Identifying and Estimating Excess Profits in New Zealand Infrastructure Utilities

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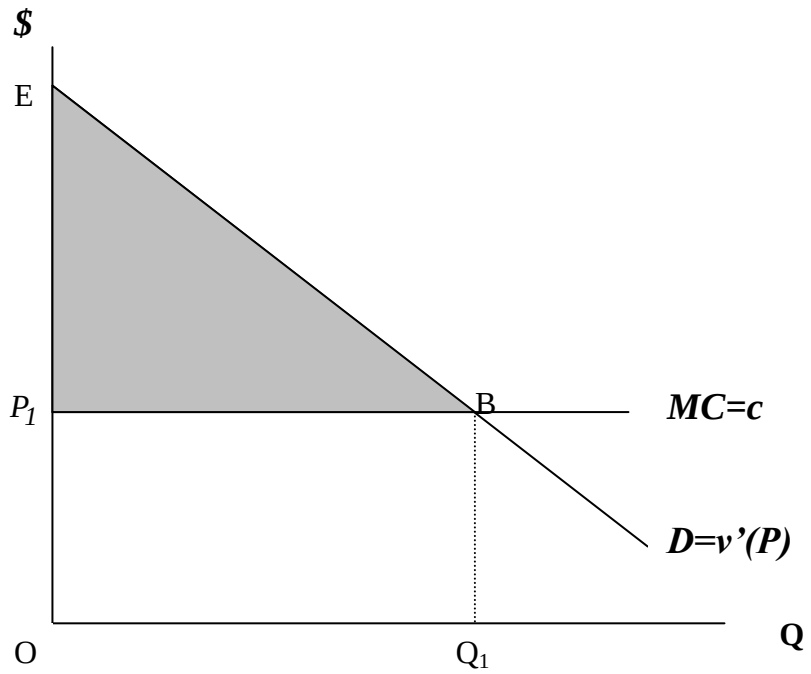
1. The Regulator's Problem

Around the world most countries have regulatory institutions in place to restrict the exercise of market power by natural monopoly firms in utility sectors. This goes along with a more general tendency to regulate against mergers which increase market power, both because increases in market power may harm economic efficiency, and because of the distributional consequences of monopoly pricing which transfers wealth from consumers to the monopoly's owners.

The regulator's problem can be summarized as follows.[1] Consider a single-product monopoly with constant marginal cost cQ and total cost $C(Q)=cQ+K$, facing the demand curve $D=v'(P)$ in Figure 1.

Figure 1



In the absence of regulation the firm will engage in pricing strategies to maximise profit subject to the constraint presented by the demand curve. If only a linear price is feasible, the firm sets $MC=MR$ and supplies less than the optimal quantity Q_1, thereby driving up the price, squeezing consumer surplus, securing a margin over MC,

[1] The following discussion is adapted from Armstrong et al (1994) Chapters 2 and 6.

and creating a deadweight loss triangle. If perfect price discrimination is feasible the firm supplies Q_1 and captures all consumer surplus as profit.

It has been normal international practice during the past century to limit the extent of profit recovery by a firm in this situation. The proposition that a natural-monopoly utility should earn no more than a fair and reasonable return on its investment has long standing in common law in the doctrine of prime necessity, and has been fundamental to most regulatory systems. Prime arguments for limiting the profitability of infrastructure utilities generally boil down to three:

(i) the economy-wide (general-equilibrium) effects of driving up the cost of infrastructural services;

(ii) the economic redundancy, from an allocative point of view, of any return on investment above that available in the competitive capital market,

(iii) the view that monopoly pricing unjustifiably transfers wealth from consumers to utility owners, relative to the distribution which competition would dictate (a key function of competitive markets is to prevent prices to the consumer from rising above the minimum consistent with sustainability of supply).

Outside New Zealand, protection of consumers against monopolies is widely considered one of the tasks of the state. Littlechild, for example, listed five criteria for assessing UK regulatory regimes:[2]

(i) protection of consumers against monopoly
(ii) encouragement of efficiency and innovation
(iii) minimization of the burden of regulation
(iv) promotion of competition
(v) proceeds from privatization and prospects for the firm

Just as his first criterion was protection for consumers against profit-taking, so his review of policy options rejected the idea of having no explicit regulation. Armstrong et al simply note as self-evident that "Option 1 [no regulation] was dropped from consideration for obvious reasons".[3]

A normal goal for regulators in both theory and practice is to maximise consumer surplus, subject to the constraint that the monopolist should recover sufficient revenue to break even (i.e. to secure a fair return on investment). In the simple model of Figure 1 this can be modeled easily using a two-part tariff, comprising marginal cost pricing plus a fixed charge.

The short-run allocative optimum is achieved by charging the marginal-cost price P_1, in which case output in Figure 1 is OQ_1, the firm receives revenue $OPBQ_1=cQ$, and consumer surplus $v(P)$ is EBP. This revenue would suffice only to cover the firm's short-run variable costs, leaving it with a loss equal to its fixed costs K.

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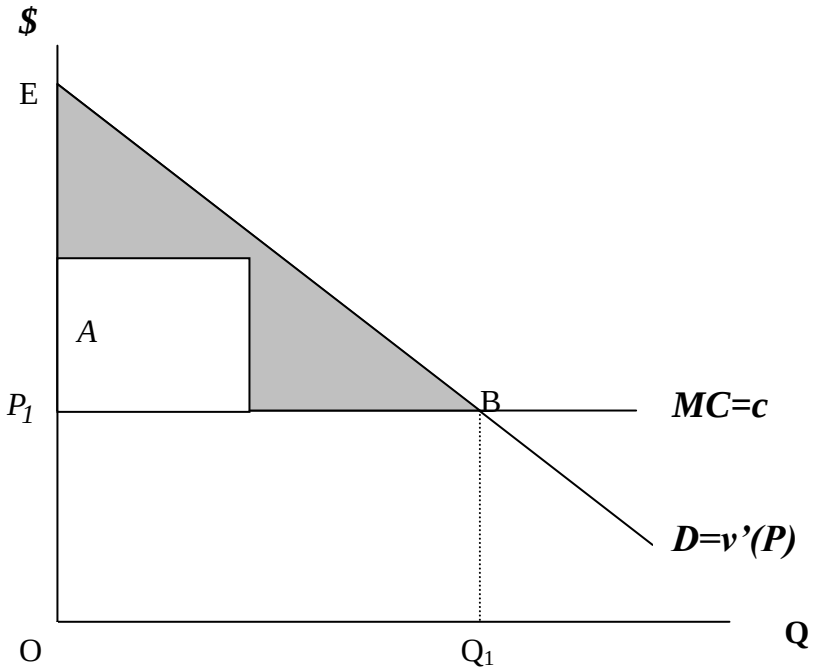
2 Littlechild (1983) reported in Armstrong et al (1994) p.167.

3 Armstrong et al (1994) p.167.

The regulator makes an estimate of K by some means and allows the firm to recover a corresponding amount of revenue, shown as A in Figure 2, by means of fixed charges, such that the resulting lump-sum transfer of income from consumers to the firm is just sufficient to secure the latter a normal rate of profit.[4]

Figure 2



Armstrong et al[5] formulate this regulator's problem in terms that take for granted that the regulator has a mandate to protect consumers to the greatest extent consistent with sustainability for the firm.[6] The regulator seeks to maximise the sum of consumer surplus and firm's profit, subject to the constraint that the firm must break even:

$$Maximise\ W = (1-\alpha)[v(P)-A] + \alpha[A + R\{Q(P)) - C(Q(P)\}]$$

$$s.t. \quad A + R\{Q(P)) - C(Q(P)\} \geq 0$$

Where	*R(Q(P))*	is the revenue from the variable (per-unit) price P
	C(Q(P)) = cQ+K	is the firm's total cost including normal profit
	A	is the fixed charge allowed
	v(P)	is consumer surplus if no fixed charge is levied

4 The rationale for this two-part arrangement was developed by Coase (1946).

5 (1994) pp.16-20.

6 In New Zealand official statements much is made of the desire to see the sort of outcomes that competitive markets provide. Prominent among those outcomes in the theory is restraint on super-normal profit-taking at consumers' expense. Hence Littlechild's point that in the absence of competition, the regulator should seek to impose comparable restraints on profit-taking.

α is the weight on profits in the regulator's welfare function, with $0<\alpha\leq 1$.[7]

The common solution to this problem is to set $P=c$ and $A=K$. To implement this solution the regulator must estimate K. For this purpose a ratebase (asset valuation), as depreciation methodology, and a normal rate of return must be specified. This leads directly to the traditional "rate of return regulation" procedures. It also opens the ratebase battleground on which regulatory disputes have been fought for decades: how to estimate capital costs for a utility most of whose investment costs are sunk.

The Sunk Cost Problem

A perennial source of confusion in ratebase determination is the treatment of sunk costs. In economic terms the issue is straightforward: "sunk investment costs are prominent among the 'byegones' that ought to be ignored in price making".[8] The only authoritative objective measure of the market value of an already-existing fixed asset is its opportunity cost or net realisable value – that is, the sum for which it could be sold if removed from its current use. Where an asset represents a sunk cost and has no alternative use, it does not have any market value (opportunity cost) that might impose on the owner of the asset some real sacrifice in making it available for its actual use. As Coase put it[9]

> If there is no other job on which the equipment could be used, the cost of using the machine (if we exclude depreciation through use) will be nil. It is not therefore possible to say whether any allowance should be made for the use of the capital; this depends on the facts of the case.

Kahn concurs: "capital irretrievably sunk in an enterprise has a lower opportunity cost than incremental capital".[10] If an asset has zero transfer earnings then any return which it yields to its owner is a rent. The issue of what level of rent is "fair and reasonable" cannot be resolved by any appeal to cost of service, because the economic surplus whose distribution is at issue is a rent, not a cost. In a cost-plus pricing equation, rents belong in the "plus", not in the "cost".

In valuing sunk-cost assets for ratebase purposes, therefore, a regulator driven solely by neoclassical economic principles would assign a zero value (or a scrap value) to any asset without an alternative use. The reason why regulators virtually never do this is that there are important conventions and incentives surrounding the institution of private property which cannot be breached without having adverse effects on both current behaviour and future investment by entrepreneurs.

To persuade private investors voluntarily to commit capital to a network utility, the regulator must provide them with some reasonable certainty of being able to secure a

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7 Relevant to New Zealand is Armstrong et al's point (1994 p.17) that α could represent the proportion of profits that are retained in the country as distinct from paid to overseas owners.

8 Kahn (1988) p.39.

9 Coase (1938) reprinted in Buchanan, J.M. and Thirlby, G.F. (eds) *L.S.E. Essays on Cost*, Weidenfeld and Nicholson, London, 1973).

10 Kahn (1988) p.43 fn55.

return of and on their capital over time, at rates that are competitive with those offered by alternative investment opportunities. A regulator which retrospectively revalues assets down to opportunity cost after their costs have been sunk, and which lowers the allowed revenue accordingly, will clearly develop a reputation which deters further investment in the sector. The sustainability requirement for the sector, if it is to be able to continue to attract finance capital for replacement and development purposes, is basically that at the time each investment is made, there must be a clear expectation by all parties that the investors will recover a fair return on the sums of money committed at the time the investment is made. This requires in turn a de facto regulatory bargain that outlaws the downward revaluation of assets relative to depreciated historic cost – in other words, investors are given security against expropriation, but at the same time the regulator implicitly underwrites the investment once it has been certified as "prudent"[11].

On the other hand, a regulator which allows unilateral upward revaluation of sunk-cost assets relative to their actual acquisition cost to those who are to maintain and operate them reveals a high α, which may imply that regulation itself is redundant. (A primary rationale for installing a regulator is to have an agent with relatively low α.)

Incentive compatibility, in other words, means that historic cost (in the US, the original cost of prudently-undertaken investments) is the lowest regulatory ratebase consistent with sustainability, if the rate of return allowed is set at the competitive cost of capital.

2. New Zealand Background

Since the late 1980s New Zealand has regulated its natural monopolies by a procedure which officials and ministers describe as "light handed regulation". As the title suggests, the defining principle of this policy is its rejection of traditional ("heavy handed") regulation of the sort generally practised in the United States and Europe. The light-handed approach places heavy reliance on information disclosure, and upon the proposition that with information about the financial performance of natural monopolies publicly available, some set of negative feedbacks will come into play to restrain the exercise of market power. Those feedbacks have not generally been well specified by policymakers, but candidates include

- industry self-regulation to avoid shame when analysis of disclosed data reveals excess profit-taking;
- litigation initiated by aggrieved customers using disclosed information to make their case;
- strengthened bargaining positions of customers negotiating contracts with natural monopolies with access to published benchmark performance data;

[11] The problem which this poses for regulators in relation to "stranded assets", such as nuclear power stations, and network assets which become redundant following deregulation of previously-monopolised markets, has been the subject of a lively US literature focusing on "deregulatory takings". Cf Kahn (1988) p.xxviii; Baumol and Sidak (1995); Sidak and Spulber (1997); Rossie (1998); Hovenkam (1999).

- political intervention triggered by a public perception of excessive profit-taking.

The remainder of this paper brings together some quantitative estimates of rates of return as revealed by utility industries over the past decade, and considers the issue of how policymakers might go about distinguishing between reasonable profits and excessive ones.

The threat of political intervention, which provides the backstop to light-handed regulation, involves potential action by the Minister of Commerce under Part IV of the Commerce Act 1986, with intervention taking the form initially of referral to the Commerce Commission for an inquiry under s.54 of the Commerce Act 1986 and subsequently, if the Commission so recommends and the Minister accepts the recommendation, an Order in Council under s.53 regulating the prices to be charged.

The first such inquiry by the Commerce Commission, into the prices charged by the owners of airfields, is currently nearing completion. A draft report published in the middle of 2001 concluded that Auckland and Christchurch International Airports were securing monopoly profits, and recommended that landing charges at these two airports should be subjected to regulation.[12]

The Commission took the view that (2001 p.140)

> From an economics perspective, airports should be able, on average over time, to earn a normal return on the optimised assets used in providing the services of airfield activities. … [T]he WACC for an entity is a return that is commensurate with the opportunity cost of capital for that entity. An actual return in excess of an appropriate target WACC would suggest that the entity was earning an excessive or monopoly return, unless those returns reflected superior performance.
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> … The issue of normal returns is closely associated with allocative efficiency, at least in the second-best sense... In competitive markets, in the short run, any returns in excess of (less than) normal returns could reflect superior (inferior) performance, or windfall gains (losses) caused, for example, by short-term fluctuations in demand and supply. However, in the long-run, competition would be expected to force prices to the allocatively efficient level where all costs would just be covered, including a normal return on the capital assets used by the business. In contrast, under monopoly, prices would be expected to be held persistently above costs, even in the long-run, resulting in a loss of allocative efficiency and a redistribution of wealth from acquirers to suppliers.

The Commission here identifies three considerations to be weighed up in deciding whether any realized rate of return is to be considered "excessive":

- monopoly pricing implies a loss of (static) allocative efficiency - the familiar Harberger triangles of deadweight loss;

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12 Commerce Commission, *Draft Report: Price Control Study of Airfield Activities at Auckland, Wellington, and Christchurch International Airports*, 3 July 2001 paragraph 15.5 p.214.

- monopoly pricing redistributes wealth from acquirers (consumers) to suppliers;
- monopoly pricing may provide a return to superior productive efficiency ("performance") in which case high returns may be appropriate rather than excessive.

The first of these involves a generalized cost of monopoly to the community at large. The second involves private losses imposed on those who consume the product, with wealth transferred to the owners of the monopoly. The third involves a generalized benefit to the community at large from the incentive to innovate associated with high profits - an argument generally associated with Schumpeter. All three potential consequences of monopoly come within the scope of the Commerce Act 1986.[13]

In *Airfields*, the Commission presented the estimates of excess profits shown in Table 1. The overall rate of return over the twelve-year period was calculated as a simple average of the annual "Accounting Rate of Profit", calculated using the formula

$$\frac{NOPAT + Revaluations}{Appropriate\ Asset\ Base + \left(Revaluations/2\right)}$$

The Commission incorporated asset revaluations into the airports' profit streams by retrospectively spreading one-off actual revaluations back over the life of the project, thus avoiding one-year spikes which would have washed out in the simple averaging process used. (As discussed below, this approach to estimating profitability over a period of many years seems unnecessarily crude).

Table 1
Commerce Commission Results for Two Airfields

	Auckland	Christchurch
WACC estimate 2001	8.0-8.8	8.0-8.8
Target return 1989-2000	9.76	9.64
Actual Accounting Rate of Profit 1989-2000	13.47	11.65
Excess return 1989-2000	3.71	2.01

All figures are nominal after tax.
Source: Commerce Commission (2001) Table 40 p.142.

The Commission took a hardnosed view of the appropriate benchmark or target rate above which "excess returns" might be perceived: any return above WACC was considered excessive in the absence of clear evidence that some "superior performance" was being rewarded.

The Commission considered also that excess profits of the order of 2-4% nominal after-tax above the benchmark would justify regulatory intervention even after taking into account the costs of regulation.

[13] S.53 of the Commerce Act 1986 gives as one criterion for imposition of price control that "It is necessary or desirable for the prices of those goods or services to be controlled in accordance with this Act in the interests of users, or consumers, or, as the case may be, of suppliers"; hence the redistributive effects of monopoly pricing are clearly to be taken into account as well as the allocative and productive efficiency aspects.

This approach to excess profit echoes a strong tradition in the economic literature (for a recent survey, and restatement of the case against allowing monopoly rents as a spur to productive efficiency, see Parente and Prescott 1999). It is, however, something of a rarity in recent New Zealand policymaking, which has been extremely relaxed in the face of levels of profit-taking that would have attracted regulatory attention elsewhere. The next section of this paper reports on some estimates of utility profitability in New Zealand since deregulation, and the subsequent section considers policy issues.

3. Some Other New Zealand Utility Case Studies

This section summarises the results from four case studies undertaken since 1999 by a team including the present author. Each study utilized financial information available from the public record, including both published company annual reports and material made available pursuant to information disclosure regulations the ostensible purpose of which has been to facilitate the identification of excess profits.

The four sectors covered by these studies were electricity distribution lines[14], Auckland International Airport[15], gas pipelines[16], and port companies[17]. In each case, the approach taken to estimating profitability involved the calculation of the internal rate of return (IRR) secured by the company or companies under analysis from the date of deregulation/privatization/share flotation in the late 1980s or early 1990s through to the end of the 1990s. The IRR approach seems more consistent, and easier to apply, than the Commerce Commission's construction of annual average Accounting Rates of Profit which are then simply averaged over the total period.

To implement an IRR analysis three pieces of information are required:

- an entry price, representing the outlay required to start the project's cashflow stream;
- an annual flow of net cash surpluses over the period the project is deemed to be operating; and
- a terminating (scrap) value at which the project exits the analysis.

In the context of New Zealand utilities, the second of these is currently the easiest to reconstruct, because of the availability of annual P&L and cashflow statements for the relevant companies combined with disclosed information under the regulations for electricity lines (since 1995) and gas pipelines (since 1997). For the purposes of our analysis we calculated net surplus, using actual net cash expenditure on capital equipment in place of book depreciation entries wherever possible. To place the analysis on as consistent a basis as possible we deflated these annual cash surplus figures to real terms using the PPI (Inputs).

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14 Bertram and Terry 2000.
15 Bertram, Dempster and Terry 2000.
16 Bertram, Dempster and Terry 2001.
17 Bertram, Dempster and Terry 2002.

The entry and exit values present more problems, and are crucial for the results obtained. For an opening outlay, we sought to approximate the amount a new owner would have had to commit to secure ownership on the basis of the company books at the date when analysis begins. In the case of electricity lines companies, ports, and airports, this means the book values at which the enterprises passed into the hands of the new entities established by corporatisation. In the case of gas pipelines we started the analysis from 1992 when both major pipeline networks - already privately owned - changed hands via share flotations at the point where the industry was deregulated, so that the market had an opportunity to price the assets on the basis of expectations of future profitability at that time.

Exit values present serious difficulties given that the businesses analysed all remain in existence as going concerns, so that at the terminating date of the analysis some forward-looking valuation has to be assigned without the absolute check of an actual liquidation. The main options here are book value and estimated market value.

Electricity Lines

Our first study covered the 32 electricity lines companies created in 1993-94, which we analysed in aggregate. Disclosed information enabled us to conduct an IRR exercise for the industry over the period from corporatisation in 1993 to 1999 (the last year for which disclosed data was available at the time the study was prepared).[18] Table 2 gives the total book value of the fixed assets of lines companies at March of each year from 1989 to 1999, together with their gross pre-tax operating surplus, all expressed in 1999 March-year dollars using the PPI (Inputs).

The figures for 1992-1994 are for combined retail and lines businesses (though excluding appliance trading and servicing) and therefore overstate the book value and surplus of the lines businesses alone. The figures from 1995 to 1999 are for lines businesses only, excluding energy trading. The result of this change in reporting framework between 1994 and 1995 is that Table 2 understates the increases in book value and operating surpluses achieved by lines businesses over the full period, and hence to bias downwards our estimate of the internal rate of return.

Book value of all lines company fixed assets was about $2 billion at the time of the transfer of those assets from the former electric power boards and MEDs to the new corporate entities in 1993. By 1999 book value had doubled, to $4 billion[19].

To estimate the IRR for electricity lines companies as a group, we imagined that a hypothetical investor purchased the entire sector for its book value at the beginning of some period, collected the actual gross pre-tax operating surplus year by year until

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[18] Up to 1994, electricity sector financial and physical statistics were collected and published annually on a consistent basis by the Ministry of Commerce. From 1995 on, financial disclosures by individual companies have appeared in the *Gazette*. The two main consequences of the change in reporting regime have been an increase in the transactions cost of research such as that reported here, and a fall in transparency due to the opportunities and incentives for companies to be creative in their interpretation of regulatory requirements.

[19] For the March year 1999 the total Optimised Deprival Value of lines businesses recorded in the Information Disclosure Statistics was $4.287 billion. The lower figure in Table 2 reflects the fact that not all lines companies were yet carrying their fixed assets at full ODV in their financial reports as prepared for disclosure purposes.

1999, and then sold out for the book value as at March 1999. Since no new financing arrangements were required at the time of transfer to the new companies, this procedure enabled us to estimate entry and exit values without becoming embroiled in the issue of debt/equity ratios.

Table 2
The Electricity Lines Company Data

	1992	1993	1994	1995	1996	1997	1998	1999
Real book value	1,911.2	1,893.8	2,299.3	2,755.1	3,019.1	3,480.0	3,709.5	4,257.5
Revenue excl Transpower charges	764.7	806.7	794.1	798.8	845.3	895.2	959.0	963.5
Other income (non-lines revenue)	87.0	103.3	126.1	61.5	18.8	30.1	35.8	68.9
Real operating costs excl depreciation	465.9	474.5	452.9	430.0	432.4	415.4	526.1	408.0
Real depreciation	100.6	98.0	*98.2*	98.3	109.5	122.6	141.9	143.3
Real net surplus	111.2	130.8	116.9	209.0	284.6	327.2	255.2	343.3
		1993	1994	1995	1996	1997	1998	1999
IRR stream:		-1,894	117	209	285	327	255	4,601
Derived Internal Rate of Return, real pre-tax		24%						

The measure of income used in Table 2 is the gross operating surplus for each year, net of depreciation, deflated to 1999 dollars using the PPI (Inputs). In this first phase of analysis we used accounting depreciation to derive net operating surplus, since cash figures for capital expenditure were not generally disclosed prior to 1999 when the disclosure regulations were tightened up. We also calculated the IRR on a pre-tax basis, in contrast to the other three studies which were post-tax.

The pre-tax real IRR for 1993-99 emerging from these figures was a rather startling 24% real pre-tax over the six-year period. The result depends heavily on the closing book value - that is, on the revaluation of assets from historic cost to ODV by the industry, with official encouragement.

Table 3
Auckland International Airport Profitability Estimates

June years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Book value at year end	416.0	393.0	400.0	389.0	386.0	372.0	383.0	453.0	514.0	531.0	813.0
Revenue excl interest		93.8	96.7	98.8	104.6	108.6	119.7	131.5	141.4	154.7	160.4
Operating costs excl interest		33.8	35.0	34.4	35.6	35.1	36.2	39.9	42.7	47.1	47.5
Gross operating surplus excl interest		60.0	61.8	64.4	68.9	73.6	83.5	91.5	98.7	107.5	112.9
Capital spending		24.0	28.0	19.0	28.0	13.0	31.0	84.0	88.0	58.0	33.0
Cash tax paid		12.0	11.0	15.0	15.0	19.0	21.0	23.0	21.0	20.0	22.0
After-tax real net surplus		24.0	22.8	30.4	25.9	41.6	31.5	-15.5	-10.3	29.5	57.9
IRR stream	-416.0	24.0	22.8	30.4	25.9	41.6	31.5	-15.5	-10.3	29.5	870.9

Derived Internal Rate of Return, real post-tax 11.4%

Source: Bertram, Dempster and Terry 2000

Auckland Airport

Our second study, conducted shortly after the electricity results were published, focused on Auckland International Airport, which was corporatised in 1989. Overall results showed a real post-tax IRR of 11.4% for the ten years 1990-1999, depressed by very heavy capital expenditures in 1996 and 1997 but boosted by the revaluation of the airport assets in 1999 - a revaluation which has been more than comfortably sustained as a market value by developments in the subsequent two years.

Because of the importance of the 1999 revaluation in the IRR stream, the return available to investors acquiring shares in AIAL at book value during the late 1990s prior to the revaluation was extremely high - of the order of 33% real post-tax for entry in 1997, when in fact a substantial volume of shares were floated.

Gas Pipelines

The third study (Bertram, Dempster and Terry 2001) examined the financial returns secured by the two main gas pipeline operators Enerco (now United Networks) and Natural Gas Corporation (NGC) over the period from 1992 (when the industry was deregulated and both companies changed hands) to 2001. The main source of information was the annual reports, supplemented by information produced for years from 1997 on under the Gas Industry (Information Disclosure) Regulations 1997.

Enerco New Zealand Ltd emerged from the 1992 restructuring of Welgas Holdings Ltd, a holding company through which Brierley Investments Ltd had built up a major position in the gas industry since acquiring an initial 20% stake in the Wellington Gas Company in December 1971.[20] The Welgas business comprised distribution networks in Wellington, Auckland, and Hawkes Bay, together with a stake in Southern Petroleum which was divested separately. The customer base was just over 50,000, rising steadily at a couple of percent a year. Sales of gas were flat at about 14 PJ p.a. Wholesale gas was purchased from NGC under a set of contracts for delivered gas dating from 1980, with prices controlled by the Commerce Commission. The historic-cost book value of fixed assets was $56 million at June 1990[21]; by December 1991 this had been raised to $77.5 million, mainly by revaluations of existing assets approved by the board. This book value of $77.5 million was effectively the asset base purchased by investors taking up shares in April 1992 at the offer price of $1.35 per 50-cent share.[22]

The subsequent evolution of Enerco's gas distribution and retail business was rapid. Over the first six years to 1998 the length of pipelines increased by 77% and customer numbers doubled, partly through acquisition in October 1993 of Progas (the former Palmerston North City Council Gas Department) and partly through increased market penetration, including a major new mains pipeline to serve the Albany area. Gas volume rose only 30%, reflecting the fact that expansion was concentrated at the small-customer level. Meantime revenue rose 75% while operating costs rose only 55%, and the book value of fixed assets trebled, mainly

20 On the history of Welgas see Brierley Investments Ltd *Annual Report 1983* p.12 and Enerco *Offer Memorandum 1992*

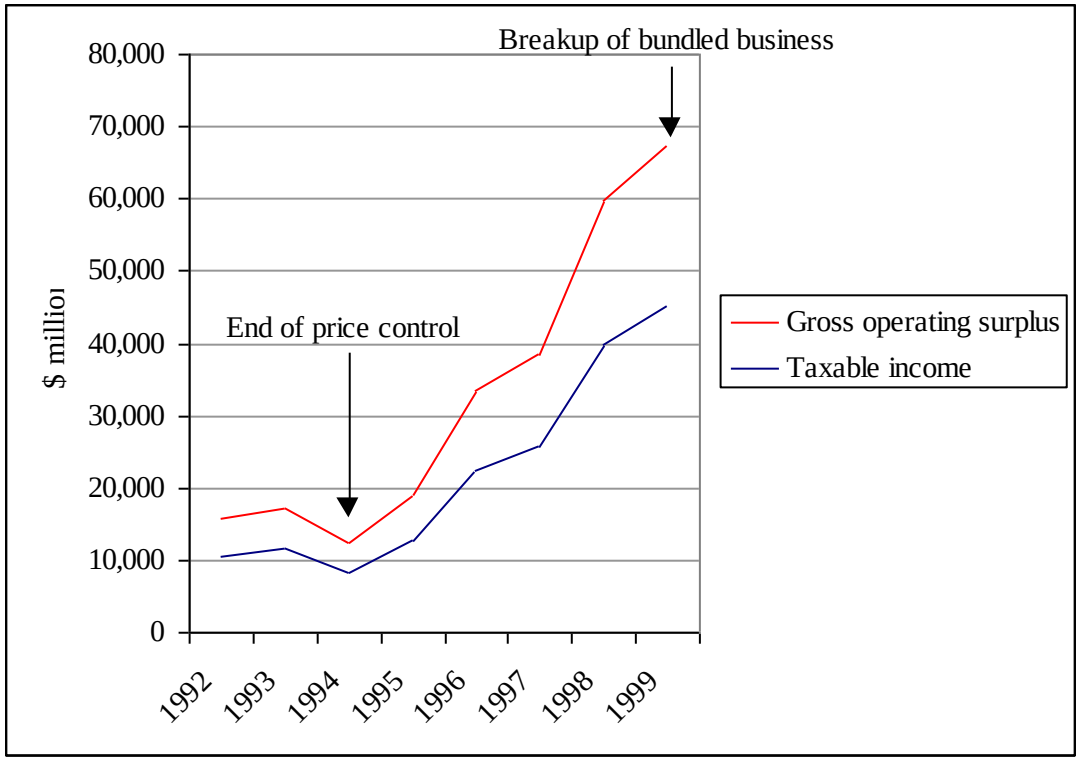
21 Offer Memorandum.

22 Enerco *Annual Report 1992* p.2. The successful issue of 56 million shares at $1.35 valued the company at $75.6 million.

through revaluations rather than new construction. Deregulation of the industry was thus followed by a major increase in Enerco's long-run profitability, and hence in the value of the business to a purchaser. Of particular significance is the extent to which revenues outstripped operating costs, causing operating surplus to rise steeply; this increased surplus made the increased asset valuation sustainable.

Figure 1 shows the path of Enerco's operating surplus following deregulation.

Figure 1
Enerco Operating Surplus and Taxable Income



In the two years following 1998 a further restructuring was undertaken by Orion, as Enerco's main shareholder[23], to extract the value which had been added to the business in the first six years after deregulation. Gas trading was separated from the pipeline networks and the businesses were sold separately: gas trading and the retail customer base to Contact Energy for $110.7 million[24], and the pipeline networks to UnitedNetworks for $550 million.[25]

Thus a gas pipeline and retail business which had a market value of $77 million in early 1992 was sold eight years later in early 2000 for a total of $660 million. Along the way $110 million had been spent on purchases of fixed assets (including replacement investment to make good wear and tear), and $32 million on the acquisition of Progas.

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23 Orion, under its earlier name Southpower, purchased a controlling stake in Enerco in October 1993, to enable Enerco to fight off an NGC takeover attempt. A one-for-three rights issue to existing shareholders, at $2.80, was undertaken in November 1993. Southpower subsequently bought NGC's 19% stake in Enerco. By 1999 Orion held all of the shares.

24 $100.5 million for small customers in late 1998, plus $10.2 million for industrial customers in April 2000.

25 *New Zealand Gazette* 21 August 2000 Issue 99 p.2487; Orion *Annual Report* 2000 p.8.

The realised capital gain on Enerco as an investment prospect was thus between $450 million and $500 million over eight years. This capital gain was recorded in three processes of asset revaluation. In March 1994 an ODV valuation added $82.1 million to the book value of fixed assets as recorded in Enerco's revaluation reserves. In March 1997 a second ODV revaluation added another $58.4 million. Finally in April 2000 the sale of pipelines with a book value of $280.4 million[26] for $550 million realised another $270 million of capital gains, to which was added approximately $110 million from sale of the retail gas customer base.

In Table 4 the basic data for calculating Enerco's IRR are arrayed. Operating surplus is entered into the stream exclusive of interest, and net of actual capital expenditure and actual cash tax paid. Entry is at the 1992 flotation value, and exit at the March 2000 book value of $281 million (about half the actual price received at sale of the business to UnitedNetworks). To allow for new share issues made during the period to finance expansions and acquisitions, the deflated cash flows have been converted to a per-share basis, so that what is measured is the IRR realized by an investor who hypothetically purchased a share at the 1992 flotation date and held the same share without putting any further funds into the company until March 2000.

The IRR, at 22.4%, again turned out very high; and crediting the investor with the actual market sale value of the assets in March 2000 raises it to 29.2%.

A profitability analysis similar in many ways to that set out in Table 4 was presented by John Gray, Chairman of Enerco, on page 6 of the 1998 Annual Report. It differed only in that it used dividends paid in place of our estimate of operating surplus, and the Enerco share price in place of our book value or market value of fixed assets. The results of this analysis were presented as follows:

Enerco as an Investment:

It may be of interest to traverse the experience of a hypothetical foundation investor in Enerco who took up 10,000 shares in the company at the issue price of $1.35 when the company listed in April 1992. The total investment was then $13,500.

Assuming the investor pays tax at the marginal 33% rate, took up a 1 for 3 share issue made in November 1993 at $2.80 per share to lift the total investment to $22,832; remains a shareholder and drew down all dividends as declared plus the return of capital, his or her investment will be worth $72,000 (at $5.40 per share) plus an income of $13,203.

This equates to a post-tax 273% return on the investment over a six-year period.

[26] *New Zealand Gazette* 21 August 2000 p.2487, "Fixed assets held for sale".

Further public evidence of the very high rates of profit enjoyed by the Enerco gas business was provided by the prices paid for the separated businesses, in the open market, by Contact Energy and UnitedNetworks. UnitedNetwork's purchase of fixed assets with an ODV book value of $280 million for a total price of $550 million, reflected the future stream of profits which UnitedNetworks anticipated being able to secure from this natural monopoly business.

Turning to the other major gas pipeline business, NGC, a brief history may again be useful. NGC was originally set up in 1967 as a statutory corporation to undertake the treatment and transmission of Kapuni gas. In 1977 NGC contracted to purchase part of the Crown's entitlement to Maui gas, and in 1978 was effectively absorbed into Petroleum Corporation of New Zealand (Petrocorp) as its natural gas transmission, treatment and trading division.[27] In the course of the 1980s, NGC progressively established a foothold in gas distribution and retailing, taking over existing networks in Gisborne and Hamilton, and constructing new distribution systems in Bay of Plenty, Rotorua-Taupo, Taranaki, Waikato, Northland and Horowhenua.

In 1988 NGC, along with the rest of Petrocorp, was privatised by sale to Fletcher Challenge Ltd, which embarked on a four-year restructuring process culminating in the floating of NGC on the sharemarket in September 1992.

The estimation of an IRR for NGC was complicated greatly by the complex financial structure of the company, which had a large amount of outstanding debt in 1992 and issued its new securities in a mixture of shares and convertible capital notes. The initial result of our analysis was an IRR of 19.2% real post tax. A subsequent re-working based on NGC's cashflow statements yielded 16.3% (see Table 5).

27 Natural Gas Corporation, *Prospectus: Natural Gas Notes* 8 March 1991 p.1.

Table 4
IRR Data for Enerco/Orion

	Period to	Jun-92	Jun-93	Mar-94	Mar-95	Mar-96	Mar-97	Mar-98	Mar-99	Mar-00
1	Number of shares on issue	56,000,000	56,140,000	83,891,837	84,785,206	84,898,539	84,965,205	84,965,205	84,965,205	84,965,205
2	Book value of fixed assets $000	76,780	77,435	203,048	201,845	204,958	288,649	312,213	285,477	280,866
3	Value of network assets at actual sale $000									550,000
4	Margin over book value of network assets at sale $000									269,134
5	Sums received from sale of retail gas customers $000								100,500	10,200
	of which, estimated fixed-assets component								16,500	
6	Book value of fixed assets per share $	1.37	1.38	2.42	2.38	2.41	3.40	3.67	3.36	3.31
7	Buy-in price $ per share	1.35								
8	Operating revenues excl interest and gains on sale of investments $000	112,758	118,086	95,666	154,177	168,486	189,964	209,030	203,693	113,344
9	Operating expenses excl interest, depreciation & exploration write-offs	94,758	98,620	80,842	127,482	132,083	149,167	147,205	136,144	79,905
10	Interest expense $000	507	1,770	1,407	2,001	41	616	2,882	7,493	8,000
11	Depreciation expense $000	5,064	4,822	3,695	8,770	9,212	10,122	11,939	*10,300*	*10,000*
12	Operating surplus with no depreciation or interest deducted $000 [8-9]	18,000	19,466	14,824	26,695	36,403	40,797	61,825	67,549	33,439
13	Cash purchases of fixed assets net of sales of fixed assets $000	1,463	4,449	3,467	6,870	12,046	35,318	35,382	*16,454*	*12,663*
14	Net cash from investing activities other than fixed assets $000	7,274	84	-77,271	49,857	-4,299	-2,242	-4,022		
15	Net cash from financing activities $000	-7,776	1,064	72,622	-36,744	-447	28,982	13,281		
16	Financing & other investment contribution to capex $000 [14+15]	-502	1,148	-4,649	13,113	-4,746	26,740	9,259		
17	Net cash purchases of fixed assets funded from surplus $000 [13-16]	1,965	3,301	8,116	-6,243	16,792	8,578	26,123		
18	Surplus net of required contribution to capex $000 [12-17]	16,035	16,165	6,708	32,938	19,611	32,219	35,702	51,095	20,776
19	Notional taxable profits, equity basis $000 [12-11]	12,936	14,644	11,129	17,925	27,191	30,675	49,886	57,249	23,439
20	Imputed tax on [19] @33%	4,269	4,833	3,673	5,915	8,973	10,123	16,462	18,892	7,735
21	Provision for tax in profit & loss accounts $000	4,503	2,430	3,147	8,028	10,040	9,761	13,205	14,433	10,472
22	Current taxation as per note to accounts, $000	4,866	2,550	3,480	8,146	8,201	10,611	4,314		
23	Cash tax actually paid, from cashflow statements, $000	10,570	4,088	3,564	12,721	7,307	12,676	6,993	na	na
24	Tax series used for purposes of analysis $000	10,570	4,088	3,564	8,146	8,201	10,611	4,314	14,433	10,472
25	Post-tax surplus used for analysis $000 [18-24]	5,465	12,077	3,144	24,792	11,410	21,608	31,388	36,662	10,304
	Deflated to 1999 dollars using PPI(Inputs)									
	IRR stream	-82,030	12,673	3,238	25,272	11,560	21,804	31,546	36,662	279,121
	IRR stream on a per-share basis	-1.44	0.19	0.08	0.30	0.14	0.26	0.37	0.63	3.28
	Derived IRR real post tax	22.4%								

Table 5
IRR Calculation for NGC Based on Reported "*Net Increase in Cash Held*"

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Net Cashflows[(i)]		55,105	(12,985)	(16,877)	(17,283)	(3,190)	29,368	(838)	(20,813)
Add back payments to stock/debt holders:									
Interest payments[(ii)]		63,432	99,448	99,532	95,213	91,283	76,175	51,980	47,467
Dividend payments[(iii)]		16,760	19,740	8,820	11,760	10,920	29,799	43,382	51,285
Free cashflows excl. stakeholder payments		135,297	106,203	91,475	89,690	99,013	135,342	94,524	77,939
Capital Received/(Paid) by stakeholders									
Share & CCN holders[(iv)]	(462,000)						151,284		(363,622)
Nat gas notes[(v)]	(300,000)							52,002	60,142
Term liabilities[(vi)]	(220,000)	34,000	38,000	28,000	54,000	41,000	(166,224)	140,404	(302,439)
Sale Price (book value)[(vii)]									1,968,622
Real Terms									
Purchase price	(1,041,357)								
NGC "free cash flow"		142,044	109,234	93,128	90,802	99,912	135,579	94,619	75,249
Stakeholder capital paym'ts		35,417	38,934	28,484	54,656	41,414	(14,910)	192,599	(573,244)
Sale price									1,862,462
Real cash stream - exit Jun-00	(1,041,357)	177,461	148,169	121,612	145,458	141,326	120,669	287,217	1,364,466
IRR	**16.3%**								
PPI data									
PPI Inputs ave for period		953	972	982	988	991	998	999	1036
PPI Inputs June		960	976	983	988	990	1002	999	1057
PPI Inputs September	943								

Notes

Data from NGC Annual accounts as follows

(i) From the statement of cashflows, line item: “Net Increase/(Decrease) in Cash Held”.
(ii) “Cashflows from Operating Activities” line items “Interest Paid” and “Convertible Capital Note Interest”.
(iii) “Cashflows from Financing Activities” line item “Payment of Dividends”.
(iv) 1993 figure from Annual Report 1993 “Summary of Acquisition of Natural Gas Corporation Limited” line item “Total Cash Paid” – note that this might be overstated given that the shares were issued at $0.90. 1998 figure from statement of cashflows, line item “Repayment of Convertible Capital Notes”. 2000 figure from 2000 annual report, statement of cashflows, line item “Issue of Shares”.
(v) From Annual Report 1993 “Summary of Acquisition of Natural Gas Corporation Limited” line item “Natural Gas Notes” – this accounts for the noteholders effectively being repaid by seller and then re-lending the money to NGC Holdings. 1999 and 2000 figures from respective annual reports, line item “Repayment of Natural Gas Notes”.
(vi) 1993 figure from Annual Report 1993 “Summary of Acquisition of Natural Gas Corporation Limited” line item “Term Liabilities”. Remaining years from annual reports, line items “Drawdown of Term Debt” and “Repayment of Term Debt”.
(vii) Annual Report 2000, Total Non Current Assets net of “Deferred Expenditure”

Port Companies

The most recent study investigated the profitability of six port companies since corporatisation under the Port Companies Act 1988. To evaluate retrospectively whether the standard regulatory criterion of financial sustainability ("operating as a successful business" at a competitive rate of return) has been achieved, the approach we adopted was to calculate the Internal Rate of Return (IRR) actually achieved by each business and to compare this with the target rates of return set out in the establishment plans prepared for individual port companies, and with the competitive rate of return available over the same period on other projects of equivalent riskiness (i.e. the WACC).

We calculated for each port the internal rate of return corresponding to the 1989-2001 cashflow stream comprising

(i) an initial outlay equal to the value at which the assets were transferred from the old Harbour Boards to the new companies,

(ii) the free cashflow of each port business as shown in annual reports, exclusive of abnormal items not clearly related to the returns on the port operation, and

(iii) a terminal (exit) value, representing the value of the business as a going concern.

The initial outlay corresponds to the amount which a hypothetical investor would have had to spend to acquire each port at the time of corporatisation; this was equated with the value at which the fixed assets were transferred onto the new company books. (The other components making up the formal transfer price for each business as a going concern were current assets and liabilities, which generally approximately cancelled each other out at the time of corporatisation.)

Free cashflow was computed by

- taking operating cash surplus before payment of interest and tax, with no allowance for depreciation,
- subtracting actual cash outlays on acquisition of new capital assets both to replace worn-out assets and to provide for growth of the business, net of cash received from disposal of fixed assets,
- subtracting cash tax paid to obtain the post-tax real cashflow to the owners of the business, and
- deflating this from nominal to real terms using an appropriate price index (we have used the PPI Inputs to convert all figures to 2000 June-year dollars).

The terminal value of the business in the last year of the analysis period was estimated using two possible values. The conservative approach is to use the net book value of fixed assets, which is a robust, audited figure from the published accounts, but which may significantly understate the value which would be placed on each port in an open-market sale process (at least in the cases of those ports which exhibit excess profits). Alternatively, "exit values" for each port business can be estimated from observations of the ratio of Enterprise Value to EBITDA (Earnings Before Interest,

Tax, Depreciation and Amortisation) for those ports whose shares are traded on the sharemarket. This provides a market-based estimate of the sale price which could be realised if each port's shares were sold off on the market at the terminal date of the analysis, at a market value reflecting observed operating cashflows of the business and the expectation that those cashflows would be sustained into the future.

Our model in effect imagined that a new owner purchased each port business for cash at the beginning of the 1988/89 year, achieved the actually-observed operating revenues and costs through to 2000/01, while committing additional cash to the business in line with actually observed investment expenditure, and sold out at the end of the 2000/01 year for the exit price determined as above.

The data excluded, so far as possible, any profits and capital outlays associated with non-port activities, in order to focus on the returns secured in the market for port services alone.

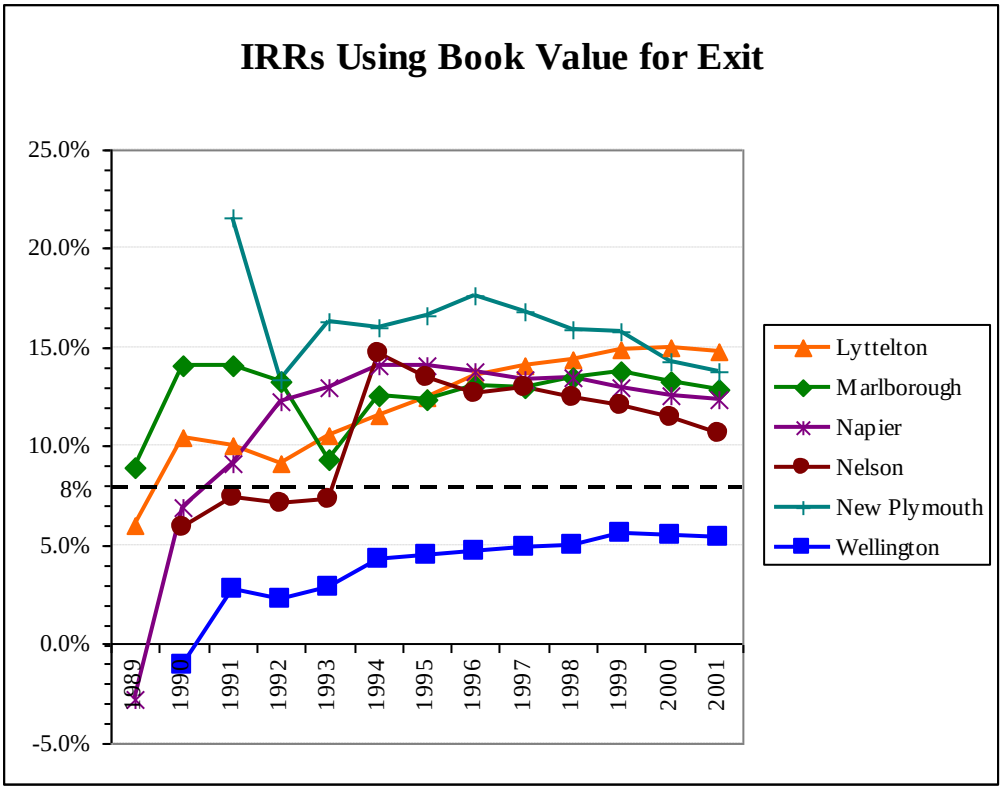
Six ports were selected for study: Lyttelton, Marlborough, Napier, Nelson, New Plymouth (Westgate) and Wellington (Centreport). These six present a reasonable cross-section of the nation's 14 large and smaller port undertakings. They accounted for 37% of all tonnage through sea ports in 1995, the last year for which comprehensive statistics are available.

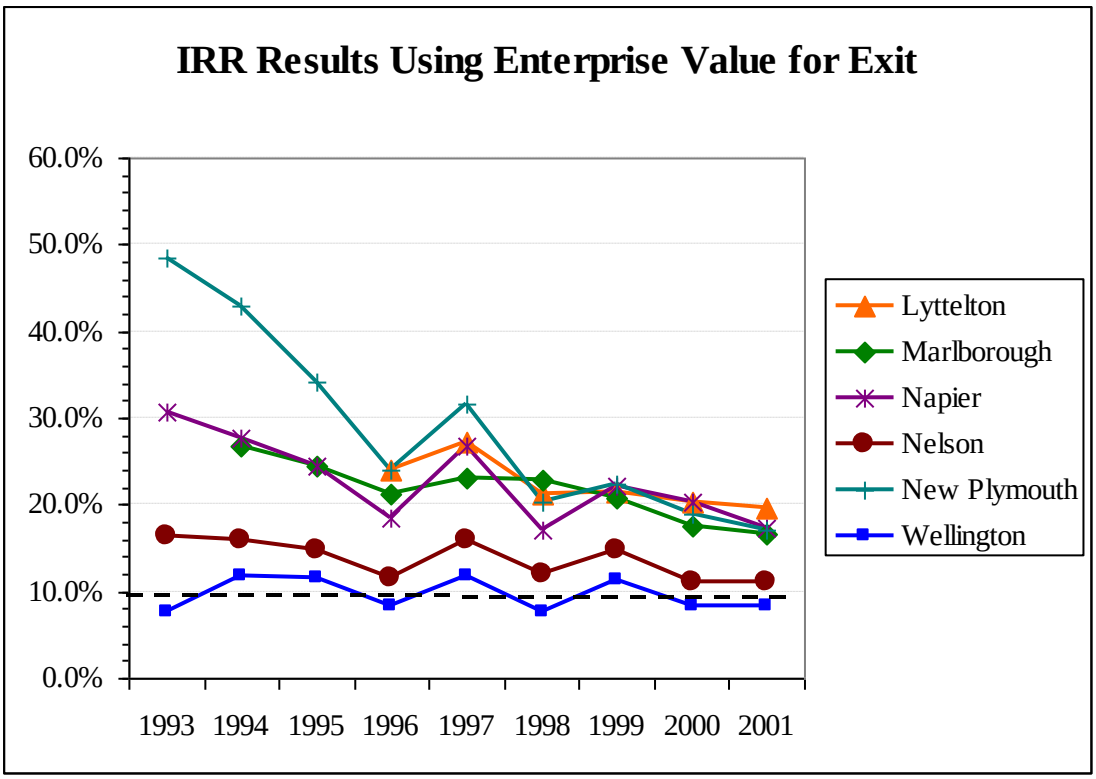
The key results for the full period from corporatisation to the end of the 2001 financial year are set out in Table 6. With the exception of Centreport the typical range of real after-tax rates of return has been between 11% and 20% using estimated market value of the port businesses to terminate the data series, or between 11% and 15% using the book value of fixed assets as the terminal value. Centreport shows a much lower IRR of 8.2% using a market exit value, or 5.4% using book value.

Table 6
Results of IRR Analysis of Six Port Companies 1989-2001

	Port Post-Tax Real Internal Rate of Return to 2001	
	Terminal value set at estimated Market Value	Terminal value set at book value of fixed assets
Lyttelton	19.7%	14.8%
Marlborough	16.6%	12.9%
Napier	17.4%	12.4%
Nelson	11.1%	10.7%
New Plymouth	17.1%	13.8%
Wellingto	8.2%	5.4%

Source: Bertram, Dempster and Terry 2002 p.14





The charts show the evolution through time of the IRRs starting from entry at the end of 1988 and exiting at successive years from 1993 on. The point of this exercise is to reveal whether the industry has been converging towards a competitive rate of return (in the region of the 8% foreshadowed by the Ministry of Transport at the time of

corporatisation) over the longer run. If anything, the charts suggest convergence more into the region of 14% real post-tax, with Wellington as the outlier.

Excess recoveries relative to an 8% benchmark IRR appear to have averaged about $31 million annually over the past five years across the six ports in our study.[28]

4. Policy Implications

The rates of return emerging from successive studies of major New Zealand infrastructure operators since deregulation lie consistently above a normal competitive level. The light-handed regulatory framework lays stress on the supposed effectiveness of information disclosure in inducing monopolistic industries to self-regulate under the threat of regulation. The publication of the studies reviewed above, however, has to date caused barely a ripple on the policy pond. Insofar as there has been any official response to unfolding estimates of high profitability, it has been to seek to justify rather than to regulate it. There seem to be two reasons for this.

First, the taking of monopoly profits is not illegal under New Zealand law[29]. Nor do there exist civil remedies for aggrieved customers of monopolies. The doctrine of prime necessity was extinguished by passage of the Commerce Act 1986, and Parliament's unwillingness to restore it suggests that the extinction was deliberate rather than accidental. Public odium, leading possibly to direct political intervention, appears to be the only potential mechanism for sanctioning monopolistic behaviour. But political intervention requires political will, which brings us to a second reason for inaction.

The light handed regulatory model suffers from the serious defect that it is not subgame perfect. The threat of heavy regulation which is supposed to provide the incentive for industry to self-regulate lacks credibility because once Government is actually confronted with monopolistic behaviour, its incentives are to back off rather than intervene. The utility industries, being aware of this, continually test the boundaries of official tolerance. The sharemarket, meantime, currently values network industries on the basis of a clear expectation that they will remain effectively unregulated.[30]

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28 Bertram, Dempster and Terry 2002 p.28.

29 This was established by the Privy Council decision in *Telecom v Clear Communications*, and re-emphasized by the Court of Appeal in *Vector Ltd (Formerly Mercury Energy Ltd) v.Transpower New Zealand Ltd*, CA32/99, judgement issued 31 August 1999. See especially paragraph 64 which notes that "there is no control under s36 [of the Commerce Act 1986] over monopoly rents, the Privy Council seeing their elimination in the short term as being within the province of Part IV".

30 See "Lines and Runways Best Investments", *Evening Post* 26 February 2002.

Bibliography (extensive relative to this paper)

Accounting for Economic Costs and Changing Prices: A Report to HM Treasury by an Advisory Group (the "Byatt Report"), HMSO, London, 1986, Vol.1.

Armstrong, M., Cowan, S. and Vickers, J., *Regulatory Reform: Economic Analysis and British Experience*, MIT Press 1994.

Arnold, R., Ironfield, D., Orr, J., Brown, S., McLachlan, R. and Jubb, C., *Issues in Infrastructure Pricing*, Research Report 69, Bureau of Industry Economics, Canberra ACT, August 1995, 111 pp.

Australian Competition and Consumer Commission, "Implementation and Measurement of TSLRIC", Appendix 2 of *Access Pricing Principles – Telecommunications*, July 1997.

Baron, D.P., "Design of Regulatory Mechanisms and Institutions", Chapter 24 in Schmalensee, R. and Willig, R.D. (eds) *Handbook of Industrial Organization Vol.II*, North-Holland, 1989.

Baumol, W.J. and Sidak, J.G.,Transmission pricing and stranded costs in the electric power industry. Washington, D.C., published for the American Enterprise Institute by AEI Press, 1995.

Baxter, *Depreciation*, Sweet and Maxwell, London, 1971.

Baxter, W.T., "Accounting Values: Sale Price Versus Replacement Cost", *Journal of Accounting Research* 5:208-214, 1967, reprinted in Parker, R.H., Harcourt G.C. and Whittington, G., *Readings in the Concept and Measurement of Income*, second edition, Philip Alalan, Oxford. 1986, pp.242-249.

Baxter, W.T., *Depreciating Assets: An Introduction*, Institute of Chartered Accountants of Scotland, 1981

Baxter, W.T., *Accounting Theory*, Garland Publishing, New York, 1996.

P.W. Bell, "On Current Replacement Costs and Business Income", in Sterling, R.R. (ed.) *Asset Valuation and Income Determination: A Consideration of the Alternatives – Papers Given at a Symposium held at the School of Business, University of Kansas, May 1970*, Scholars Book Co, Lawrence Ka, 1971, pp.19-32.

Berg, S.V. and Tschirhart, J., *Natural Monopoly Regulation*, Cambridge University Press, New York, 1988.

Bertram, G., 'Light Handed Disciplines on the Market Power of Network Owners: New Zealand's Pipeline Access Code and Gas Industry Information

Disclosure Regulations', *Victoria Economic Commentaries* 16(1):10-27, July 1999.

Bertram, G., I. Dempster and S. Terry, *Rates of Return at Auckland International Airport*, Simon Terry Associates Ltd report for Air New Zealand, July 2000.

Bertram, G., J. Grierson and S. Terry, *Pipeline Pantology: An Analysis of Disclosed Gas Information*, Simon Terry Associates Ltd and Josephine Grierson, Wellington, March 1998

Bertram, G. and S. Terry, *Lining Up the Charges: Electricity Line Charges and ODV*, Simon Terry Associates Ltd, Wellington, July 2000.

Bertram, G., Dempster, I. and Terry, S., *Pipeline Profits: Gas Pipeline Rates of Return*, Simon Terry Associates, July 2001.

Bertam, G., Dempster, I. And Terry, S., *Portly Charges: Port Company Profitability*, Simon Terry Associates, March 2002.

Board, M. et al, *Accounting Requirements for Regulated Industries*, Centre for the Study of Regulated Industries Research Report No 9, London, May 1998.

Bonbright, J.C., 1937, *The Valuation of Property: A Treatise on the Appraisal of Property for Different Legal Purposes*, 2 vols., The Michie Company, Charlottesville, Virginia, reprinted 1965. [VUW library HD1387/B699/V.]

Bonbright, J.C., Danielson, A.L. and Kamerschen, D.R., *Principles of Public Utility Rates* second edition, Public Utilities Reports Inc.,. Arlington Va, 1988.

Braeutigan, R.R., "Optimal Policies for Natural Monopolies", Chapter 23 in Schmalensee, R. and Willig, R.D. (eds) *Handbook of Industrial Organization Vol.II*, North-Holland, 1989.

Bureau of Industry Economics, *Issues in Infrasatructure Pricing*, Research Report No 69, Canberra, August 1995.

Carpenter, P.R. and Lapuerta, C., *Asset Valuation and the Pricing of Monopoly Infrastructure Services: A Discussion Paper*, The Brattle Group, Cambridge Mass. and London UK, July 2000.

Chambers, R.J., "Evidence for a Market-Selling-Price Accounting System", in ", in Sterling, R.R. (ed.) *Asset Valuation and Income Determination: A Consideration of the Alternatives – Papers Given at a Symposium held at the School of Business, University of Kansas, May 1970*, Scholars Book Co, Lawrence Ka, 1971.

Chambers, R.J. and Wolnizer, P.W., "A True and Fair View of Position and Results: the Historical Background", *Accounting, Business and Financial History*

March 1991, reprinted in Parker, R.H., Wolnizer, P.W. and Nobes, C.W., *Readings in True and Fair*, Garland Publishing, New York, 1996.

Clarke, F. and Dean, G., "Commentary: Public Sector Accounting, Product and Service Pricing, and Performance Evaluation", in Choy, E., *Asset Valuation by Government Trading Enterprises: An Evaluation of Pricing Issues*, Independent Pricing and Regulatory Tribunal of New South Wales and Australian Society of Certified Practising Accountants, Melbourne 1996, pp.111-135.

Choy, E., *Asset Valuation by Government Trading Enterprises: An Evaluation of Pricing Issues*, Independent Pricing and Regulatory Tribunal of New South Wales and Australian Society of Certified Practising Accountants, Melbourne 1996, pp.111-135.

Coase, R.H., "Business Organisation and the Accountant", originally in *The Accountant*, October 1 – December 17 1938, reprinted in Solomons, D. (ed) *Studies in Costing*, London, Sweet and Maxwell, 1952. Also reprinted in Buchanan, J.N. and Thirlby, G.F. (eds) *LSE Essays on Cost*, Weidenfeld and Nicholson, London, 1973.

Coase, R.H., "The Marginal Cost Controversy", *Econometrica* 13(51):169-182, August 1946.

Confederation of British Industry, *The Privatisation of the Electricity Industry: Asset Valuation, Rates of Return and Electricity Pricing*, London 1988. Held by ECNZ.

Cooper, K., "Valuation Techniques and Problems", Continuing Education Paper No 439, in *Infrastructure Assets Forum*, New Zealand Society of Accountants, Wellington, 1995.

Davis, Kevin, *Asset Valuation, Cost of Capital, and Access Pricing in the Australian Gas Industry*, University of Melbourne Dept of Accounting and Finance Research Paper 99-02, March 1999.

Dixit, A.K. and Pindyck, R.S., *Investment Under Uncertainty*, Princeton University Press, 1994.

Edey, H., "Deprival Value and Financial Accounting", in Edey, H. and Yamey, B.S. (eds), *Debits, Credits, Finance and Profits*, London, Sweet and Maxwell, 1974, pp.75-84. [UW library HF5629/E22/D]

Edwards, E.O. and Bell, P.W., *The Theory and Measurement of Business Income*, University of California Press, 1961.

Ernst and Young, *Rationale for Financial Performance Measures in the Information Disclosure Regime, Including Use of Optimised Deprival Values and Avoidance of Double Counting of Asset Related Expenses: A Report to Energy Policy Group, Energy and Resources Division, Ministry of Commerce, by Ernst & Young for Briefing ESANZ*, August 1994, 16 pp.

Federal Power Commission v Hope Natural Gas Company, 320 U.S. 344 (1944).

Foster, C.D., *Privatization, Public Ownership and the Regulation of Natural Monopoly*, Blackwell, Oxford, 1992.

Friedman, J.W., "On Entry Preventing Behaviour and Limoit Price Models of Entry", in Brams, S.J. and Schwodiauer, G. (eds) *Applied Game Theory*, Wurzburg, Physica-Verlag, 1979, pp.236-253.

Gale, S. and McWha, V., *The Origins of ODV: Report to Air New Zealand*, NZIER, Wellington, August 2000.

Grout, P., "The Cost of Capital in Regulated Industries", Chapter 16 in Bishop, M., Kay, J. and Mayer, C., *The Regulatory Challenge*, Oxford University Press, Oxford, 1995.

Harcourt, G.C. and Parker, R.H., *Readings in the Concept and Measurement of Income*, Cambridge University Press, 1969.

Hicks, J.R., *Value and Capital*, Clarendon Press, second edition 1941.

Holt, C.A., "Industrial Organization: A Survey of Laboratory Research", in Kagel, J.H. and Roth, A.E. (eds) *The Handbook of Experimental Economics*, Princeton University Press, 1995, pp.349-443.

Hovenkam, Herbert, "The Takings Clause and Improvident Regulatory Bargains" *108 Yale L.Rev. 801* (1999).

Independent Pricing and Regulatory Tribunal of New South Wales (IPART), *Summary of IPART's Report on Pricing for Electricity Networks and Retail Supply*, Sydney, June 1999.

Kahn, A.E., *The Economics of Regulation,* John Wiley, New York, 1970; second edition MIT Press 1988..

King,. S.P., 1997, *Access Pricing Under Rate-of-Return Regulation*, Discussion Paper No 366, Centre for Economic Policy Research, Australian National University, Canberra, May 1997, 21 pp.

King, S.P., *Competition and Vertical Separation*, Discussion Paper No 317, Centre for Economic Policy Research, Australian National University, Canberra, October 1994, 19 pp.

King, S.P. and Maddock, R., *Competition and Almost Essential Facilities: Making the Right Policy Choices*, La Trobe University May 1996. Held at Open Polytechnic of NZ.

Littlechild, S.C. *Regulation of British Telecommunications Profitability*, HMSO, London, 1983.

Martin, S., "Competition Policy: Publicity vs Prohibition & Punishment", Chapter 6 in Martin, S. (ed) *Competition Policies in Europe*, North-Holland, 1998, pp.105-141.

Melbourne Society of Certified Accountants, *Asset Valuation by Government Trading Enterprises: An Evaluation of Pricing Issues: A Project Sponsored by the Independent Pricing and Regulatory Tribunal*, 1996. Held by Institute of Chartered Accountants.

Maikle, S., *A Critique of the Optimised Deprival Value Ratebase* Masters dissertation, Auckland University, 1999.

Miller, J., *The New Zealand Electricity Sector 1996-1999,* ANZ Securities, Auckland, 1997.

Ministerial Inquiry into the Electricity Industry, *Report to the Minister of Energy*, Wellington, June 2000.

Ministry of Commerce, Energy Policy Group, Energy & Resources Division, *Discussion Paper on the Proposed Revisions to the Optimised Deprival Valuation Handbook of Electricity Lines Businesses,* 1997.

Ministry of Commerce, Energy Policy Group, *Questions and Answers on Financial Performance Measures, Optimised Deprival Valuations and Avoidance of Double-Counting of Asset-Related Expenses,* August 1994.

Ministry of Commerce, Energy Policy Group, *Handbook for Optimised Deprival Valuation of Electricity Line Businesses,* 23 June 1994, 61 pp.

Ministry of Commerce, Energy Policy Group, Energy & Resources Division, *Discussion Paper on the Proposed Revisions to the Optimised Deprival Valuation Handbook of Electricity Lines Businesses,* 1997.

Monopolies and Mergers Commission, *Gas: Volume 1 of Reports under the Fair Trading Act on the Supply Within Great Britain of Gas Through Pipes to Tariff and Non-Tariff Customers, and Other Supply within Great Britain of the Conveyance or Storage of Gas by Public Gas Suppliers*, HMSO, London, August 1993.

Monopolies and Mergers Commission, *BG plc - A Report Under the Gas Act 1996 on the Restriction of Prices for Gas Transportation and Storage Services*, HMSO, London, 1997.

New Zealand Labour Party, *Changing Course: Labour on Energy*, October 1999.

Newbery, D., "Determining the Regulatory Asset Base for Utility Price Regulation", *Utilities Policy* 6(1):1-8, 1997.

Officials Coordinating Committee, *Review of the Regulation of the Gas Industry: Report to the State Sector Committee*, March 1991.

Parente, S.L. and Prescott, E.C., 1999, "Monopoly Rights: A Barrier to Riches", *American Economic Review* 89(5):1216-1233, December.

Park, R.E., *Incremental Costs and Efficient Prices with Lumpy Capacity: the Single-Product Case*, RAND Corporation, June 1989.

Pickford, M., "Economics and the Commerce Act", in *Compliance: Business Issues Information*, Commerce Commission, Wellington, October 1997.

Rossie, Jim, "The Irony of Deregulatory Takings" *77 Tex.L.Rev. 297 (1998).*

Scott, M. FG, "Some Economic Principles of Accounting: A Constructive Critique of the Sandilands Report", in Parker, R.H., Harcourt, G.C. and Whittingon, G., *Readings in the Concept and Measurement on Income* second edition, Philip Allan, 1986.

Sherman, R., "Is Public Utility Regulation Beyond Hope?" in Danielson, A.C. and Kamerschen. D.R. (eds), *Current Issues in Public-Utility Economics: Essays in honor of James C. Bonbright*, Lexington Books, Lexington Mass., 1983.

Sidak, J. Gregory and Spulber, Daniel F., *Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States* 1997.

Small, J.P. and Ergas, H., "The Rental Cost of Sunk and Regulated Capital", mimeo, Department of Economics, Auckland University, June 1999.

Solomons, D., "Asset Valuation and Income Determination: Appraising the Alternatives", in Sterling, R.R. (ed.) *Asset Valuation and Income Determination: A Consideration of the Alternatives – Papers Given at a Symposium held at the School of Business, University of Kansas, May 1970*, Scholars Book Co, Lawrence Ka, 1971, pp.107-113.

Solomons, D., "Economic and Accounting Concepts of Income", in Backer, M., *Modern Accounting Theory* Prentice-Hall, Englewood Cliffs NJ, 1966 reprinted in Harcourt, G.C. and Parker, R.H. (eds) *Readings in the Concept and Measurement of Income*, Cambridge University Press, 1969,pp.154-160.

Tweedie, D.P. and Whittington, G., *The Debate on Inflation Accounting*, Cambridge University Press 1984.

United States-United Kingdom Arbitration Concerning Heathrow Airport User Charges, 101 International Law Reports 216 (1995).

Walker, R.G., *The SEC's Ban on Upward Asset Revaluations and the Disclosure of Current Values*, University of NSW Working Paper 106, 1991. Held by Institute of Chartered Accountants.

Whittred, G., Zimmer, I. And Taylor, S., *Financial Accounting: Incentive Effects and Economic Consequences*, Harcourt Brace, Sydney, 4th ed 1997.