For the former group, Coase's analysis teaches economists that they should find out more about the toy examples or 'fables' they use to illustrate their key ideas.¹⁶ For policymakers, the key lesson is that government supply of pure public goods using general taxation—still the most favoured policy instrument in many textbooks—is only one of many possible ways of addressing the economic issues raised by non-excludable, non-rival goods. Other institutional arrangements, such as those analysed by Coase, are also feasible and may often be more economically desirable. In modern parlance, Coase showed that lighthouses were supplied under a type of *public-private partnership* (PPP)—a term that describes a range of procurement methods and contractual arrangements for goods, including roads, bridges, tunnels, schools and hospitals, traditionally supplied by governments.

What price should a natural monopolist charge?

The issues associated with regulating natural monopolies have long occupied economists. Formally, the production technology of a good is said to exhibit natural monopoly characteristics if the cost function is *subadditive*. For some fixed output of the good, the production cost to a single firm is less than the sum of the costs faced by two or more firms who, in aggregate, produce the required fixed amount. Goods with large fixed costs and low marginal costs (such as roads) are likely to exhibit these characteristics, with average costs declining over some relevant range of output.

One set of policy questions revolves around whether a natural monopoly should be owned and operated by the state. This question has largely been resolved: An overwhelming amount of evidence now suggests that public ownership and government operation of natural monopoly

businesses leads to higher costs, compared to the alternative private ownership and management.¹⁷

Given the superiority of private ownership, another set of questions revolves around the regulation of natural monopolies when they are in private hands, particularly the appropriate regulation of a natural monopoly's pricing arrangements. Coase critiqued the well-known approach to marginal cost pricing, under which regulators force a firm to set a price equal to marginal cost.¹⁸ However, since average costs are likely to exceed marginal costs (due to the firm's natural monopoly characteristics), such a regulation would cause the firm to make a loss. The standard policy response is for the government to cover this loss by subsidising the firm out of general tax revenues.

Marginal cost pricing is therefore feasible but is besides the point: It provides none of the information governments should be interested in.

Coase found this policy recommendation unsatisfactory. First, he recognised that general taxation would have its own distortionary effects, and there was nothing to ensure that the welfare losses from general taxation would be less than the welfare losses associated with alternative pricing arrangements (such as average cost pricing). Second—and more importantly—Coase argued that marginal cost pricing had a serious defect: Under marginal cost pricing, there was no way for the government to tell whether total willingness to pay for the good exceeded total costs. This could lead to a serious misallocation of resources by governments. To see why, consider the following example. Suppose the government is considering building a bridge, and suppose it knows the marginal costs of provision (which are likely to be low) and the volume of demand at that price. Marginal cost pricing is therefore feasible but is besides the point: It provides none of the information governments should be interested in. In the absence of further information, the

government cannot know whether building the bridge will improve overall economic wellbeing. With marginal cost pricing, the government has no way of comparing the total costs of the bridge with total willingness to pay. It could easily turn out that marginal costs are low and fixed costs are high, with consumers having a very low total willingness to pay for the services provided by the bridge. Constructing the bridge would therefore reduce the community's wellbeing.

Coase's insights have obvious implications for modern public utility pricing, but his analyses did not stop there. He proposed a straightforward solution: multipart pricing or a *two-part tariff*, under which consumers are charged an access fee that is proportional to the monopolist's fixed cost, and a usage fee that is equal to marginal cost. Thus, by design, revenue covers total costs, and the willingness to pay for the project must be at least as large as total costs. The risk that the government would build economically wasteful projects under such an arrangement is therefore likely to be considerably smaller than under marginal cost pricing.

Conclusion

This article has provided a brief overview of five of Coase's most important and interesting contributions to economics. Two themes can be found throughout Coase's writings: careful attention to institutional arrangements and details such as legal rules and property rights, and analyses primarily motivated by 'real world' commercial issues or policy questions. Above all, Coase's work demonstrates the power of economic analysis and that, to quote another famous economist, 'A few lines of reasoning can change the way we see the world.'¹⁹ Ronald Coase changed the way we see the world for the better, and he will be dearly missed.

Endnotes

1 Ronald Coase, 'The Institutional Structure of Production,' Prize lecture delivered to the memory of Alfred Nobel (9 December 1991), published in *American Economic Review* 82:4 (1992).

- 2 The Royal Swedish Academy of Sciences, 'The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel,' press release (Stockholm: 1991).
- 3 Ronald Coase, 'The Nature of the Firm,' *Economica* 4:16 (1937); Ronald Coase, 'The Problem of Social Cost,' *Journal of Law and Economics* 3:1 (1960).
- 4 Ronald Coase, 'The Nature of the Firm,' as above.
- 5 F.A. Hayek, 'The Trend of Economic Thinking,' *Economica* 13 (1933).
- 6 Commonwealth of Australia, *Australia's Export Infrastructure, Exports and Infrastructure Taskforce*, Report to the Prime Minister (Canberra: May 2005), 2.
- 7 These 'Williamsonian tradeoffs' are well known in the analysis of horizontal mergers. See Oliver Williamson, 'Economics as an Anti-Trust Defense: The Welfare Trade-offs,' *The American Economic Review* 58:1 (1968).
- 8 Alex Robson and Stergios Skaperdas, 'Costly Enforcement of Property Rights and the Coase Theorem,' *Economic Theory* 36:1 (2008). See Alex Robson, *Law and Markets* (London: Palgrave Macmillan, 2012) for a further discussion of the Coase Theorem.
- 9 James Buchanan, 'The Coase Theorem and the Theory of the State,' *Natural Resources Journal* 13 (October 1973); Donald Wittman, 'Why Democracies Produce Efficient Results,' *Journal of Political Economy* 97:6 (1989); Donald Wittman, *The Myth of Democratic Failure* (Chicago: University of Chicago Press, 1995); Francesco Parisi, 'Political Coase Theorem,' *Public Choice* 115:1-2 (2003); Barbara Luppi and Francesco Parisi, 'Politics With(out) Coase,' *International Review of Economics* 59 (2012).
- 10 Varouj A. Aivazian and Jeffrey L. Callen, 'The Coase Theorem and the Empty Core,' *Journal of Law and Economics* 24:1 (1981).
- 11 Alex Robson, 'Transaction Costs Can Encourage Coasean Bargaining,' *Public Choice* (September 2013).
- 12 Ronald Coase, 'Durability and Monopoly,' *Journal of Law and Economics* 15:1 (1972).
- 13 See Nancy Stokey, 'Rational Expectations and Durable Goods Pricing,' *Bell Journal of Economics* 12:1 (1981); Faruk Gul, Hugo Sonnenschein, and Robert Wilson, 'Foundations of Dynamic Monopoly and the Coase Conjecture,' *Journal of Economic Theory* 39:1 (1986).
- 14 For example, John Stuart Mill first used the example of a lighthouse in his *Principles of Political Economy* (1848).
- 15 Ronald Coase, 'The Lighthouse in Economics,' *Journal of Law and Economics* 17:2 (1974).
- 16 For a further discussion, see Alex Robson, 'A Labour Market Fable,' *Policy* 20:4 (2004).
- 17 Dennis Mueller provides a summary of dozens of examples the superiority of private ownership that have been studied in the empirical literature. See Dennis Mueller, *Public Choice III* (Cambridge: Cambridge University Press, 2003).
- 18 Ronald Coase, 'The Marginal Cost Controversy,' *Economica* 13:51 (1946).
- 19 Steven Landsburg, *The Armchair Economist* (Free Press, 1995).