A REGULATORY FRAMEWORK FOR THE 21ST CENTURY

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INTRODUCTION

A new millennium for the world’s population awaits just around the corner. Public policies aimed at human safety, environmental quality, and mitigation of economic harm will become global requirements, irrespective of geography or politics. The design of these policies—the balance between the role of government and of market forces—is a major challenge facing the 21st century.

For most of the current century, the balance favored a large role for government. Markets fail—because of monopoly, public goods, externalities, lack of information, and for other reasons. Government intervention was viewed as the panacea—whether through the creation of economic and environmental regulatory agencies, or in other countries, through government provision of the goods and services of many infrastructure industries.

At the end of the century, market forces are in the ascendency. Two highly successful ideas from the 20th century have been most responsible for limiting and redefining the role of government—Coasian theory and contestability theory. Coasian theory, with its emphasis on incentives and contracts, has permitted less intrusive governmental intervention in the areas of externalities and public goods. Contestability theory, with its emphasis on unbundling and free entry, has provided the intellectual underpinnings for the deregulation and privatization movements. Both theories recognize that traditional governmental approaches are often strikingly unsuccessful at reducing the harm they were meant to address. Both theories provide practical corrective policies that, once adopted, allow market forces to beneficially hold sway.

We begin by describing the insights achieved from each of these theories. We show that by joining together these insights, we can provide a prescriptive framework for a variety of other market failures, such as information asymmetries. Coasian and contestability theories working together enable design of an improved regulatory framework for a broad set of new issues involving harm as we move into the 21st century.

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COASIAN THEORY

At the start of the century, policies addressing negative externalities and public goods were not very high on the public agenda. However, their importance has grown throughout the century and is continuing to grow as we look toward the next century. The major insight about efficient policy design for externalities is due to Ronald Coase (1900). The key conceptual breakthrough of Coase was that an externality or an injury is reciprocal in the sense that two parties are required. If these two parties can reach a private agreement that internalizes the externality, then such an agreement will efficiently mitigate the harm. Thus, hoosiers and apple growers in Washington State came to contract with one another so that the pollution services of the bee would be provided at a socially efficient level (Cheung, 1973). According to Coase, the role of government is not to intervene in such situations, but instead is to define property rights. In the case of negative externalities, such a right might give one party the entitlement to pollute or the other party the entitlement to be free of pollution. This assignment of rights determines distributional consequences — who pays whom in order to balance abatement and pollution costs at the margin — but the socially efficient outcome is achieved however the property rights are assigned.

Coasian theory did not initially alter the role of government when there are many affected parties. In such situations, private agreements are difficult to strike due to transactions costs. Over the next decades, however, Guido Calabresi and Douglas Melamed (1972) and Stephen Breyer (1982) began to build upon the Coasian legacy by recommending guidelines for the assignment of costs. Their idea was to design policies in which costs and benefits are weighed. The costs of the harm are placed on the party best able to avoid them or, where this is unknown, on the party best able to induce others to act more safely. In practice, this guideline has meant that businesses assume most of the burden of care. Moreover, any solution should be designed to correct the harm at least cost to society. Thus, the owner of the swimming pool should fence it, rather than having each of the neighbors build his own fence.

Coasian theory also allowed the presumption that public goods required government provision. A classical example of a public good is a lighthouse. Extra ships can consume its output without the existing users having to consume less. Coase (1974) pointed out that in the 17th century many of Britain's lighthouses were privately built and run. The government's role was to authorize the collection of fees in local ports so that the private market could work. It was not to provide the public good itself. This thinking now underlies a number of efforts to privatize.

The Coasian criteria are pragmatic, and enable us to examine various 20th century environmental policies to judge whether such is well or poorly designed. One problem has been environmental damages caused by pollution. As long as polluters do not bear the full cost of the environmental damage they impose on others, they will lack the incentives to reduce emissions adequately. The Coasian implementation using market forces has been the creation of a pollution rights trading system. The government issues permits that allow emission of a given quantity of a pollutant. Total emissions are limited by the number of permits issued, which government can lower over time. Consumers receive the benefits of cleaner air or water. While the number of producers is far greater than two, transactions costs are minimized by reliance on the market trading system. Moreover, the trading mechanism enables a cost to society that is far below that which might be expected from a command-and-control standard that would be unable to factor in the different costs of pollution reduction in different facilities. The 1990 Clean Air Act Amendments established a tradable permit program among electric utilities for sulfur dioxide emissions (Jokow, Schmalensee and Bailey, 1998). In 1998, a similar program was enacted for nitrogen oxide emissions.

Another area of pollution concerns manufacturing. Here, the Coasian correction has been mandatory disclosure. Social repugnance from local community newspaper reports provides a powerful incentive for local manufacturing plants to improve their polluting behavior. The Right-to-Know Act, passed in 1886, has turned out to be a most effective environmental law. It required companies that have more than 10 employees and make or process more than 25,000 pounds of chemicals per year to provide information on a number of widely used toxic chemical releases. In the 10 years from 1988 to 1998, the amount of such releases dropped by an astounding 46 percent.

It is useful to contrast successful with unsuccessful policy design. A glaring example of unsuccessful design is the EPA's Superfund program for the cleanup of existing toxic waste disposal sites. The law chose joint and several liability as the ex post regulatory system. This has meant that a producer responsible for one percent of the disposal may be required to pay 100 percent of the cleanup costs. It is not surprising that litigation is undertaken in such circumstances. Indeed, transactions costs from litigation now account for a significant portion of the cost of cleanup. So the law was designed with an eye to minimizing transactions costs, as Coasian thinking would suggest. It was also not designed with the costs and benefits equation in mind. The law requires the same cleanup of all sites. Paving over a site in a commercial area would be far less costly and would not forego any social benefits. Yet, it is subject to the same full cleanup and removal of soil such as might make sense if a toxic site were to be converted into a children's playground.

Other environmental examples have public goods properties. A decade ago, scientists found that chlorofluorocarbons (CFCs), used as coolants in refrigerators and air conditioners, were eating away the ozone layer. Ozone holes were appearing, ultraviolet rays were being less efficiently blocked, and more skin cancers would be the result. A worldwide agreement was needed to phase out the production of such chemicals. In 1987, 110 nations signed the Montreal Protocol. At first, the law worked well. Large multinational firms came up with replacement chemicals faster than required. New methods were found, for example, to clean circuit boards that eliminated the use of these chemicals. Indeed, the United States and the European Union stopped almost all CFC production within a decade. So, Coasian principles were followed in that a solution was reached with good transactions costs and cost-benefit properties. The regulatory framework required a strong correction—a phased-in ban—but the ongoing governmental role was then limited to inspection and enforcement, so that market forces could work. These policies seem less successful in the most
recent view, but for a different reason. A number of emerging economies have raised their annual CPC production, for example, from 12,360 metric tons in 1986 to 60,000 by 1996 in China. Thus, the falling production in the more developed world is being replaced by a rising production elsewhere. Enforcement across governmental entities has proved to be difficult. This lesson of non-compliance is important when attempting to design a 21st century policy for the global warming problem, which we will discuss later.

CONTESTABILITY THEORY

Let us turn now to the deregulation movement. At the beginning of the last century, government granted monopoly rights to many infrastructure industries, such as telecommunications and railroads. It then created regulatory agencies, whose bureaucratic responsibility was to oversee these industries [Kahn, 1970]. The focus was to be on universal service; that is, rapid deployment of communications and transportation services to all areas of the country, whether rural or urban. Moreover, prices to any citizen were not to be unreasonable. This particular regulated monopoly partnership between the role of government and the role of business did result in the building of infrastructure. There was universal service and this service became available at reasonable prices to all citizens. However, over the course of the century, the arrangement began to show signs of strain. As new technologies developed, many believed that there was no longer a natural monopoly at the national level. Technological change altered the cost structures between long distance and local services. Regulatory pricing policies resulted in longer haul charges that were way above costs, a situation that normally would be a signal for entry, which, by and large, government blocked. Also, as more and more modes came into being (such as trucks and air transportation), distortions in pricing across modes became more and more apparent. By the 1960s and 1970s, the entire regulatory bargain came into question. George Stigler [1971] and others of the Chicago School came to view the regulatory agencies as having been "captured" by the industries they regulated. Political scientists such as James Q. Wilson [1971] criticized the "dead hand" of regulation.

Thus, the stage was set for a new compact between government and business. The key innovation in regulatory thinking that enabled beneficial change to take place has been contestability theory [Baumol, Panzar and Willig, 1982]. Two insights from contestability theory proved most helpful. The first mandate has been to unbundle and analyze individual markets for harm, to isolate any monopoly failure into its smallest unit. The concept of economies of scale was used along with contestability theory's new concept of economics of scope, to analyze both size of firm and market, and variation across products. The second insight has been to ensure broadly that entry is kept open. In many markets, potential competition or competition from some other mode provides sufficient competitive pressure that a sensible monopolist will forestall competition by setting prices as if it were operating in a competitive market. In such "contestable" markets there are small numbers of players, but there is no economic harm.

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Thus, the new theory argues that neither large size nor fewness of firms necessarily means that markets need function unsatisfactorily. Impediments to entry and exit, not concentration or scale of operations, often is the primary source of interference with the workings of the invisible hand. Indeed, because regulators have been predisposed to block entry and interfere with exit, the contestability analysis suggests that they have been among the primary causes of unsatisfactory industry performance.

The practical template for redesign of public policy is straightforward. Any market that is either competitive or contestable should be deregulated. There should be continued regulation only in areas where economic harm is still an issue. Thus, instead of regulating an entire industry, the idea is to deregulate as much of the industry as possible. Instead of having an independent regulatory agency overseeing all pricing and entry functions for the industry, that agency should either be disbanded (sunset) or have its regulatory powers and oversight functions sharply curtailed.

As with Coase theory, contestability theory is highly pragmatic in application. I went to Washington to be part of the team that deregulated the airline industry. Our agency, the Civil Aeronautics Board (CAB), was the first to implement the deregulatory prescription. We found that contestability theory facilitated the formation of policy that mitigated harm while at the same time it lessened the need for public intervention [Baily, 1991]. The policy prescription was similar to that of Coase in that the correction served both to limit and redefine the role of government.

Let me cite some examples. One occurred in a merger analysis involving Texas International and National. The Department of Justice recommended disapproval because of one market overlap situation—involving the Houston-New Orleans market—where market share of the two leading firms would increase from 91 percent pre-merger to 75 percent post-merger. The CAB noted that there were eleven carriers with gates at both ends of this market, and that the markets were thus readily contestable. We approved the merger and, indeed, by the time our order was written, Southwest Airlines had entered and was offering 25 percent of the market.

A second example involves stock brokerage commission rates. The Securities Act Amendments of 1975 instructed the Securities and Exchange Commission (SEC) to outlaw fixed brokerage rates on the New York Stock Exchange. Such fixed rates had been in force for 180 years, from 1792 to 1975. Governmental antitrust immunity had supported practices in which quantity discounts were prohibited, rebates were prohibited, minimum rates were fixed. When this immunity was withdrawn, competitive unbundling of services became immediately apparent with discount brokers arising for those who were not interested in ancillary brokerage services. Pricing for large buyers and sellers plummeted since the regulatory system had forced them to cross-subsidize the trades of ordinary consumers. Interestingly, both the small consumer and the large institutional fund traders benefited, as prices fell for both, albeit with much greater benefits going to the larger block traders.

A third example of sound policy design was apparent in the railroad industry. Even before the Staggers Act was passed, the Interstate Commerce Commission (ICC) permitted railroads total pricing freedom for transportation of fresh fruits and vegetables. The ICC reasoned that a competitive check existed since truck transporta-
tion of these commodities was already deregulated. In the case of dominant markets, such as coal transport to electric utilities, where sunk-cost problems existed, regulation was continued. Here, a new type of policy design was encouraged, one that permitted contracting between the railroads, the coal companies, and the utilities (Jaskow, 1987). Thus, the Coasian principles of contracting were combined with the contestability principles of isolating the harm.

Contestability theory has been helpful not only in practical policy design, but the deregulation it facilitated enabled us to measure the cost of inappropriate regulatory frameworks. Nancy Rose [1987] has shown empirically that labor was a primary beneficiary of trucking regulation, with excessive wages and employment. Clifford Winston [1993] has measured significant gains for consumers and for industries from U.S. infrastructure deregulation. The total for airlines has been some $8-15 billion of 1990 U.S. dollars for consumers and another $5 billion for producers. In rail, which is only partially deregulated, the numbers are $7-10 billion for shippers and $3 billion for the industry. In trucking, shippers have gains of over $5 billion annually, while the industry has lost $6 billion in profitability. In telecommunications, with long distance services deregulated, but not yet local services, the gains are in the $1-2 billion range for consumers. These gains are a measure of the productivity losses of the regulatory system, as contrasted to the benefits associated with an admittedly imperfectly deregulated market. Thus, in spite of the fact that contestability theory only achieves its elegant results of perfect markets under certain stylized assumptions [Spence, 1963], in practical terms the deregulated marketplace has yielded gains that are significant improvements over the prior regulatory regime.

COMBINING THE THEORIES

A combination of Coasian and contestability theories holds great promise in design of regulatory frameworks for the 21st century. Such a combining of the theories can also address a number of other market failures, the chief of which is imperfect information. The insight of contestability theory that is most useful is the idea of unbundling markets to try to isolate the harm, whether from monopoly or from any other market failure. In markets where the unbundling reveals market failure issues, then the Coasian approach of looking for the least intrusive regulatory intervention that will restore market incentives is suggested.

Consider, for example, policy design in securities trading. The contestability prescription to unbundle the market helps to identify those areas such as insider trading and the financial transparency where intervention in the form of corrective rules might be warranted. The Coasian design in U.S. securities markets would recommend policies similar to those that have indeed been put in place, such as mandating uniform accounting practices and requiring independent auditor review of financial statements to address the transparency issues. On insider trading, the solution concepts involve disclosure of trades by insiders, blackout periods in which insiders cannot trade (periods just prior to public disclosure of information), serious enforcement efforts using computerized trading tapes, and severe penalties for those who are caught. An rationale is to bring the parties to the market together, preventing "hit-and-run" strategies that may cause external effects. The regulatory framework intervenes to prevent abusive practices, leaving market forces to provide a vibrant trading system.

Consider another example, which occurred about a decade after the Airline De-regulation Act was passed in 1978. Consumers were up in arms because they were missing the many connections at hub airports. Hub-and-spoke operating systems, which replaced the linear routes designed by the regulators, provided more destinations and more frequent and better-timed services. But there was economic harm from publishing schedules that competed on arrival times. A contestability analysis attempted to diagnose in a narrow manner the source of the economic harm, which was an information problem. The Coasian solution was to require firms to put into their published schedules actual experienced connection times for that airport and time of day. Truth-in-airline scheduling became a governmental rule under which the parties best able to mitigate the harm were required to do so [Bailey and Kirstein, 1989]. The regulatory intervention was a corrective rule that once in place, permitted market forces to function with far less failure.

Before turning to 21st century regulatory issues, it makes sense to comment on the application of contestable markets and Coasian insights to the arena of infrastructure privatization in other parts of the world. As in the U.S., unbundling services for competition—both vertical unbundling and horizontal unbundling—is important. Vertical unbundling—separating electricity generation from transmission and distribution—has been effectively adopted in countries such as Argentina, Chile and the Philippines. These policies allow new, substantial entry in generation. Competition from substitutes also informs energy policy. Germany has viewed competitive pressures as strong enough to justify deregulating its natural gas industry, even though there are still strong sunk costs. Horizontal unbundling—separating activities either geographically or by service categories—has happened in the Japanese and other national railway reorganizations. Competition in telecommunications infrastructure markets has been helped by the advent of radio-based cellular telephone networks, which can compete with existing local networks, and by a 1997 international accord which broadly opens entry by international carriers into emerging and each others markets. In water and sewerage, where direct competition is often not possible, efficiency is being increased by means of competition managed in the Coasian manner, through contracted arrangements, ranging from simple contracts for specific services to longer-term leases and concessions. Competition occurs before the contract is signed and, in principle, when the contract (or concession) expires and is due for renewal [World Bank, 1994].

REGULATORY ISSUES FOR THE 21ST CENTURY

An important issue needing attention as we enter the 21st century is that of sustainable economic development, particularly in the area of global warming. The scientific evidence suggests that there has been a significant percentage increase in the atmospheric concentration of greenhouse gases from levels prevailing prior to the industrial revolution. It therefore makes sense to begin a process of limiting emis-
sions of carbon dioxide and other greenhouse gases. The Kyoto protocol of 1997, unlike the Montreal protocol discussed earlier, has not been sent for approval either to the U.S. Senate or to many other governments. Thus, there are grave doubts that the protocol can serve as a contract to which parties can commit. Moreover, the lesson from the Montreal protocol is that targets and timetables for greenhouse gas reduction from OECD countries are likely to be counteracted by increases in emissions from the developing world. Therefore, rather than only relying on governments, it makes sense to turn at least in part to market-based solutions.

One promising avenue to lower emissions arises because energy usage in formerly Communist countries is roughly double what would be required if supply were efficient. International lending organizations are helping to support a win-win situation by agreeing to serve as a contractual guarantor of hundreds of dollars of district heating projects promising better control technology at the boiler, better insulation during distribution, and better radiators and other controls in apartment buildings. Pilot energy conservation projects are achieving energy savings at the 40-50 percent level. Such market-oriented solutions can permit significant new economic growth, without leading to the feared emissions increases from this emerging market sector. Other market-based Coasian solutions must also be developed in detail, such as international permit trading systems.

A second important challenge for the 21st century is the design of regulatory policy for the high-tech, dynamic part of the economy. Both Microsoft and Intel are currently under antitrust scrutiny. What worries competition authorities most is the ability of these firms to exploit their monopoly power to co-opt the technologies of other companies. Their conduct seems to be chilling innovation in markets where competition is largely defined by innovation. In terms of contestability theory, policy makers need to keep entry open. They need to encourage the generation of new intellectual property, while ensuring that such property is not exploited for anti-competitive ends. The Intel case was recently settled with what appears to be a Coasian-type least-cost interventions. A great deal of effort will undoubtedly be invested in determining remedies in the Microsoft case that will best enable dynamic Schumpeterian energies to continue to shape the market.

The Internet provides another new and emerging technology. Here, harm centers around both pornography and privacy. The Supreme Court has turned down the Coasian solution on pornography (build a fence around pornography on the Internet, not a fence in every single home) on First Amendment grounds. Yet, there is clearly harm when children can readily and insidiously access hard-core pornography. Designers of 21st century policy may well seek some sort of self-regulation, as has happened for rating systems at movies. In the privacy area, there are major international issues, since personal information is considered to be private in Europe but less so in the United States.

A third area of dynamic knowledge breakthroughs that is important for the 21st century concerns biotechnology and pharmaceutical advances. The importance of actual and potential competition caused the Federal Trade Commission (FTC) to challenge the acquisition of Genentech, Inc., by the Swiss-based company Roche Holdings, Ltd. in 1990. The FTC was concerned in part because Roche was a potential competitor to Genentech in the market for products to treat human growth hormone deficiency. They were concerned also at any loosening of actual competition in therapeutic innovations for the treatment of AIDS and HIV infection. In a second decision in 1996, involving a proposed merger between Ciba-Geigy Ltd. and Sandor Ltd., the FTC crafted a consent decree designed to correct those aspects of the transaction that raised concerns for current and future competition. In particular, Genentech and Sandor agreed to license technology and patents sufficient to allow one of their rivals to compete against the merged entity in the development of gene therapy products.

As we move into the new millennium, we would hope to avoid the specter of over-regulation focusing on whole industries and instead look carefully within each activity for barriers as has been described above in the antitrust arena. It makes sense to regulate heavily in an area such as cloning a human being, while at the same time, permitting experimentation where a person's own cells are used to reconstruct a missing ribcage. Using ideas from Coasian and contestability theories can benefit such new policy designs to a considerable extent.

OTHER THEORETICAL MODELS AND EMPIRICAL TOOLS

It is worthwhile to comment on some of the other powerful economic models and empirical tools developed in the 20th century which clearly have a place in 21st century thinking. Jean-Jacques Laffont and Jean Tirole (1993) have developed truly elegant agency models of regulation. The insights from these models provide a more perfect regulatory design particularly when there are principle-agent problems and informational asymmetries. Other models emphasize the abuse of power in economies where the political and economic elite coincide, and where corruption is rampant (Schleifer and Vishny, 1998). Both of these approaches should provide useful insights, particularly as the imperfections of deregulation and privatization come to be addressed.

A second strand of thought from the 20th century is economometrically based. Here, the idea is for antitrust agencies to use the technologies developed during the past decade: desktop computers with extraordinary number crunching power and the scanners used at retailers' checkout. Such empirical analysis has been used, for example, to block a proposed merger of Staples and Office Depot, two chains of office-supply "superstores" in America. Sales prices and quantities were scrutinized for every item sold by each chain. The computers spotted a pattern: Staples' prices were lower in cities where Office Depot also had a store than in cities where it had none. This was strong evidence that the merger would allow Staples to raise prices. Such econometric analysis is fully compatible with the fundamental contestability insight, namely, determine first if there is economic harm in the market under scrutiny, and then take action.

Game theory has also been brought to bear in an attempt to understand when long-term monopoly pricing is likely to persist even in the presence of what seem to be competitive forces. An article written by finance professors William Christie and Paul Schultz (1994) pointed out that NASDAQ stockbrokers maintained wide spread between the price they pay for shares and the price at which they sell them. A game
that is played only once may also yield non-collusive pricing. However, a repeated game (as in the NASDAQ case) may well promote conditions in which tacit collusion may occur. This is a case where invisible hands are not good hands. Specific harm was noted and Coasian-like steps have been taken to restore a more competitive outcome.

**SUMMARY**

The first lesson learned in the 20th century concerns the diagnosis of harm. There are many sources of market failure and many degrees of harm. The insight from contestability theory is to parse the situation—to unbundle—to determine with precision which features of the market exhibit strong degrees of harm. Features that do not exhibit harm should be left to the market. When significant harm is diagnosed, not just any regulatory remedy should be designed. Rather, the design must be targeted, it must get the incentives right. According to Coasian analysis, government should provide the least intrusive correction that restores a well-functioning market.

The second lesson from the 20th century is that somewhat imperfect competition is likely to do less harm than traditional regulation. Indeed, when a heavy hand of overarching regulation is imposed, there is no guarantee that the government intervention will benefit society. Government failure can be at least as pernicious as market failure. Empirical studies of deregulation have shown that many industry-wide regulatory regimes have loosened rather than improved social welfare. Wedges have been created as regulation forced industries away from efficient practices, with the wedge getting wider over time, as the distortions worsened.

As we look forward to the 21st century, the policy prescription is to continue to unbundle, to seek large harms, particularly in newly emerging industries, and to move down the regulatory continuum to leave intrusive regulatory correction when harm is discovered. New incentive-based interventions may need to be designed in newly deregulated and privatized segments, or in areas where technology is advancing. The regulatory framework for the 21st century must have a design whose intent is to limit the role of government, while providing incentives so that market forces and the invisible hand can again perform their magic.

**REFERENCES**


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