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A Critique of Light-Handed Regulation: The Case of British Gas February 1999

Paul Carpenter
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I. INTRODUCTION

Network industries in the United States such as telecommunications, electricity, and natural gas have traditionally involved private companies subject to price regulation by state and federal government agencies. Regulation has been justified by the perception that at least some aspect of each industry is a natural monopoly, such as the local telephone network, the high-voltage electricity transmission network, and the natural gas pipeline system. Other countries lack a similar regulatory tradition because foreign governments directly owned the companies that provided such services. However, the recent trend of privatization has prompted the need for other countries to establish regulatory systems.

The British government, for example, privatized the telecommunications, electricity and natural gas industries in the 1980s. Recognizing the need for a regulatory system to constrain the potential monopoly position of privatized companies, the British government reviewed the experience with regulation in the United States. The government concluded that United States regulation had involved excessive administrative costs and produced inefficient incentives for regulated companies. The alternative of "light-handed" regulation was proposed, where prices would be updated automatically on an annual basis by a mathematical formula that accounted for inflation and for target improvements in efficiency. It was hoped that this approach would avoid costly regulatory proceedings and provide incentives for privatized companies to reduce costs.

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Although attractive in theory, the implementation of light-handed regulation in the United Kingdom has faced several problems. First, light-handed regulation has not worked as anticipated to avoid the need for lengthy regulatory proceedings. Second, light-handed regulation has unintentionally created inefficient incentives for regulated companies. Third, light-handed regulation has not successfully constrained the monopoly power of incumbents.

We illustrate the problems with light-handed regulation principally by reference to the experience of British Gas. The British government established the Office of Gas Regulation, known as *Ofgas*, to regulate British Gas after its privatization. However, *Ofgas* was not able to set reasonable prices without instigating lengthy proceedings before the Monopolies and Mergers Commission that examined the costs of British Gas. We analyze a particular dispute over British Gas prices that took over four years to resolve. The desire to avoid "heavy-handed" regulation of British Gas also created inefficient incentives for the pipeline to add new customers. Light-handed regulation further left British Gas the scope to abuse its monopoly position over existing customers.

We conclude from the British Gas experience that the United Kingdom's privatization policy in the 1980s did not adequately anticipate the complexities of regulating private companies with monopoly power. The United States regulatory experience may have seemed quite unattractive when compared to an optimistic vision of light-handed regulation, but appears less so when compared to the difficulties encountered by British regulation in practice. Other countries now establishing regulatory systems will benefit from a careful comparison of international experience, and would do well to avoid the extremes of either heavy-handed or light-handed regulation.

II. UNITED STATES REGULATORY EXPERIENCE

A distinguishing feature of traditional United States regulation is its close examination of costs in formal regulatory proceedings known as "rate cases." Prices are set at levels deemed sufficient to recover the reasonable costs incurred in providing service. The regulated firm typically has an obligation to compile detailed accounts of its expenses, which are scrutinized closely for their reasonableness. The costs that are recognized in connection with long-lived investments include depreciation, which is typically based on the original accounting cost of an asset, and a rate of return on the undepreciated balance. Before the regulator recognizes the costs of an asset in the determination of prices, the company must establish that the asset is being "used and useful" and that the costs of the investment were prudently incurred. This form of regulation is sometimes called "rate of return" regulation.

Once a rate case is completed, the resulting prices are fixed until either consumers or the company petition for a new proceeding to re-examine

costs. The legal and other costs of participating in a rate case naturally reduce the desire to petition for a new one. The frequency of rate cases therefore depends on the pace at which the company's underlying costs are believed to change, and on the transaction costs of participating in such a proceeding. In an environment characterized by high inflation, rate cases can be expected to occur more frequently.

One of the perceived problems of United States regulation was the high level of administrative costs involved. Decades of regulatory experience led to the development of elaborate procedural rules for conducting administrative proceedings. The proceedings tended to take a lot of time and involve considerable legal costs. The regulated company also faced a considerable administrative burden of compiling detailed accounting information for all its activities. At times it appeared that disproportionate effort was dedicated to examining relatively trivial matters. Although the Food and Drug Administration did not conduct rate cases, it provided some notorious examples of expensive and prolonged administrative proceedings over issues that did not appear to merit the effort. One was a series of proceedings that began in 1959 and did not end until 1970 to determine whether it would "promote honesty and fair dealing in the interest of consumers" to require that the label "peanut butter" be limited to products with at least 90 percent peanuts as opposed to 87 percent.¹ Apparently, the first government witness "presented a survey of cook books, patent applications, and . . . the historical composition of peanut butter. . . On cross-examination, the witness was asked about his personal tastes in peanut butter. . . [and] about cook book formulations of peanut butter he had not referred to in his direct testimony."² Similarly, the law was criticized for requiring the agency to "hold hearings on questions such as whether 'golden' should be a synonym for 'yellow' in canned corn, or whether pear halves should weigh a minimum of three-fifths or four-fifths of an ounce."³

Another problem was that close scrutiny of the regulated company's activities did not ensure efficient outcomes. As the price of oil rose dramatically in the 1970s, for example, many electric utilities planned to construct nuclear power plants. The plants appeared justified under forecasts of continued high oil prices and continued growth in demand. By the time the plants were completed, however, it was apparent that many were not efficient. Nevertheless, the formal planning studies that had been undertaken before constructing these plants were, in many cases, sufficient to establish the "prudence" of the investments. Even if the plants did not operate at full capacity, partial operation was sufficient to meet the "used and useful" standard. Many regulators therefore set rates sufficiently high

¹ R. Hamilton, "Rulemaking On A Record By The Food And Drug Administration", 50 TEX. LAW REV. 1132, 1144 (1972).

² *Id.*

³ *Id.* at. 1188.

to recover depreciation and a rate of return on the investments in these plants. The experience with nuclear power plants demonstrated that the examination of prudence and the "used and useful" standard could not ensure efficiency.

Close scrutiny of a regulated company may also facilitate "regulatory capture," where the regulator's primary loyalty is to the regulated companies rather than consumers. The concern is that intimate contact between the regulator and the regulated company may breed a familiarity that ultimately secures the regulator's loyalty. One study of United States regulation noted that agencies, "rather like Shakespeare's seven ages of man... went through a series of stages -- gestation, youth, maturity and finally debility and decline," where the goals in the final stage were to protect the status quo and the regulated companies rather than consumers.⁴ Others have cited early United States railroad regulation as a specific example of regulatory capture.⁵

Finally, it became evident that rate of return regulation could actually promote inefficiency. A seminal article by Averch and Johnson identified possible incentives to engage in excessive capital investment.⁶ Their intuition can be illustrated by imagining the trade-offs confronting a regulated telephone company in the production of telephone sets. The company can build a modest factory that produces cheap telephone sets with limited useful lives, or it can build an extremely expensive factory to produce telephone sets that last forever. It may well be that the modest factory makes more economic sense, if the initial savings in building the factory more than offset the subsequent costs of replacing telephones. However, if the telephone company is subject to rate of return regulation, it may have an inherent bias toward building the more expensive factory. If recognized as prudent by the regulator, the more expensive factory will provide more rewards to shareholders through depreciation and the allowed rate of return. Averch and Johnson summarized their theory as follows:⁷

if the rate of return allowed by the regulatory agency is greater than the cost of capital, but is less than the rate of return that would be enjoyed by the firm were it free to maximize profit without regulatory constraint, then the firm will substitute capital for the other factor of production and operate at an output where cost is not minimized.

⁴ Dennis Swann, *The Retreat of the State: Deregulation and Privatization in the UK and US* 72 (1988) (citing M. Bernstein, *Regulating Business by Independent Commission* (1955)).

⁵ *Id.* (citing G. Kolko, *Railroads and Regulation 1877-1916* (1965), and B.M. Mitnick, *The Political Economy of Regulation* (1980), p. 179.

⁶ H. Averch, L. Johnson, "Behavior Of The Firm Under Regulatory Constraint", *American Economic Journal*, (December 1962), p. 1053.

⁷ *Id.*

III. THE UK EXPERIMENT: LIGHT-HANDED REGULATION

The British government was conscious of the problems with United States regulation when its privatization program prompted the need to establish a new regulatory framework. Anticipating the privatization of British Telecommunications, in October 1982 the British government commissioned a study from the noted professor Stephen Littlechild.⁸ At the outset, the Secretary of State “expressed a desire for regulation with a light rein.”⁹ The *Littlechild Report* examined the appropriate method for regulating the telecommunications industry, and developed a proposal for light-handed regulation as a superior alternative to traditional United States regulatory practice.

The *Littlechild Report* found little inspiration in United States regulatory experience: “[r]esearch on rate of return regulation in the USA had shown that it resulted in waste of investment and a costly bureaucracy.”¹⁰ The detailed scrutiny of costs and regulated activities was viewed as counterproductive: “In the USA regulators have been given ample powers to extract and analyze information, and considerable discretion in approving tariff structures and rates of return. The end-result has not been a reduction in monopoly power—in general, quite the opposite has happened. At the same time, investment has been distorted and efficiency and innovation discouraged.”¹¹ The *Littlechild Report* also referred to the Averch-Johnson effect in the United States: “The evidence of over-capitalisation in the US power industry is claimed to be strong. One estimate is that actual production costs exceeded efficient production costs by about 12 percent in 1962.”¹²

The *Littlechild Report* exerted a strong influence on British government policy, and has been called the “catalyst” for the development of light-handed regulation in the United Kingdom.¹³ Its dissatisfaction with heavy-handed United States regulation became an important part of regulatory philosophy in the United Kingdom: “the government was anxious to avoid the perceived problems of U.S. rate-of-return regulation in terms of cost inefficiency, regulatory burden, and vulnerability to capture.”¹⁴

The *Littlechild Report* proposed a relatively simple alternative to lengthy regulatory proceedings. Average prices were to be set by a mathematical formula involving “RPI minus X.” A reasonable benchmark

⁸ Stephen C. Littlechild, “Regulation of British Telecommunications’ Profitability” (February 1983), p. 3 [hereinafter *Littlechild Report*].

⁹ *Littlechild Report*, p. 39.

¹⁰ *Littlechild Report*, p. 3.

¹¹ *Littlechild Report*, p. 8.

¹² *Littlechild Report*, p. 18.

¹³ M. Armstrong, S. Cowan, and J. Vickers, *Regulatory Reform: Economic Analysis and British Experience* (1994), p. 166.

¹⁴ *Id.* at p. 216.

price cap would be selected as the starting point for the regulated company, and would automatically be increased in each year to track inflation as measured by the retail price index ("RPI"). At the same time, the percentage increase in prices would be offset by a specified factor known as "X" selected by reference to a target level of efficiency improvement for the regulated company. The intention was to select an "X" factor that would provide consumers some share of the benefits anticipated from increased productivity. At the same time, investors would benefit if the regulated company's productivity improvements exceeded X percent per year.

The proposed system of RPI-X regulation was anticipated to have several benefits. Among them was its administrative simplicity: "If the RPI -- X per cent constraint is violated the [regulator] will need to ascertain the reason for this and remedial action may be needed to be taken; but a simple tariff reduction will suffice. The [regulator] does not have to make any judgement or calculations with respect to capital, allocation of costs, rates of return, future movements of costs and demand, desirable performance etc."¹⁵

Another anticipated benefit lay in avoiding the Averch-Johnson effect. Under RPI-X regulation, companies would maximize profits by saving on capital expenditures. Embarking on large construction programs would no longer be a strategy for securing higher rates. The regulated company also stood to benefit by lowering costs by more than the X factor: "the knowledge that a target has to be met each year may prove a spur to efficiency. Any cost reductions exceeding the agreed target are kept by the company."¹⁶

The *Littlechild Report* proposed that the existing tariffs of British Telecommunications be used as the starting point for RPI-X regulation. Because the X factor would cause the existing tariff to decrease in real terms over time, the RPI-X proposal was labelled "a local tariff reduction scheme."¹⁷ The use of existing tariffs promised further to facilitate the implementation of light-handed regulation, as the regulator would not have to perform any independent analysis of reasonable tariff levels.

Following the Littlechild Report, the British government implemented RPI-X regulation for British telecommunications. The same basic approach was subsequently adopted for other industries as their "natural monopolies" were privatized, including airports, parts of the electricity industry, natural gas and water companies.¹⁸

¹⁵ Littlechild Report, p. 36.

¹⁶ *Id.*

¹⁷ *Id.* at p. 34.

¹⁸ M. Armstrong, S. Cowan & J. Vickers, *Regulatory Reform: Economic Analysis and British Experience* (1994), p. 165.

IV. THE PROBLEMS WITH LIGHT-HANDED REGULATION

In practice, the approach taken by the British government has not solved all the problems of traditional United States regulation, nor has it proved as simple to administer as anticipated. British regulators have found that reasonable prices cannot be determined without an inquiry into the costs of the regulated company. British regulatory practice has had to respond by becoming more "heavy-handed," performing similar cost analyses to those traditionally performed by United States regulators. Unfortunately, the regulated companies have the advantage of knowing their costs far better than the regulator, and have systematically used their advantage to the detriment of consumers. Light-handed regulation has also created inefficient incentives and allowed regulated companies to abuse their market power.

We first demonstrate why RPI-X regulation as originally proposed is not sustainable without an analysis of costs. The mere selection of "X" presumes some estimate of efficiency improvements that can be realized by the regulated company, which requires an understanding of existing and projected operating costs. The reasonableness of prices also depends fundamentally on the level of capital expenditures needed to provide the service. A company's existing tariff level can serve as a reasonable starting point for the RPI-X formula only if it already provides sufficient compensation for prospective capital expenditures. For example, changes in electricity consumption can require significant investments in the transmission network. There is no guarantee that past transmission tariffs, even if increased for changes in the retail price index and allowing for additional volumes of electricity, will be sufficient to compensate for the necessary investment. To determine the parameters of the RPI-X formula by reference to an examination of operating costs and capital costs can be viewed as a step back towards heavy-handed United States regulation.

The requirement to consider capital costs was explicitly cited in a critique of light-handed regulation as applied to the privatized water companies. Economists John Vickers and George Yarrow warned of inefficient underinvestment unless capital expenditures and rates of return were explicitly considered in rate cases. Specifically:¹⁹

firms may deliberately underinvest since, by confronting regulators with supply shortages and relatively poor service standards, they will be in a stronger position to argue that higher prices are required to finance the desired improvements. In contrast, if high expenditures to improve standards are incurred at the outset, regulators will later treat these items as *sunk* costs and firms would have to rely more heavily on arguments of fairness in supporting their case for higher prices, which arguments may not always be persuasive to public bodies facing consumer pressures for lower prices. To offset these

¹⁹ J. Vickers & G. Yarrow, *Privatization: An Economic Analysis* (1988), pp. 410-1 (emphasis added in last sentence).

biases, therefore, *we can see no alternative to the explicit introduction of rate-of-return criteria in regulatory decisions...*

RPI-X regulation in the United Kingdom has since evolved into a cost analysis quite similar to United States regulatory practice. Regulators assess the value of existing investment that should be recognized in the determination of prices. They also estimate a reasonable rate of return on this investment, and project its depreciation over the "control period," which refers to the number of years before the question of reasonable prices will be revisited. Projections of operating costs and capital expenditures for the control period are also involved. Prices are then set at levels which, when adjusted over the control period by RPI-X and accounting for projected changes in volumes, will compensate for operating costs and a reasonable rate of return on investment. Examples of this logic can be found in the recent "rate cases" for the National Grid Company²⁰ and British Gas.²¹

RPI-X regulation supplemented by an analysis of operating and capital costs, does not differ greatly from traditional United States rate of return regulation. RPI-X regulation retains an advantage in considering projected inflation rates over time. Recall that United States regulation typically leaves rates fixed until one party or another is sufficiently concerned to invoke a new rate case. At times of high inflation, rate cases are more frequent. Applying an RPI-X formula could well have postponed some rate cases in the United States during the late 1970s when inflation was quite high. However, the advantage of the RPI-X formula is far less significant in the current environment of low inflation.

Another key difference is that the British regulatory system determines compensation in advance for investments that are projected throughout the control period. Under traditional United States regulation, an investment must be complete and operational before its costs are recognized in a rate case. Although the United States approach became associated with the Averch-Johnson effect, the approach under RPI-X regulation has its own problems. Regulated companies have an information advantage over the regulator, and have an incentive to distort the amount of capital expenditures that will be required over the control period. Once the

²⁰ The Office of Electricity Regulation ("Offer"), *The Transmission Price Control Review of The National Grid Company – Proposals* (1996), p. 3 ("The range of possible price controls put forward in the fourth consultation paper reflected a considered evaluation of NGC's past and prospective operating costs, capital expenditure, cost of capital and asset valuation").

²¹ Monopolies and Mergers Commission, BG plc, *A Report Under the Gas Act 1986 on the Restriction of Prices for Gas Transportation and Storage Services* (May 1997)(*hereinafter* 1997 MMC), p. 31 ("The appropriate level of revenues reflects judgments on a number of key financial issues: first, what is the appropriate cost of capital. . .secondly, what is the financial base to which that cost of capital should be applied; and thirdly, how should depreciation be treated. . . We also have to consider the appropriate level of capital investment. . . The appropriate level of revenue will also depend on the assumed level of operating costs.").

regulator is persuaded of a company's projections and uses them to set prices, the company then has a financial incentive to abandon the initial plans and simply collect compensation for investments never undertaken.

Regulated companies in the United Kingdom have consistently abused their information advantage by spending less than projected by regulators. The phenomenon has become known as the "underspend." For example, the National Grid Company ("NGC") had persuaded the regulator that the electricity transmission network required £1.6 billion in capital expenditures between the years 1993 and 1996.²² This forecast was incorporated into the RPI-X formula. Actual expenditures for the same period were only £900 million or roughly 45 percent less than forecast.²³ Over three years consumers of electricity effectively paid to finance £700 million in investments that were never made. The "underspend" for British Gas has also been dramatic. From 1994 to 1996, British Gas prices had presumed capital expenditures of £3.1 billion, while British Gas actually spent only £2.1 billion.²⁴

Unfortunately, there is no easy remedy to the "underspend." After the underspend has been detected, the company has an incentive to claim that the initial forecasts were reasonable, and that unforeseen management efficiency was responsible for the underspend: "NGC says that, while some of this reduction in capital expenditure has been due to factors outside its control and in particular to the slowdown in generation development, a large part of it represents capital efficiencies by management initiatives on NGC's part."²⁵ The implication is that management should be allowed to retain the benefits of the underspend as a reward for efficiency, much as the company is allowed to retain the difference between its actual productivity gains and the target implied by "X." If the regulated company were not allowed to retain the financial benefits of the underspend, it would lose its efficiency incentives and the danger of the Averch-Johnson effect could resurface.²⁶

The light-handed approach of regulators has exaggerated the problems arising from incomplete information. For example, in 1996 the Office of

²² The Office of Electricity Regulation ("Offer"), *The Transmission Price Control Review of The National Grid Company – Fourth Consultation* (1996), p. 23.

²³ *Id.*

²⁴ 1997 MMC, p. 106 (comparing British Gas forecasts to actual expenditures) and Ofgas, "Price Controls on Gas Transportation and Storage" (1994), p. 6 (confirming that regulated prices were based on British Gas forecasts: "The Director has assessed the value of 'X' as that required, given reasonable assumptions, to permit profits to grow in real terms sufficient to remunerate capital and replacement expenditure *as currently forecast by BG*") (emphasis added).

²⁵ The Office of Electricity Regulation, *The Transmission Price Control Review of The National Grid Company – Fourth Consultation* (1996), p. 23.

²⁶ Monopolies and Mergers Commission, BAA plc, *A Report on the Economic Regulation of the London Airports Companies (Heathrow Airport Ltd., Gatwick Airport Ltd. and Stansted Airport Ltd.)* (1996), p. 38.

Electricity Regulation ("Offer") sought to determine reasonable prices for NGC in part by reference to the market value of its shares at privatization. However, NGC's shares were supported in part by a subsidiary named Energis that operated a telecommunications business. *Offer* determined that the value of Energis should be subtracted from the market value of NGC's shares to derive a reasonable estimate for the transmission business.²⁷ A debate emerged over the value of Energis, which was conducted with limited information and involved private interviews between *Offer* and investment advisors.²⁸ In retrospect, *Offer* reached an erroneous conclusion that, as shown below, seriously overstated the prices that consumers pay for electricity transmission.

Offer cited as one indicator of value the total investment of £400 million that NGC had incurred in Energis to date. It was pointed out that £400 million understated the total investment by NGC, since NGC's transmission rights-of-way were used by Energis to lay fiber-optic cables.²⁹ The value of the rights of way should have been included in the measure of total investment. However, no data were made available allowing an evaluation. It was also pointed out to *Offer* that NGC had rejected an offer by AT&T to purchase one third of Energis for £200 million.³⁰ AT&T's offer suggested that Energis was worth more than £600 million. Presumably, NGC only rejected the offer after performing a serious valuation that yielded a higher figure. However, no documents associated with NGC's valuation were disclosed in the regulatory process. Nor did *Offer* perform an in-depth analysis of its own. *Offer* concluded that a reasonable value for Energis was only £250 million, cited as the mid-point of a range from £200 to £300 million derived from unnamed analysts.³¹

Roughly one year after *Offer*'s decision, a portion of Energis was floated on the stock market as a separate stock. The price of the shares implied a total market value for the company of £850 million.³² The implication was that *Offer*'s light-handed approach to assessing the value of Energis had led consumers to overpay for electricity transmission by £600 million. An article in the *Financial Times* discussed the episode and concluded that responsibility for the mistake lay with an information asymmetry exacerbated by the British light-handed approach to regulation.³³

²⁷ Offer, *The Transmission Price Control Review of The National Grid Company – Proposals* (1996), p. 16.

²⁸ *Id.* at p. 18 ("I asked my merchant bank advisers for their view").

²⁹ *Id.* at p. 17.

³⁰ *Id.* at p. 18.

³¹ *Id.*

³² "Energis Shares Rise 2p," *The Financial Times* (Dec. 10, 1997) ("Energis, the telecommunications subsidiary of National Grid, yesterday made a satisfactory if unspectacular market debut. . . the price values the company at about Pounds 850m").

³³ G. Palast, "Regulators Could Learn from Texas Chicken Chef," *The Financial Times* (Mar. 26, 1998).

[Offer] was at a distinct disadvantage in facing down the utility chiefs. [It] had no access to the management's own projections and bankers' opinions which, undoubtedly, valued Energis closer to reality. In the US, such crucial documents would have been available for review. . . . To British eyes, the US system is a shock. One [Member of Parliament] shuddered at the concept of the US system. "It's too litigious, too complex, too many lawyers." And it is true. US free-for-all public hearings are loud, messy, contentious and highly politicized -- in a word, democratic.

V. THE EXPERIENCE OF BRITISH GAS

The experience of British Gas has revealed several interesting problems with light-handed regulation. In addition to the problem with the "underspend" cited above, regulation has been greatly complicated by the lack of any tradition in the use of accounting costs to set prices. Regulators realized that the parameters of the RPI-X formula should be set by reference to cost projections and a measure of existing investment, but they became immersed in an intricate debate over the level of existing investment that should be recognized in prices, known as the "regulatory asset base." Furthermore, light-handed regulation of British Gas has given rise to inefficient incentives. British Gas actually has a financial incentive to expand throughput of the system even if it involves the addition of customers whose costs exceed the revenues they pay. We conclude that the regulation of British Gas has not sufficiently constrained the abuse of market power in the transportation of natural gas.

A. The Regulatory Asset Base

By 1993, RPI-X regulation of British Gas was supplemented by an analysis of the returns to existing investment. Unfortunately, no consistent measure of investment had ever been used to determine prices for British Gas under previous government ownership or since privatization. British Gas had a set of accounts that purported to measure the value of its assets under "Current Cost Accounting" ("CCA"), but these accounts were inconsistent with the history of prices. British Gas argued that the CCA value of its assets was the relevant economic benchmark for establishing prices, because it reflected the cost of replacing the existing pipeline infrastructure. However, "the rate of return had been kept below a full economic level prior to privatization,"³⁴ and as a result the shares in British Gas at privatization "were issued at a price that valued the company at a substantial discount to the balance sheet replacement cost (CCA

³⁴ Monopolies & Mergers Commission, *BG plc: A Report under the Gas Act 1986 on the Restriction of Prices for Gas Transportation and Storage Services* (May 1997), p. 42 [hereinafter *MMC 97*].

valuation).”³⁵ The discount was roughly 60 percent, as investors “paid only 40p for each £1 of current cost net assets underlying their shares.”³⁶ A dilemma was therefore created: if the CCA value of existing investment was accepted in the determination of prices, then shareholders would expect a windfall over the price they actually paid for British Gas shares at privatization.

The Monopolies & Mergers Commission (“MMC”) confronted the issue of measuring the regulatory asset base of British Gas. Using the full CCA value of assets would have implied a present value of £17.5 billion in association with 1991 investment. Using the market value of British Gas shares as of 1991 would have yielded a present value of only £10.5 billion.³⁷ The magnitude of the dispute was therefore £7 billion.

The MMC struck an awkward compromise between the two positions. Cosmetically the MMC accepted the CCA value of assets of £17.5 billion, but adjusted the allowed *rate of return* by the “Market to Asset Ratio,” (“MAR”) which referred to the quotient of £10.5 billion over £17.5 billion, or 60 percent. By cutting the rate of return, the MMC appeared to accept the view that £10.5 billion was the relevant figure.³⁸ The MMC explained:³⁹

The lower ROR [rate of return] on existing assets is justified by the difference between the current cost value of BG’s net assets and the (lower) market value of its equity, measured by the MAR. Because the assets were acquired at a discount, from the shareholders’ standpoint, and still stand at a discount in the market, allowing a full ROR (equal to the market cost of capital) would lead to a substantial windfall gain to BG’s shareholders, at the expense of its customers.

Oddly, the MMC failed to follow a similar approach with respect to depreciation. Shareholders are compensated for their investment under traditional regulation by a combination of depreciation and a rate of return on the undepreciated balance of their investment. Although the MMC effectively accepted the £10.5 billion figure to calculate the rate of return,

³⁵ Monopolies & Mergers Commission, *British Gas plc: Reports Under the Gas Act 1986 on the Conveyance and Storage of Gas and the Fixing of Tariffs for the supply of Gas by British Gas plc* (1993), Vol. II, p. 194 [hereinafter *MMC 93*].

³⁶ Geoffrey Whittington, “Current Cost Accounting: Its Role in Regulated Utilities,” *Fiscal Studies* (1994) Vol. 15, No. 4, p. 91.

³⁷ Unfortunately, the price paid by investors for British Gas at privatization was disregarded in favor of an alternative analysis that focused upon the market value of British Gas shares as of 1991. While shareholders had only paid “40p for each £1” of CCA assets at privatization, as indicated above, by 1991 the market value of British Gas shares had risen to 60 percent of the CCA value. By focusing on the market value of shares as of 1991, the MMC effectively granting shareholders a windfall for the run-up in share prices between the 1986 privatization and 1991. *Id.*

³⁸ Mathematically, if one takes £17.5, multiplies it by the appropriate rate of return and by £10.5/£17.5, then the £17.5 “drops out” and the result is simply £10.5 times the rate of return.

³⁹ *MMC 93*, Vol. II, p. 202.

it accepted £17.5 billion for calculating the annual depreciation allowance. The MMC acknowledged that consistency would require a similar adjustment to depreciation as to the rate of return, but decided that “arcane adjustments of this type may make the calculations unduly complicated and give a spurious aura of precision to what are essentially subjective estimates.”⁴⁰

The proceedings before the MMC had not involved any public scrutiny or cross-examination of the argument that multiplying CCA depreciation by 60 percent would be either “arcane” or excessively complicated mathematically. We estimated that the MMC’s approach implied a present value of £14.3 billion in association with 1991 assets.⁴¹ The failure to adjust CCA depreciation by the MAR therefore offered a windfall of roughly £3.8 billion over the 1991 market value of the assets. We suspect that consumers would not have considered the adjustment arcane, would consider £3.8 billion beyond the zone of “spurious” precision, and would have gladly aided the regulator with the necessary mathematical calculations.

In 1997 the MMC was again confronted with the issue of determining reasonable prices for British Gas, and arguments resurfaced over the CCA value of assets as opposed to the prices that shareholders had paid at privatization.⁴² The inconsistent treatment of the rate of return and depreciation was also questioned. The MMC diplomatically conceded a blunder: “The [previous] MMC report was produced at a relatively early stage in the development of utility regulatory thinking in the UK... to allow full [CCA] depreciation in revenues during the period under review may be expected to result in prices higher than necessary to finance the carrying on of Transco’s activities, to the detriment of consumers of gas.”⁴³

By the time of the 1997 MMC decision, however, Transco had enjoyed several years of full CCA depreciation. A question arose on the proper method of dealing with Transco’s excessive depreciation. We stressed that the current rate base should be measured by the 1991 market value of assets, inflated for subsequent capital expenditures, and reduced by the excess of total target revenues in each year over the sum of operating costs and the appropriate rate of return.⁴⁴ In effect, the regulatory asset base, measured correctly in 1991, should be depreciated by the total capital charges above and beyond an appropriate return that Transco had been allowed to collect by the regulatory formula since 1993. With the regulatory asset base, updated correctly to 1997, no prospective adjustment

⁴⁰ *Id.*

⁴¹ P. Carpenter, C. Lapuerta and T. Briggs, *Submission of Enron Capital & Trade Resources, Ltd To the Monopolies and Mergers Commission* (November 1996), Appendix 4, Figure 2 [hereinafter *Submission to MMC*].

⁴² *MMC 97*, pp. 111-115.

⁴³ *Id.* at pp. 41, 44.

⁴⁴ *Submission to MMC*, p. 30.

to the rate of return would be necessary. However, prospective depreciation would be designed to erode gradually the resulting regulatory asset base over the remaining useful life of the underlying assets. We demonstrated that our proposal would allow investors to receive a present value equal to the £10.5 billion market value of the assets in 1991.⁴⁵

Ofgas advanced a more modest proposal before the MMC.⁴⁶ To avoid even unfounded accusations of “retroactive ratemaking” by British Gas, *Ofgas* proposed that the actual depreciation charges received by British Gas between 1994 and 1997 be ignored entirely. Instead, *Ofgas* suggested that a new regulatory asset base be measured by simply taking the 1997 CCA value and multiplying by 60 percent.⁴⁷ Prospectively, depreciation would be calculated to recover the resulting regulatory asset base, rather than the full CCA value. We demonstrated that this approach effectively allowed investors to expect a present value of £12.1 billion for 1991 assets.⁴⁸ Nevertheless, the proposal submitted by *Ofgas* appeared quite stark in comparison to the proposal by British Gas, which involved continued use of full CCA depreciation.

The MMC rejected the arguments by British Gas and adopted a position almost identical to the *Ofgas* proposal.⁴⁹ Although on a prospective basis the resulting methodology involved a consistent treatment of depreciation and the regulatory asset base, shareholders were allowed to preserve a large windfall relative to the 1991 market value of their assets. The outcome can be viewed as an exercise of monopoly power. The windfall to shareholders was not made possible by the efficiency of British Gas, but simply by dint of a regulatory process that could pick among a variety of feasible price levels in the absence of any competing pipeline system.

The debate over the regulatory asset base of British Gas and depreciation can be attributed to the initial simplistic vision of light-handed regulation. The British government should have anticipated that even RPI-X regulation must be informed by reference to a measure of existing investment, an appropriate rate of return and depreciation. A realistic assessment of prospective regulation would have enabled the establishment of consistent guidelines prior to privatization. The choice of a higher or lower regulatory asset base would still have affected consumer prices, but at least the government would have received a flotation value consistent with the subsequent regulated revenues of British Gas, and shareholders would not have retained a windfall. As it stands, the government received

⁴⁵ *Id.* at Appendix 4, Figure 2.

⁴⁶ *Ofgas, 1997 Price Control Review British Gas' Transportation and Storage, The Director General's final proposals* (August 1996).

⁴⁷ *Id.* at pp. vii-viii.

⁴⁸ *MMC Submission*, Appendix 4, Figure 2

⁴⁹ *MMC 97*, pp. 40-44.

a serious discount for British Gas and high prices under light-handed regulation have enabled shareholders to receive excessive returns.

B. The Short-Haul Commodity Tariff

In February 1997 Transco, the pipeline subsidiary of British Gas, proposed a new tariff that represented a significant discount for customers located near the British coast-line, where offshore pipelines from North Sea gas reserves connected to the British Gas pipeline system.⁵⁰ The tariff was intended to deter these customers from constructing their own short-distance pipelines to connect directly to the European Interconnector, a new independent pipeline that connected the United Kingdom with continental Europe.⁵¹ In a document that attempted to persuade customers to accept the new tariff, Transco unwittingly showed that the feared bypass of its system would actually *benefit* other system users.⁵² Transco specifically showed that prices to other system users would *increase* if the new tariff had its intended effect of avoiding bypass.⁵³ Unfortunately, *Ofgas* nevertheless approved the tariff with minimum discussion.⁵⁴

Transco had not reviewed the results of its analysis in sufficient detail. The apparently odd results reflected an underlying weakness in the structure of Transco regulation. Specifically, Transco's RPI-X price cap failed to constrain the prices for different customers. Rather, the price cap was specified simply as a constraint on the *total* revenues in each year divided by the total volumes. Put differently, Transco faced no specific price limit on any one customer as long as the average price across all customers fell below a certain amount. The term "price cap" could indeed be viewed as a misnomer for what was actually a revenue cap. To comply with regulations, it did not matter whether the cap was satisfied by charging all customers the same price, or by charging some customers a price significantly above the average and others a price significantly below. The perverse impact of the proposed short-haul commodity tariff derived from Transco's practice of charging some users a significantly lower price than others.

⁵⁰ Transco, Pricing consultation Paper PC9, Optional NTS Commodity Tariff, February 1997 [hereinafter PC9].

⁵¹ *Transco PC9*, p. 1.

⁵² Transco, *Pricing Consultation Paper PC9A: Optional Commodity Tariff* (Nov. 1997) [hereinafter *Transco PC9A*], p. 9. This contradicted other statements that Interconnector bypass would prompt increases in tariffs "to all shippers using Transco's pipeline" (Transco, *Transportation Ten-Year Statement: 1997*, p. 67) and "future prices to existing users would be higher if existing or future potential loads abandon the Transco system" (*Transco PC9A*, p. 5).

⁵³ *Transco PC9A*, at p. 9.

⁵⁴ Letter from Transco re: "NTS Optional Commodity Tariff" (Jan. 9, 1998).

Table 1: Prices to Other System Users			
Case 1: Bypass Occurs			
			1996 1997
[1]	Million Therms	See Note	5,381 5,512
[2]	Percent Increase	$[1]/[1]_{t-1} - 1$	2.43%
[3]	50% of Increase	$[2] \times 0.5$	1.22%
[4]	RPI-X	MMC 97 p.178	1.00%
[5]	Allowed Increase (Outturn)	$(1+[2])(1+[3]) - 1$	2.23%
[6]	1997 Price	See Note	1.85
[7]	Annual Revenues (Outturn)	$[1] \times [6] / 100$	£102.1
[8]	Other Prices (Outturn)	See Note	1.856
[9]	Previous Revenues	MMC 97, p.178	£107.9
[10]	Difference in Revenues	$[7] - [9]$	(£5.8)
Transco Reported Figures			
[11]	Change in Actual Income	PC9A, p.9	(£5.0)
[12]	Change in Regulatory Income	PC9A, p.9	(£6.0)
[13]	Impact on Charges for Other Users	PC9A, p.9	(£1.0)

Notes

[1]: MMC 97, p.78. 1997 is MMC Forecast less volumes subject to optional tariff.

[6]: $([8]_{t-1} \times [1]_{t-1} / 100) \times (1 + [5]) / ([1]_{t-1} / 100)$

[8]: Transco Case 1 analysis: Transco PC9A, p.9.

At our request, Transco supplied the detailed assumptions underlying its calculations.⁵⁵ In “Case 1” where Transco explored potential bypass, it had assumed a loss in volume of 618 million therms and decreased revenues of £5.23 million per year, implying that the relevant customers were currently being charged an average of 0.85 pence per therm. This was less than half the average price cap of 1.76 pence per therm. By charging low prices to some customers, Transco could charge higher prices to other system users without exceeding the average cap for the year. Charging the potential bypass customers 0.85 pence per therm actually allowed Transco to collect 1.86 pence per therm from the remaining volumes. The weighted average of these different prices across their respective volumes satisfied precisely the average 1.76 pence per therm price cap.⁵⁶

Table 1 presents the underlying mechanics of Transco’s own “Case 1” bypass analysis. The average cap for all users was anticipated to increase slightly if bypass occurred, as the MMC had recently specified a regulatory formula that was contingent upon actual volumes. However, other system

⁵⁵ Transco, “Detailed Data Underlying Table 1 in PC9A”, 3 December 1997.

⁵⁶ Letter to *Ofgas* from T. Briggs, P. Carpenter and C. Lapuerta, re: “Optional NTS Commodity Tariff—Further Consultation” (Dec. 5, 1997).

users would have welcomed the bypass. Removal of the bypass customers would simultaneously prevent Transco from charging other system users amounts that *exceeded* the cap on average. The assumed bypass in Table 1 was anticipated to raise the average cap from 1.76 to 1.85 pence per therm, but other system users would have benefited by witnessing a reduction in their average price from the 1.86 pence per therm that they were currently paying to 1.85. These prices were consistent with the summary figures quoted publicly by Transco, which suggested that the impact on other users would be a net decrease in charges of £1 million per year.⁵⁷

Table 2: Comparison of Rates

	Optional Commodity Tariff Customers	Other System Users	Average Large User Price Cap
1997 Rates	0.85	1.86	1.76
Case 1: Bypass	N/A	1.85	1.85
Case 2: No Bypass	0.49	2.15	1.48

A similar problem explained the results of Transco's "Case 2," which assumed that the new tariff could stem bypass and attract additional volumes to the system. Even though the additional volumes were anticipated to reduce the average cap from 1.76 to 1.48 pence per therm, other system users would suffer. The average pence per therm for customers receiving the new tariff would fall from 0.85 pence per therm to 0.49 pence per therm, allowing Transco to *raise* the rates on other large users from 1.86 to 2.15 pence per therm while still complying with the new lower cap. Again, these prices were consistent with the summary figures quoted by Transco, which showed other system users paying £16 million more per year.⁵⁸ Table 2 summarizes the rates to different classes of customers under the different scenarios analyzed by Transco.

British Gas's ability to charge different rates to different customers and still meet the average price cap creates inefficient incentives to encourage new volumes. British Gas can still make money even if the rates offered to potential new customers bear no relationship to the underlying costs of serving them. For example, it would clearly be inefficient for

⁵⁷ Transco, Table 1: Potential Impact of Offering Optional NTS Tariff, pricing Consultation Paper PC9A: Optional Community Tariff, Feb. 1997, at 9.

⁵⁸ *Id.*

British Gas to attract new volumes by offering to transport gas for free.⁵⁹ Efficiency requires that new customers be charged at least the marginal costs that they impose on the system. However, British Gas can find it attractive to offer new customers a free gas transportation service. The volumes added to the system will allow British Gas to raise the rates on other customers and still satisfy the aggregate cap for the year. It is the average cap and its relationship to incremental volumes that ultimately determines the incentives of British Gas, not the specific revenues collected from new customers.

Similar inefficient incentives do not arise under United States regulation. Pipelines are free to offer discounts to avoid the potential loss of customers, but the discount to any one set of customers does not allow the pipeline to raise the rates on others. Pipelines therefore do not find it lucrative to offer discounts unless the incremental revenues from potential bypass customers more than offset the incremental costs of keeping them on the system. The pipeline is allowed to keep the incremental profit associated with the discounts until the next rate case. The practice of discounting is then acknowledged formally in the determination of rates, and other customers are allowed to benefit from the incremental profits from discounting.⁶⁰ The fundamental problem with "light-handed regulation" is its failure to constrain British Gas' discretion over prices within the scope of the broad regulatory formula.

VI. CONCLUSION

Light-handed regulation initially promised to avoid the problems associated with traditional United States regulation. Proponents in the United Kingdom anticipated administrative simplicity and efficient incentives for privatized utilities. The reality has been more complex. Regulators have had to confront issues related to the measurement of assets, depreciation, rates of return, and cost projections. Had these issues been anticipated prior to privatization, more satisfactory solutions could have been found. Furthermore, light-handed regulation has exacerbated the information disadvantage of regulators, which has been exploited successfully by regulated companies. Finally, light-handed regulation has failed to avoid inefficient incentives. Although UK regulators were

⁵⁹ In some cases, a free gas service might make economic sense for volumes in strategic locations that help relieve system congestion. However, we assume in this example no problems with congestion.

⁶⁰ The FERC allows the "Revenue Crediting" and "Discounted Billing Determinants" approaches to account for discounting. Under revenue crediting, the incremental costs of the discounted volumes are included in the pipeline's total revenue requirement, but the associated revenues are also "credited" against the revenue requirement. The net effect is for other rate payers to enjoy the incremental profit from discounting. The discounted billing determinants method accomplishes a similar result by including a fraction of the discounted volumes in the calculation of rates, corresponding to the fraction of the total regulated price that they pay.

justified in their attempt to avoid the pitfalls of US-style regulation, it is evident from their experience with light-handed regulation that the examination of certain factors can not be avoided when determining the appropriate rates offered by regulated companies.

