OXERA

OXFORD ECONOMIC RESEARCH ASSOCIATES

BRITISH GAS TRADING

POTENTIAL SALES OF NATIONAL GRID TRANSCO'S DISTRIBUTION NETWORKS: CRITICAL REVIEW OF THE PRELIMINARY REGULATORY IMPACT ASSESSMENT

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Executive Summary

This report examines two aspects of Ofgem's preliminary Regulatory Impact Assessment (RIA) of the potential sale of National Grid Transco's (NGT) gas distribution networks:[1]

- the estimate of the consumer benefit that may result from such sales;
- the costs and issues surrounding the proposed Agency concept, an institution designed to ensure non-discriminatory treatment of each of the distribution network businesses, whether independent or retained by NGT.

Consumer benefits

Table 1 compares the Ofgem and OXERA estimates for the net present value (NPV) of consumer benefit that may result from the sale of NGT's distribution network businesses. If no loss of scale economies is assumed, the OXERA estimates for the sale of all distribution networks is around half and two-thirds that of Ofgem's. Also, the ratio of benefits associated with selling one distribution network relative to selling them all is smaller in the OXERA estimates (around one-fifth to one-sixth) than in the Ofgem estimate (around half). The value of a single distribution network sale is subject to greater uncertainty than the sale of all eight, since it matters which distribution network is sold. For example:

- as distribution networks vary in size, if a large one is sold, an improved rate of cost reduction will have a greater impact;
- selling a distribution network near to the frontier may result in the frontier being pushed out faster than otherwise, tightening the price cap on the other distribution networks, and providing greater benefits to consumers.

In addition, if scale economy losses are significant, the OXERA estimates are reduced. For example, if scale economy losses equal around 5% of operating expenditure (OPEX) and Ofgem does not share the cost of these between consumers and producers, the benefit to consumers of selling all the distribution network businesses is around one-fifth as large as Ofgem's estimate at the upper end of the range, but is negligible at the lower end. Were Ofgem to share the impact of losses in scale economies the consumer benefit would lie somewhere between the two sets of estimates presented.

Table 1: Comparison of consumer benefit estimates (£m)

	Sale of one distribution network	Sale of all eight distribution network businesses
Ofgem	150	330
OXERA—no loss of scale economies	34 to 44	149 to 218
OXERA—loss of scale economies equal to 5% of OPEX	17 to 24	7 to 68

Sources: Ofgem (2003), 'National Grid Transco—Potential Sale of Network Distribution Businesses 77/03', July, p. 144; and OXERA modelling.

The two sets of results are dissimilar because of the different methodologies used. Ofgem estimated the total consumer benefit over three regulatory periods by assuming that, if all the distribution networks became independent, annual efficiency savings would rise from

[1] See Ofgem (2003), 'National Grid Transco—Potential Sale of Network Distribution Businesses 77/03', July.

3% to 4.3%. Ofgem also assumed that almost half the benefits would be captured were only one distribution network to be sold and become independent.

The OXERA estimates are based on a Monte Carlo simulation method, which assumes that consumers can benefit from distribution network sales in two ways. First, the increased incentive to improve performance to which independent distribution networks are exposed is expected to generate a greater average rate of cost reduction. Therefore, the sold distribution networks are assumed to exhibit between 3.5% (for the lower results) and 4% (for the higher results) annual efficiency savings, while retained distribution networks are assumed to exhibit 3% annual savings. The additional efficiency savings are passed through to consumers based on the standard regulatory framework. Second, if sold distribution networks are at, or close to, the efficiency frontier, the regulator may have greater confidence in its estimates of the location of the frontier. Therefore, a tighter frontier definition can be used, generating additional benefits for consumers.

The Agency

The OXERA analysis suggests that the only incremental costs of setting up a separate Agency are those associated with separating these functions from NGT. These costs include a one-time-only separation cost, and an ongoing loss of scale economies. A comparison with Elexon, the equivalent of the Agency in the electricity market, suggests that these costs are below £5m. These costs are not currently included within the preliminary RIA.

Contents

1. Introduction

OXERA was commissioned by British Gas Trading (BGT) to examine Ofgem's preliminary RIA into the potential sale by NGT of distribution network businesses. This paper provides analysis on two areas of the RIA:

- section 2 examines the estimate of the NPV of consumer benefit as a result of allowing the sale of distribution networks; and,
- section 3 examines the costs associated with setting up the Agency.

2. Consumer Benefits

Ofgem estimates that the NPV to consumers of allowing the sale of all the eight distribution network businesses is approximately £330m over 15 years, with around £150m of this being captured if one distribution network is sold. However, there appear to be some flaws Ofgem's method of estimation. Section 2.1 outlines the method used and highlights various problems associated with it.

OXERA has adopted an alternative and more robust approach, while still retaining the focus on OPEX efficiency. The OXERA modelling is examined in section 2.2.

The Ofgem RIA focuses on OPEX, and does not examine capital expenditure (CAPEX). This may reflect concern about various problems with using comparative regulation for incentivising CAPEX efficiency. These include cost allocation problems, different approaches to depreciation policies by different firms, and the inherent lumpiness of much CAPEX spending. The OXERA modelling follows that of Ofgem in this respect, focusing only on OPEX.

2.1 The Ofgem approach

The Ofgem method of calculating the consumer benefit of distribution network sales is based on the assumption that, if distribution network businesses are sold, the resultant comparative competition will increase the average efficiency gains on an industry-wide controllable OPEX of £680m from around 3% to around 4.3% per annum.[2] This structural shift in the rate of efficiency improvements yields an estimated NPV of benefits to consumers of allowing the sale of distribution networks that is equal to £330m if all eight are sold, with approximately half, or £150m of benefits, being captured if only one distribution network is sold.

There appear to be two potential problems with this approach:

- the estimated increase in the rate of efficiency improvements in comparative and non-comparative industries is difficult to reconcile with evidence across sectors;
- there is an inconsistency between the stated value of separate price caps and the value that is implicitly assumed within the preliminary RIA—ie, Ofgem has stated that the separate price controls have some value, while implicitly assuming within the preliminary RIA that they have zero value.

Each of these is examined in turn below.

2.1.1 The estimate of the benefit of comparative efficiency based regulation

Underlying the methodology is the Ofgem estimate that there is a structural difference between the rates of efficiency achieved in industries with comparative competition and those achieved in industries without. Ofgem's analysis shows that those without the benefit of comparative efficiency achieve approximately 3% annual efficiency

[2] The Ofgem approach is outlined in Appendix 5 of the consultation document, Ofgem (2003), 'National Grid Transco—Potential Sale of Network Distribution Businesses 77/03', July.

improvements, while those with achieve 4.3%.[3] This is perhaps the most fundamental assumption made by Ofgem.

However, such a comparison does not necessarily yield a positive gap between efficiency achieved under a comparative regulatory regime, and that achieved under a non-comparative regime. For example, work by OXERA for the Office of the Rail Regulator's ongoing interim review of track access charges yields substantially different results (see Table 2.1). This analysis, which spans the period from the privatisation of each of these industries to the most recently available data, suggests that comparative efficiency regimes do not necessarily lead to higher efficiency rates—Table 2.1 suggests that comparative efficiency regulation yields lower rates of efficiency improvement.

Table 2.1: Annualised average real unit operating expenditure (RUOE) reduction rates for UK network industries

Regulation type	Industry	Period	Average annual RUOE reductions (%), adjusted for scale
Comparative	Water industry	1992/93–2001/02	2.5 to 2.6
Comparative	Sewerage industry	1992/93–2001/02	0 to 0.9
Comparative	Electricity distribution	1990/91–2000/01	3.1 to 3.8
Non-comparative	National Grid Company	1990/91–2001/02	4.6 to 5.7
Non-comparative[1]	Northern Ireland Electricity (NIE)	1992/93–1999/2000	3.9
Increased efficiency observed under comparative-efficiency regimes[2]			–0.1 to –5.7

Note: For this exercise comparative efficiency regulated industries are deemed to be those that have several companies performing the same function within a single regulatory environment. Non-comparative regimes often include an element of comparison, but not within the same regulated structure. For example, regulators may engage in international benchmarking. [1] Although NIE operates in a non-comparative regulatory environment, Ofreg does use evidence from companies in other regulatory environments, in particular the electricity companies in England and Wales. [2] Efficiency under comparative regulation minus efficiency under non-comparative regulation.
Source: OXERA (2003), 'Operating Cost Reductions in Regulated Network Industries', report prepared for the Office of the Rail Regulator, June, p. iv.

This is not to say that comparative regulation does not offer advantages over non-comparative regulation; it merely suggests that it is not enough to compare efficiency improvements across different industries. There are two key reasons that explain why this comparison is not robust. First, the underlying rate of technological change may vary significantly between the industries—a fast rate of technological change is likely to result in a high rate of efficiency improvements, and vice versa. Second, the industries have engaged in different levels of quality investment—both the water and sewerage industries have made significant investment.

These problems mean that there is at least some doubt surrounding the assumption made by Ofgem that switching to a comparative efficiency regulatory regime can increase the annual rate of efficiency improvements by around 1.3% per annum on average.

[3] Ofgem (2002), 'Mergers in the Electricity Distribution Sector: Policy Statement', May, p. 11.

2.1.2 The incremental benefit of distribution network sales

A second assumption within the Ofgem approach is that the 1.3% increase in annual efficiency savings relates to the sale of distribution networks. This figure is based on comparing a situation of a single price cap together with common ownership, with a situation of individual price caps together with separate ownership. Therefore, Ofgem is effectively assuming that the move from a single to separate price controls for distribution network businesses offers no benefit in terms of increased efficiency savings. This implicit assumption conflicts with the earlier statement by Ofgem that separate price controls for the distribution networks will help create 'greater management focus and promote savings which can be shared with consumers'.[4] If this statement is correct it suggests that a figure lower than the 1.3% increase in efficiency should be used to value the incremental benefit associated with distribution network sales, reducing the expected consumer benefit.

2.1.3 Conclusion

Ofgem's estimate for the increase in annual efficiency savings associated with distribution network sales appears to use a methodology that may yield spurious results. In addition, there appears to be an inconsistency between the assumption within the preliminary RIA and a previous statement by Ofgem regarding the value of the separate price controls that have already been applied to NGT's distribution network businesses.

2.2 The OXERA approach

This section describes the OXERA approach to estimating the net consumer benefit of allowing distribution network sales. It is organised as follows: section 2.2.1 describes the theoretical underpinnings of the model; section 2.2.2 explains the model's structure and assumptions; and section 2.2.3 presents the resulting estimates of the NPV (discounted at NGT's cost of capital of 6.25%[5]) to consumers of allowing the sale of distribution networks.

2.2.1 Theoretical underpinnings

The OXERA model is based around the concept that there are two key mechanisms that allow the sale of a distribution network to provide benefits to consumers.

- *Changes in regulation*—Ofgem will be able to have greater confidence in the data being provided from independent firms than it would in data being submitted from the wholly owned subsidiaries of NGT. Therefore, Ofgem can have greater confidence in its estimates of the location of the efficiency frontier if one or more of the sold firms are at, or close to, the frontier. Consequently, it can set a more challenging frontier target, or a faster rate of catch-up for laggard firms, passing more benefits to customers than would otherwise be the case. This broadly follows the approach taken by Ofwat, whereby the use of a faster catch-up rate is dependent on the robustness of data available.

- *Changes within firms*—distribution networks that are sold by NGT will have new management, which may be able to extract efficiency savings more effectively than those they replace. The independent distribution networks may also face

[4] Ofgem (2003), 'Separation of Transco's Distribution Price Control', final proposals, June, summary section.

[5] Ofgem (2001), 'Review of Transco's Price Control from 2002', final proposals, September, states that Transco received a '6.25 per cent cost of capital for transportation activities', p 4.

greater incentives to draw out efficiency savings compared with the retained distribution networks because they will not take into account the external negative effect that this may have on other distribution networks if they push the frontier out faster. Retained distribution networks would take this into account and face less of an incentive. Therefore, the independent distribution networks may experience a higher rate of efficiency savings per annum than if they were retained by NGT. Higher rates of efficiency savings mean that OPEX will fall faster than otherwise, with the result that greater benefits can be passed to consumers at each price-control review.

Changes to distribution networks' OPEX targets do not alter the marginal incentive that firms face to increase efficiency. Therefore, increasing the assumed catch-up rate, or choosing a tougher frontier, does not generate additional aggregate welfare. Instead, welfare is redistributed from the producer to the consumer.

In contrast, increased levels of efficiency within firms do increase total welfare. This benefit is shared between producers and consumers. Tougher OPEX targets result in a greater proportion of the increased welfare being passed to the consumer than weaker OPEX targets.

2.2.2 Model structure

The OXERA model is based on a Monte Carlo simulation process to estimate the NPV to consumers of allowing a distribution network to be sold. This approach allows input variables to be specified as distributions, reflecting uncertainty about the true value, rather than as a single number. The outputs can therefore be presented as probability weighted averages, or distributions of outcomes, rather than as a single point estimate.

The model runs two parallel scenarios simultaneously. The first represents the counterfactual of allowing no sales to take place. The second represents the test scenario, in which one or more distribution networks are sold. The main output of the model is the difference in consumer welfare between the two parallel scenarios. Positive results indicate that the test scenario offers higher net consumer welfare than the counterfactual.

The model covers three five-year regulatory periods. This is the period over which Ofgem chose to conduct the preliminary RIA. Within each five-year regulatory period, two stages occur within the model.

Stage 1: Ofgem sets OPEX targets at price control

The first stage of the model simulates the inefficiency levels observed by Ofgem within each distribution network. Inefficiency is modelled as a uniform distribution, representing inefficiency levels between 0% and 30% on the controllable OPEX for each of the eight distribution networks.[6] For the first price control, the observed inefficiency is random. For subsequent reviews, it is correlated with the efficiency improvements exhibited by the firm in the previous regulatory period.

The observed level of inefficiency is then used to set the benchmark for the distribution networks. Three alternative rules for setting the benchmark are explored. Either the most, second most, or third most efficient firm sets the benchmark.

[6] Ofgem (2003), 'Separation of Transco's Distribution Price Control: Final Proposals', June, Table 2.3, using the amount for each distribution network, excluding 'rates'.

Once the benchmark is set, the OPEX targets for each of the distribution networks are set, assuming a 50% rate for laggard firms to catch up to the benchmark. The OPEX targets also assume a linear trend from the existing OPEX to the target OPEX at the end of the regulatory period.

Stage 2: Distribution networks' actual OPEX

Distribution network actual OPEX is modelled by assuming a normal distribution of annual efficiency savings, centred on 3% per annum with a variance of 2%. These efficiency savings are invariant to the price-control OPEX targets set by Ofgem; instead, it is assumed that the marginal incentive to increase efficiency is the same, irrespective of the actual target. In addition, the assumption of a five-year fixed-retention period for efficiency savings (also known as a 'rolling mechanism') means that the incentive for outperformance is the same at all times within a price-control period. Consequently, average efficiency savings are assumed to remain constant throughout the simulation.

Different assumptions can be made about the distribution of efficiency savings for firms that are sold, and for those that remain within the NGT group. This allows a scenario in which the sold distribution networks exhibit higher rates of efficiency improvement than the retained distribution networks to be examined.

Assumptions

Several assumptions are made within the OXERA modelling. For ease of reference, the key baseline assumptions are listed in Table 2.1. Several of these are tested for sensitivity in section 2.3.

Table 2.2: Summary of baseline assumptions

Regulatory period	Period 1	Period 2	Period 3
Range of observed inefficiency of firms at review	Uniform distribution 0–30%	Uniform distribution 0–30%	Uniform distribution 0–30%
Correlation of observed inefficiency with efficiency gains achieved during previous regulatory period	n/a	–0.5	–0.5
Efficiency improvement for unsold firms	Normal distribution	Normal distribution	Normal distribution
Mean	3%	3%	3%
Variance	2%	2%	2%
Efficiency improvement for sold firms	Normal distribution	Normal distribution	Normal distribution
Mean	3.5 to 4%	3.5 to 4%	3.5 to 4%
Variance	2%	2%	2%
Frontier type	Second most efficient firm	Second most efficient firm	Second most efficient firm
Frontier catch-up rate	50%	50%	50%
Frontier shift	0	0	0

Source: OXERA modelling.

The choice of these assumptions is supported by evidence from two industries with comparative regulation: electricity distribution and the water and sewerage industry.

In terms of the range of observed inefficiency, Ofwat reported a 47% range in 1993/94.[7] In addition, evidence from 2001/02 suggests 'up to a 40% difference between the most and the least efficient companies'.[8] Similarly, regression and efficiency analysis carried out for Ofgem for the third distribution price-control review (DPCR 3) suggests a range of approximately 40% in its reviews of the public electricity suppliers (PESs).[9]

In terms of the catch-up rate, Ofgem currently uses a 75% rate for distribution network operators (DNOs) with no frontier shift. Ofwat currently uses a 60% rate for water companies' OPEX with a 1.4% per annum frontier shift. Before the 1999 price-control review Ofwat used a 50% catch-up rate with a 1% frontier shift. The OXERA model assumes a 50% catch-up rate with no frontier shift, hence it is at the lenient end of observed regulator behaviour. However, it could be argued that this is reasonable, since there will be a maximum of only eight comparators among the distribution networks.

Efficiency improvement

Despite the lack of robust evidence on the size of the increase in annual efficiency savings due to a comparative regulatory regime (see section 2.1.1), there is a theoretical argument for why a gap might be expected to exist between comparative and non-comparative regimes. Under comparative regimes, a natural experiment takes place in which different management techniques effectively compete against one another. Under non-comparative regimes this does not take place, and poor management techniques are more difficult to detect and replace. Therefore, it is reasonable to assume that there will be some increased rate of efficiency improvement in an industry that is subject to comparative efficiency regulation relative to that industry were it subject to non-comparative efficiency regulation. For the modelling, this difference is assumed to be no more than 1% per annum, but probably no less than 0.5%. This means that independent distribution network businesses exhibit between a 3.5% and 4% annual efficiency improvement.

However, theory also suggests that independent distribution networks are likely to exhibit a higher rate of efficiency increase than distribution networks retained by NGT. If NGT retains ownership of several distribution network businesses then it will have an incentive to maximise profit across all its distribution networks simultaneously, rather than at each one individually. For example, NGT could attempt to rein in the frontier distribution network businesses that it owns; in this way, the company's laggard distribution networks would receive more generous OPEX allowances than if the frontier distribution networks were allowed to push the frontier forward. It is possible that NGT could profit by holding back the development of the frontier in this way. Consequently, if NGT retains several distribution networks, it is likely that they will not exhibit as high a rate of efficiency improvement as independent distribution networks.

Related to this, NGT may make a strategic choice about which firms to sell. For example, it may choose to sell only laggard firms, so that it continues to control those firms that are at, or close to, the frontier, thereby effectively retaining control of the frontier.

For NGT to make strategic choices about firms sales, or to rein in the annual efficiency savings of frontier firms, it needs to be able to readily observe the efficiency of the

[7] Ofwat (1994), '1993–94 Report on the Costs of Water Delivered and Sewage Collected', Table 7, using combined water services model.
[8] Ofwat (2002), 'Water and Sewerage Service Unit Costs and Relative Efficiency: 2001–02 Report', December, p. 5.
[9] Ofgem (1999), 'Reviews of Public Electricity Suppliers 1998 to 2000: Distribution Price Control Review: Final Proposals', December, Table 2.8, p. 20.

distribution networks, and there needs to be relatively little movement in terms of efficiency rankings between the distribution network businesses. If NGT cannot observe the level of efficiency, it cannot make strategic choices about whether to hold back the development of the frontier. If distribution networks that are currently laggards can quickly become frontier companies, strategic choices made by NGT regarding which firms to sell will have little impact. Within the modelling, it is assumed that NGT can observe the efficiency of the distribution networks, and that the NGT distribution network businesses therefore exhibit a 3% annual rate of efficiency improvement.

Sale of distribution networks

Within the model, it is assumed that distribution networks are sold immediately. The sale may incur a one-off, lump-sum cost in the first year, representing transaction costs in the form of refinancing costs and other expenses incurred due to the change of ownership. It is assumed that these costs are borne by NGT or the new owner of the distribution network, and are not passed through to consumers. In addition, the change of ownership may imply that overheads have risen relative to those incurred when the firm was part of NGT. This cost increases OPEX by a specified percentage in the first year. This increased cost is recurring, but is subject to the efficiency savings that the firm incurs. This increase in costs is borne jointly by consumers and producers.

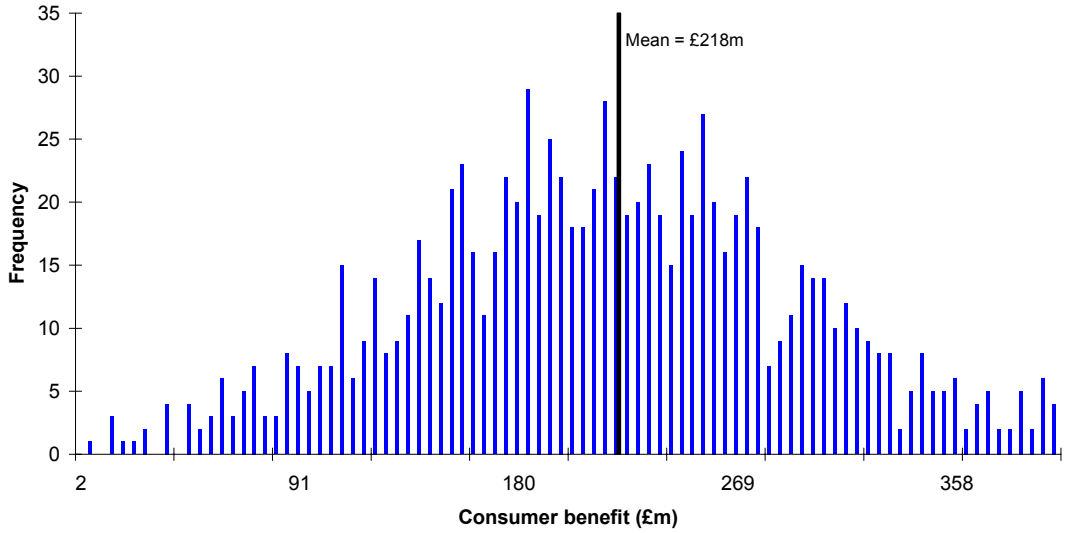
2.2.3 Results

This section outlines the results of the OXERA modelling. First, the results of the baseline scenario, which adopts the assumptions described above, are presented. The analysis is then extended to consider the potential impact of loss of scale economies on the consumer benefit. Finally, sensitivity tests of the key assumptions in the model are detailed.

Baseline scenarios

Figure 2.1 illustrates the range and frequency of estimates of the net consumer benefit generated by the sale of all eight distribution network businesses when assuming that sold firms increase annual efficiency savings by 1% per annum. The figure shows that consumer benefit is spread across a wide range, with a probability weighted mean average of £218m.

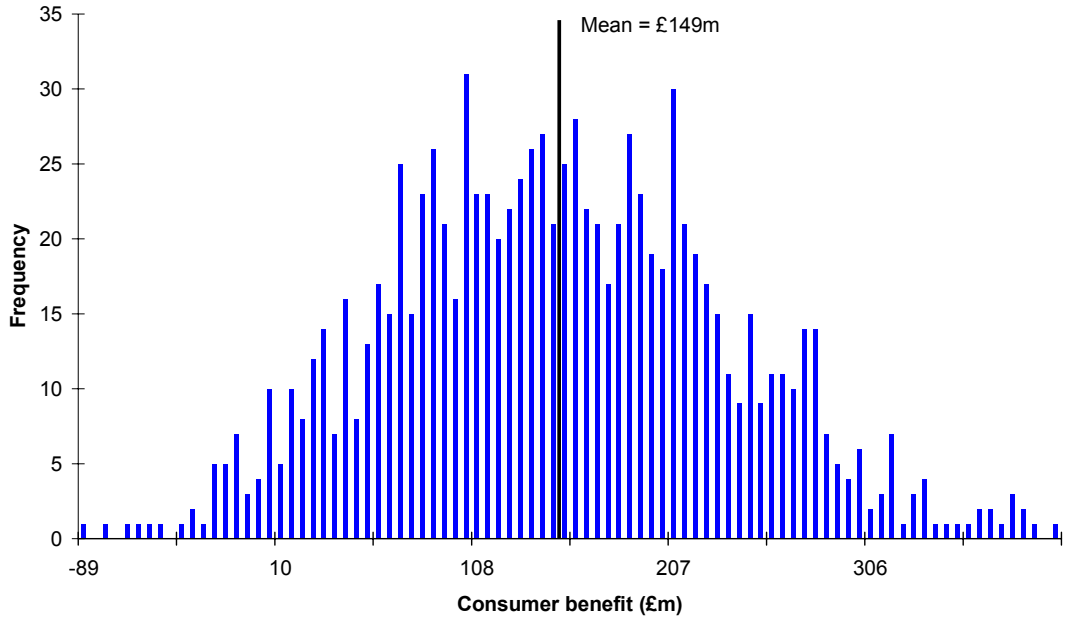
Figure 2.1: Range and frequency of baseline consumer benefit when selling all eight distribution networks—1% increase in efficiency of sold firms



Source: OXERA modelling.

Figure 2.1 shows the range and frequency of estimates of the net consumer benefit generated by the sale of all eight distribution network businesses, when assuming that sold firms increase annual efficiency savings by 0.5% per annum. This gives a probability weighted mean average benefit of £149m, which is around one-third lower than when assuming that sold firms increase annual efficiency savings by 1% per annum.

Figure 2.2: Range and frequency of baseline consumer benefit when selling all eight distribution networks—0.5% increase in efficiency of sold firms



Source: OXERA modelling.

There are two key drivers for the variance in the estimate of consumer benefits.

- *Variability in firms' outturn efficiency*—the model uses different random draws for the outturn efficiency gains for the sold firms under the test scenario from those in the base-case scenario. While the independent distribution networks will, on average, exhibit a 0.5% (or 1%, in the high case) higher rate of efficiency, for an individual run, the gap between the independent distribution network in the test scenario and the equivalent retained distribution network in the base-case scenario may not be equal to 0.5% (or 1%). When this gap is small, the benefits of the sale will tend to decrease; when large, they will tend to increase. This effect becomes greater as more firms are sold, hence the increasing width of the range of results shown in Figure 2.2.

- *Variability in Ofgem's observation of firms' inefficiency at reviews*—the model makes random draws to determine the level of inefficiency that Ofgem observes at each review. In some runs several firms may exhibit very high levels of inefficiency, which indicates that there is a large scope for catch-up to the frontier. Consequently, any increase in the catch-up rate, or a more challenging frontier definition , will have a greater absolute impact than if low levels of inefficiency were observed. In other runs, several of the firms may exhibit very low levels of inefficiency, suggesting that there is little scope for catch-up to the frontier, and consequently a stronger frontier definition or faster catch-up rate will have less absolute effect.

Figure 2.3 shows the estimated range of consumer benefit that would result from the sale of various numbers of distribution network businesses using the two sets of baseline assumptions outlined above. This indicates that the consumer benefit of selling one distribution network is equal to around £44m for a 1% increase in efficiency for sold firms, and £34m for a 0.5% increase in efficiency for sold firms.

NGT has indicated that it intends to stay in the distribution network market, which implies that it is unlikely to sell all its distribution network businesses.[10] Were NGT to halve the number of distribution network businesses that it owns, the OXERA model suggests that consumer benefit could be expected to be between around £102m and £134m—over half the total estimated potential benefit of £149m–£218m.

Figure 2.3: Consumer benefit (£m) of selling distribution network businesses

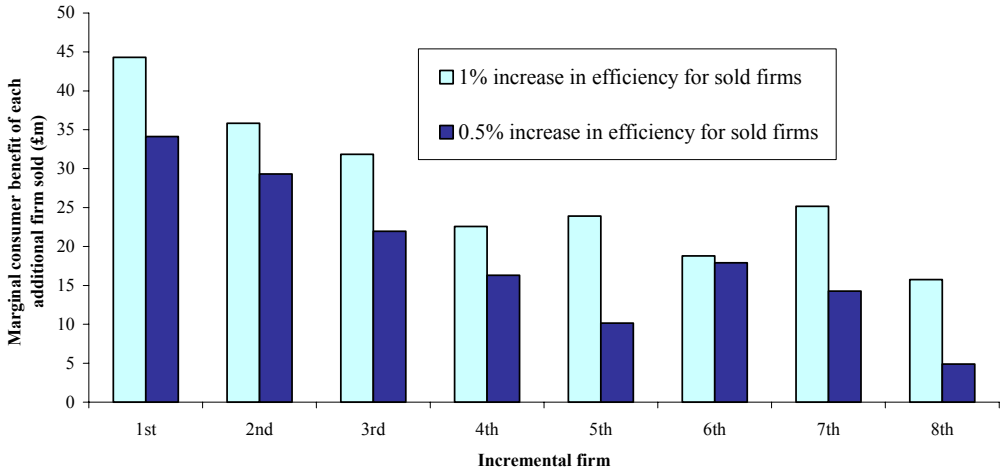
Source: OXERA modelling.

The marginal benefit of selling distribution network businesses falls with each subsequent sale (see Figure 2.4). The first distribution network to be sold would generate around £44m of consumer benefit under the 1% increase in efficiency scenario, while the eighth distribution network to be sold would generate less than £15m of consumer benefit—a reduction of around 65%. If the 0.5% increase in efficiency assumption is used then the reduction is around 80%. These results suggest that, while the first few distribution network sales do generate more consumer benefit than the last few, the difference is much smaller than that suggested by Ofgem in the preliminary RIA, which:

> assumed that half the potential benefit [of selling all eight distribution networks] could be obtained if there was only one comparator—i.e. only one distribution network was sold.[11]

[10] Speech given by David Rees, NGT, at Ofgem workshop, September 10th 2003, British Library.
[11] Ofgem (2003), 'National Grid Transco—Potential Sale of Network Distribution Businesses 77/03', July, p. 141.

Figure 2.4: Marginal consumer benefit of each additional distribution network sale



Source: OXERA modelling.

It should be noted that marginal values shown in Figure 2.4 do not represent a smooth curve due to the impact of the random draws undertaken during the Monte Carlo analysis. In fact, the expected marginal impact of each additional DN sale would fall.

It is possible that NGT will adopt some form of strategy when choosing which distribution networks to sell. For example, NGT may choose to sell the least efficient businesses, since it may believe that the newly independent distribution network businesses may make faster rates of efficiency improvement than those it retains, because if it were to sell the most efficient ones, it risks the frontier being pushed out faster than otherwise, with negative financial consequences for the other retained distribution networks.

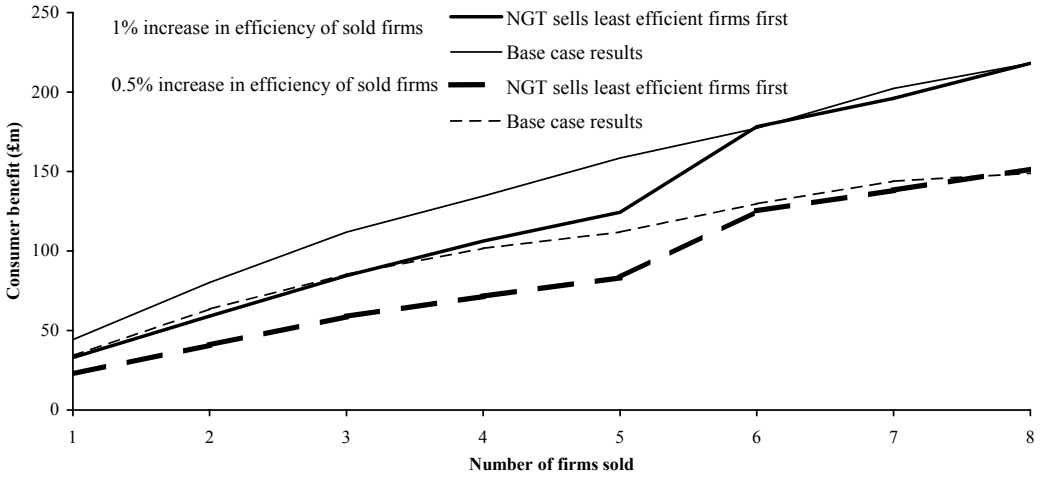
The impact of the strategy of selling the least efficient companies has been modelled by assuming that NGT knows the current level of inefficiency within each of the distribution networks, and that it chooses to sell the most inefficient first. The results of this are plotted in Figure 2.5 against the baseline level of consumer benefit, which assumes that the distribution network sales are random. Consumer benefit is reduced by around 25% until six distribution networks are sold, when the impact is negligible.

The gap between the consumer benefits when random firms are sold and that when NGT chooses to sell the least efficient firms first increases in absolute terms as the number of firms sold increases. This is because the principal benefit of choosing which distribution networks to sell is that it is possible to control whether Ofgem increases the toughness of the frontier or the catch-up rate. Since only one of the newly independent distribution networks is required to be in the top three in terms of efficiency rankings, the greatest benefit from this choice is achieved when five distribution networks are sold, as NGT can ensure that it retains the distribution networks that are in the top three.

The benefit of choosing which distribution networks to sell falls to virtually zero once six distribution networks are sold. Again, this is because the principal benefit of choosing which distribution network to sell is that it allows NGT to ensure that independent

distribution networks are not in the top three in terms of efficiency rankings. Once six are sold, NGT cannot achieve this aim.

Figure 2.5: Impact of NGT choosing to sell its least efficient distribution networks first



Source: OXERA modelling.

As NGT has indicated that it intends to remain in the distribution network market, it may be instructive to examine a scenario in which it sells half of the distribution network businesses, but retains control of the other four. Figure 2.5 can be used to examine this case, as it is possible that NGT would wish to sell only the distribution network businesses that would have the least detrimental impact on its remaining distribution networks—ie, it would sell only the least efficient networks. Figure 2.5 suggests that consumer benefit in this scenario is likely to be between £72m and £106m.

Loss of scale economies

The RIA did not consider whether distribution network businesses would suffer a loss of scale economies as a result of demerging from NGT. It is reasonable to assume that there would be some losses. For example, until May 2002, Ofgem's merger policy for DNOs assumed that overhead costs would be approximately halved when two previously independent firms merged. This meant that Ofgem required a minimum rebate to customers of £12.5m per DNO to allow the merger to take place.[12] If £12.5m of scale economies can be reaped by DNOs when merging, it is reasonable to assume that a DNO will incur a similar loss of scale economies when it demerges. DNOs typically have around £100m of annual OPEX; therefore, scale economy losses due to demerging can be considered to be around 12.5% of this figure. It may be reasonable to assume that distribution networks will incur similar losses in scale economies as they demerge from NGT; however, further analysis of this may be warranted as it has a significant effect on the estimated consumer benefit.

Ofgem could take one of two approaches in dealing with losses in scale economies. First, it could simply increase the OPEX allowance given to each distribution network, resulting in consumers bearing the cost of the loss of scale economies. Second, it could

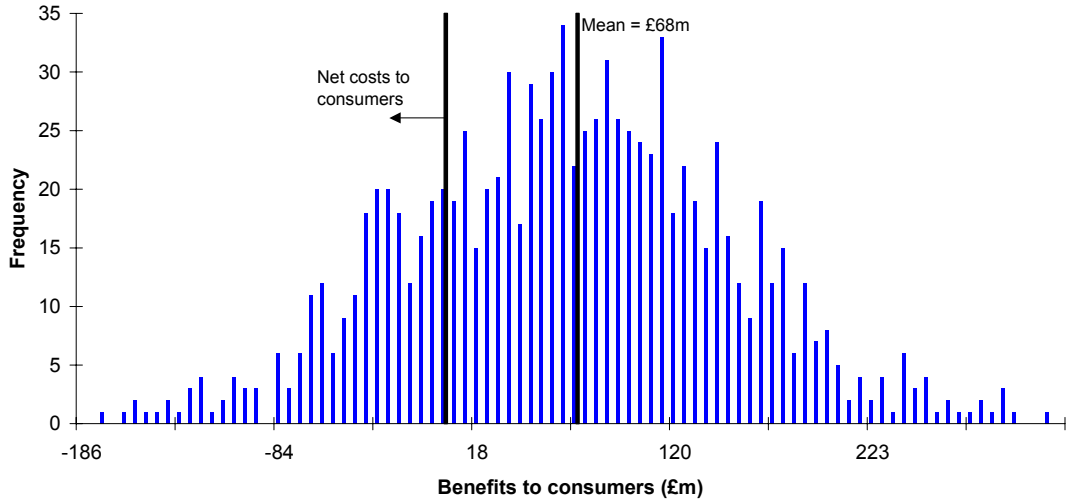
[12] Ofgem (2002), 'Mergers in the Electricity Distribution Sector: Policy Statement', May, paras 3.2–3.5.

protect consumers from any increase in scale economies. However this second option would still mean that the benefits of the sale would effectively be zero to consumers until any increased rate of efficiency improvement exhibited by the sold firm had more than compensated for the loss of scale economies. Therefore the benefits stream would be postponed, falling in value in NPV terms.

If a relatively conservative assumption is made that the loss of scale economies is equal to 5% of OPEX for distribution networks, then the probability weighted mean estimate of consumer benefit when selling all eight distribution networks falls from the previous range of estimates of between £149m and £218m to between £7m and £68m. When selling only one distribution network, the estimate falls by almost half, from between £34m and £44m to between £17m and £24m. These results assume that the extra costs associated with the lost economies of scale are borne by customers. If, instead, Ofgem were to adopt the second approach to dealing with scale economies, the reduction in consumer benefits would be smaller, though still substantial.

The range of estimates when selling all eight distribution networks and assuming a 1% increase in efficiency for the sold firms is shown in Figure 2.6. This highlights that around 22% of the simulation runs resulted in negative estimates of the consumer benefit.

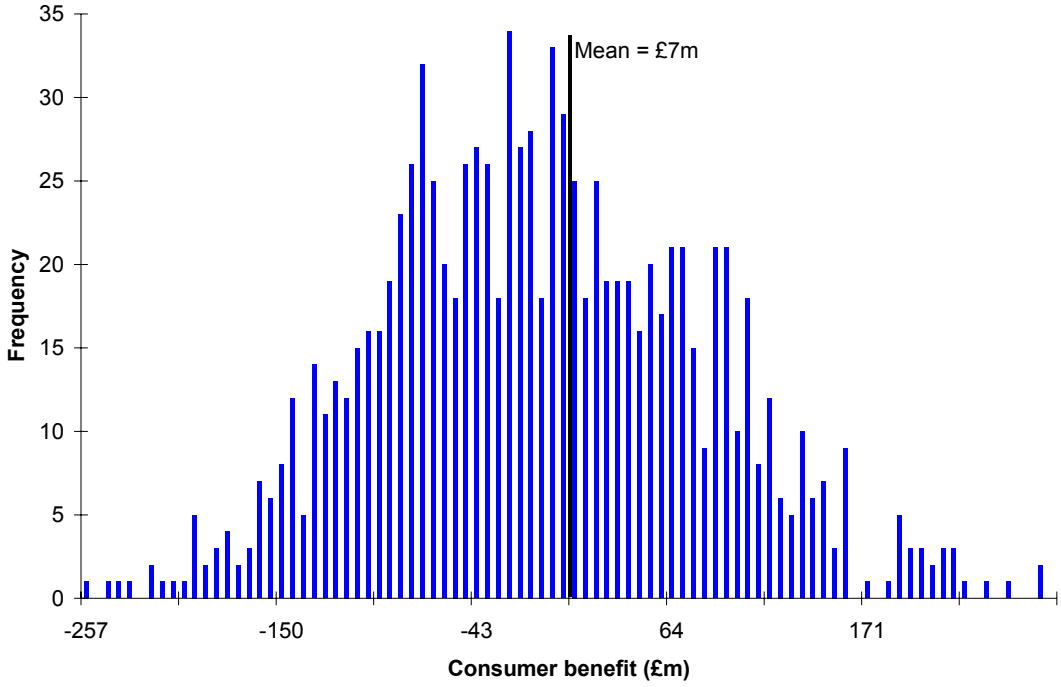
Figure 2.6: Range and frequency of consumer benefit when selling all eight distribution networks with loss of scale economies equal to 5% of OPEX— 1% increase in efficiency of sold firms



Note: Approximately 22% of simulation runs resulted in a negative consumer benefit.
Source: OXERA modelling.

Figure 2.7 presents a similar graph of the range of estimates when assuming a 0.5% increase in efficiency of sold firms. This indicates that almost half of the simulation runs resulted in a negative consumer benefit.

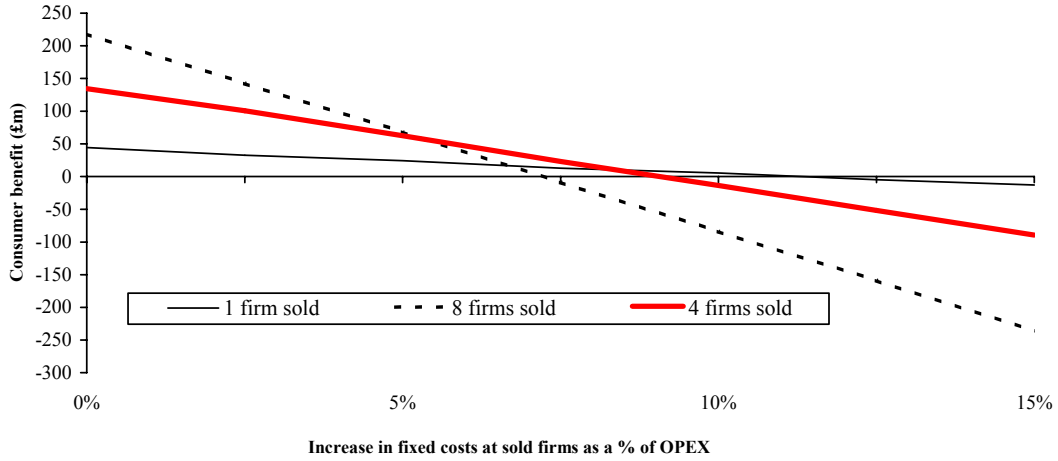
Figure 2.7: Range and frequency of consumer benefit when selling all eight distribution networks with loss of scale economies equal to 5% of OPEX— 0.5% increase in efficiency of sold firms



Source: OXERA modelling.

Figures 2.8 and 2.9 show the impact of various levels of loss in scale economies on the mean estimate for net consumer benefit of distribution network sales. On the assumption that there is a 1% increase in efficiency of the sold firms, if eight distribution networks were sold, there would be zero net consumer benefit once losses in scale economies were equal to approximately 7% of OPEX. Were four distribution networks to be sold, a loss of scale economies of around 9% would result in zero consumer benefit. However, if only one distribution network were sold, a loss in scale economies of around 11% of OPEX would result in zero consumer benefit.

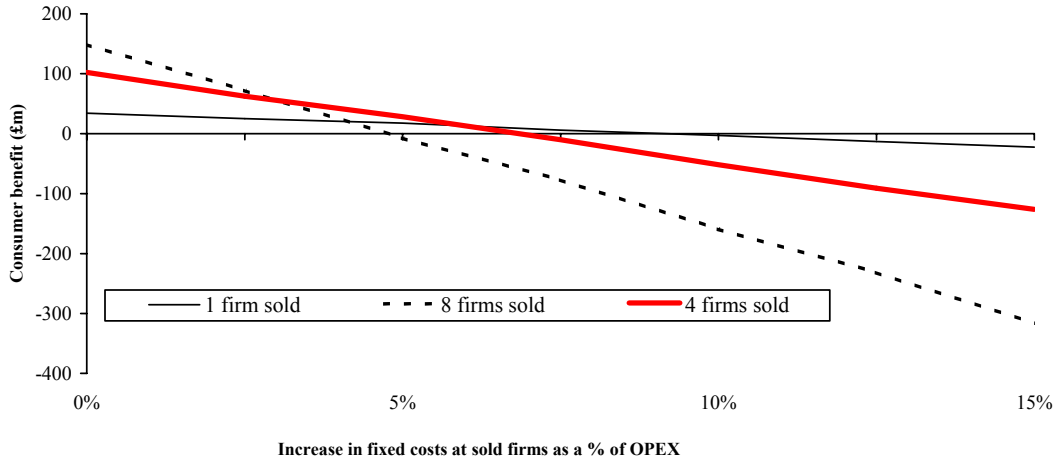
Figure 2.8: Impact of loss of scale economies on consumer benefit of distribution network sales—1% increase in efficiency of sold firms



Source: OXERA modelling.

Switching from the assumption of a 1% to a 0.5% increase in efficiency for sold firms has the effect of shifting the consumer benefit lines downwards. Consequently, a smaller loss of scale economies is enough to reduce consumer benefits to zero. For example, if four distribution networks were to be sold, scale economy losses equivalent to around 6–7% of OPEX are sufficient to result in approximately zero consumer benefits.

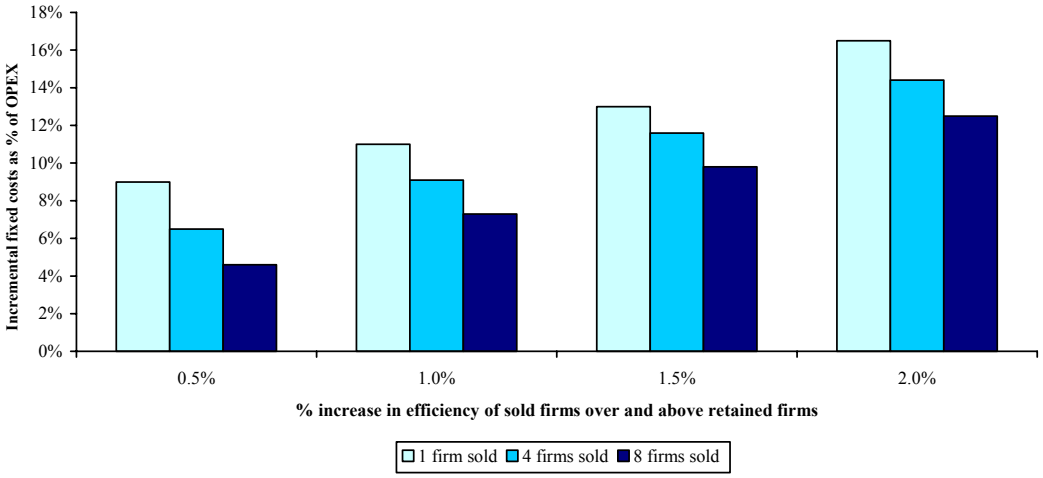
Figure 2.9: Impact of loss of scale economies on consumer benefit of distribution network sales—0.5% increase in efficiency of sold firms



Source: OXERA modelling.

Losses in scale economies can be compensated for by increases in annual average efficiency savings. Figure 2.10 shows the rise in fixed costs that results in zero net consumer benefit for various increases in efficiency above the levels exhibited by retained distribution network businesses.

Figure 2.10: Efficiency increase required to offset the increase in fixed costs at sold firms



Source: OXERA modelling.

The extent to which the distribution networks will incur incremental losses in scale economies is not clear. However, this section shows that, if there are significant losses in scale economies, the consumer benefits associated with distribution network sales are significantly reduced, and may become negative.

Sensitivity testing

The OXERA modelling relies on several assumptions (see section 2.2.1). Tables 2.3 and 2.4 show the sensitivity of the baseline results to changes in these assumptions. The tables suggest that the results are most sensitive to the assumptions about the range of observed inefficiency at regulatory reviews, the frontier catch-up rate, and the increase in efficiency of the distribution network as a result of its sale. Significantly altering any one of these assumptions can change the results by around one-third.

Table 2.3: Sensitivity of results to assumptions—1% increase in efficiency of sold firms (% change in baseline estimates)

Description	Baseline assumption	Low assumption	Impact when a single distribution network sold	Impact when eight distribution networks sold	High assumption	Impact when a single distribution network sold	Impact when eight distribution networks sold
Range of observed inefficiency of firms at review	0–30%	0–10%	–36%	–18%	0–50%	30%	19%
Correlation of observed inefficiency with efficiency gains achieved during previous regulatory period	–0.5	–0.25	1%	–2%	–0.75	1%	1%
Efficiency savings per annum of distribution networks	3%, with +1% for sold firms	2%, with +1% for sold firms	2%	5%	4%, with +1% for sold firms	–2%	–6%
Frontier type	Second most efficient	Third most efficient	–7%	–3£	n/a	n/a	n/a
Frontier catch-up rate	50%	25%	–28%	–14%	75%	19%	17%

Notes: Baseline estimate is £44m for a single distribution network sold, and £218m for eight distribution networks sold.
Source: OXERA modelling.

Table 2.4: Sensitivity of results to assumptions—0.5% increase in efficiency of sold firms (% change in baseline estimates)

Description	Baseline assumption	Low assumption	Impact when a single distribution network sold	Impact when eight distribution networks sold	High assumption	Impact when a single distribution network sold	Impact when eight distribution networks sold
Range of observed inefficiency of firms at review	0–30%	0–10%	–38%	–29%	0–50%	50%	27%
Correlation of observed inefficiency with efficiency gains achieved during previous regulatory period	–0.5	–0.25	–5%	–2%	–0.75	5%	3%
Efficiency savings per annum of distribution networks	3%, with +0.5% for sold firms	2%, with +0.5% for sold firms	10%	1%	4%, with +0.5% for sold firms	–8%	–8%
Frontier type	Second most efficient	Third most efficient	–17%	–10%	n/a	n/a	n/a
Frontier catch-up rate	50%	25%	–40%	–15%	75%	25%	15%

Notes: Baseline estimate is £34m for a single distribution network sold, and £149m for eight distribution networks sold.
Source: OXERA modelling.

2.3 Conclusion

The OXERA model has produced estimates of the net consumer benefit associated with the sale of NGT's distribution networks which differ substantially from Ofgem's RIA. Table 2.5, which compares the Ofgem estimates with the key OXERA estimates, shows that, assuming no loss of scale economies, the OXERA estimates are between one-third and one-half smaller than the Ofgem estimate for the sale of all eight distribution network businesses. In addition, the OXERA estimate for the sale of a single distribution network is significantly less than half of the benefits of selling all eight. With no loss of scale economies, selling one distribution network yields between around one-fifth and one-sixth of the benefit of selling eight.

When losses in scale economies are included, and Ofgem does not attempt to share the costs between producers and consumers, the OXERA estimates are even smaller. If all eight distribution networks were sold, the estimated benefit is between £7m to £68m, and between £17m to £24m were only one sold. If Ofgem were to decide that firms should bear some of the cost of scale economy losses, the estimated benefit would lie somewhere between the two sets of results presented.

Table 2.5: Comparison of consumer benefit estimates (£m)

	Sale of one distribution network	Sale of all eight distribution network businesses
Ofgem	150	330
OXERA—no loss of scale economies	34 to 44	149 to 218
OXERA—loss of scale economies equal to 5% of OPEX	17 to 24	7 to 68

Sources: Ofgem (2003), 'National Grid Transco—Potential Sale of Network Distribution Businesses 77/03', July, p. 144; and OXERA modelling.

3. The Agency

Setting up the Agency provides costs and benefits to the industry. The benefit offered by the Agency is in helping to ensure non-discriminatory treatment of the distribution networks by NGT, whether they are retained or independent. On the other hand, there are likely to be two sets of costs associated with the Agency:

- costs associated with restructuring the Network Code arrangements; and
- costs associated with separating the Agency function from NGT.

However, it could be argued that only the second set should be considered to be incremental costs that are only incurred due to the creation of such an Agency.

3.1 Benefit

The setting up of an Agency is linked to achieving the full additional efficiency savings that are assumed to emerge within the modelling discussed in section 2. Failure to set up an independent Agency may mean that the full efficiency gain cannot be reaped due to the potential for discrimination between distribution networks by NGT. If NGT retained the Agency function in-house it would potentially have access to sensitive information about the behaviour of the independent distribution networks. This information could be used by NGT to discriminate in favour of its retained distribution networks, in services for which competition between distribution networks is apparent. An example of this could be tradeable linepack services.

However, the scale of this benefit will depend on the level of substitutability and competition between distribution networks for services such as linepack. It is not clear how substitutable these services are at present since they tend to be geographically distinct in many cases. Therefore, if linepack offered from one distribution network is not a good substitute for that offered by another, the potential for discrimination by NGT is much reduced, and thus the benefits offered by the Agency are likely to be limited.

3.2 Costs

The first set of costs will arise regardless of whether the distribution network businesses are sold. These include the costs of developing the new Network Code, and the costs incurred by shippers and suppliers in changing their systems to be compatible with the new arrangements. These costs will be incurred whether the resulting arrangements are administered by NGT, or by a wholly independent Agency. Therefore, it is arguable that, while these costs are required to allow the sale of the distribution networks, they are not attributable to the Agency because it is possible to operate new Network Code arrangements within NGT. In any case, the RIA would seem to take these costs into account already. They are included in the 'Ofgem and supplier/shipper costs of developing proposals' line, and the 'Shipper supplier implementation' line.[13] Ofgem indicates that, together, these costs amount to around £15m.

The second set of costs consists of incremental costs associated with converting the new revised functions within NGT into a separate entity to form the Agency. Since an independent Agency would perform exactly the same functions were it part of NGT, the

[13] Ofgem (2003), 'National Grid Transco—Potential Sale of Network Distribution Businesses 77/03', July, p. 144.

only obvious incremental costs are those due purely to the separation of the Agency function from NGT. These costs are one-off separation costs (eg, relocation costs, and restructuring of financing arrangements) and an ongoing loss of scale economies (eg, no longer sharing finance functions with NGT).

The RIA does not at present appear to take these costs into account. An analysis of the separation costs and loss of scale economies associated with the setting up of Elexon, the equivalent of the Agency in the electricity market (see next section), suggests that these costs are below £5m.

3.3 Parallels with Elexon

There is currently no estimate in the RIA of the costs associated with separating the Agency function from the rest of NGT. It is possible that an examination of Elexon, perhaps the closest equivalent of the Agency within the energy sector, can shed some light on the potential magnitude of these costs. However, it is important to note that the parallel with Elexon is not associated with the activities of the Agency; Elexon is focused on balancing, while the Agency is likely to be involved in supply point administration (SPA) arrangements. The parallel is rather that Elexon has similar contractual relationships with market participants—the system operators and users.

Elexon was set up to manage the delivery of the new electricity trading arrangements in England and Wales, which are set out in the Balancing and Settlement Code. These new arrangements took effect in 2001.

Information from Elexon indicates that it is of comparable size to the proposed Agency, at least in terms of staff numbers—Elexon has around 200 staff,[14] while the Agency is expected to have around 300.[15] Therefore, some very broad comparisons may be appropriate.

Elexon's business plan makes clear that the company intended to incur approximately £3.4m of overhead costs, and £3.5m of financing costs in its first year of operation.[16] Due to its similar size, the Agency may be expected to incur similar levels of cost. However, not all of these will be incremental costs, as some will have been incurred previously by NGT. Consequently, it could be reasonable to estimate that the incremental costs associated with setting up the Agency will be less than £5m.

[14] Discussion with Elexon staff.
[15] Response by Chris Train, NGT, to a question at Ofgem workshop, September 10th 2003, British Library.
[16] Elexon (2001), 'BSCCo's Business Plan: 1 April 2001–31 March 2004', Table 4, p. 28.