

**The 2007 Gas Distribution Price Control Review:  
A Top-down Analysis of the Scope for Real Terms Cost Reductions**

**A report prepared for the GDNs**

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**FIRST  
ECONOMICS**

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## Executive Summary

- This report by First Economics examines the likely rate of 'frontier shift' affecting the costs of gas distribution businesses.
- In its fourth consultation document Ofgem includes a number of illustrations in which movements in the industry's efficiency frontier permit the GDNs to make annual real reductions in total operating expenditure (opex) of 2% per annum. Because economy-wide productivity savings and economy-wide input price inflation feed directly into the annual increase in the retail prices index (RPI), such assumptions effectively imply that the GDNs will not only become more efficient, but also that they will do so at a significantly faster pace than other firms supplying goods and services to UK households.
- This is not something that should simply be taken for granted. The RPI basket includes a wide range of goods and services, all of which are subject to slightly different cost drivers. Since the late 1990s, it has become increasingly apparent that some sectors of the UK economy are benefiting from large productivity savings and extremely benign input prices. It is therefore crucial that Ofgem understands that nature of the benchmark that RPI represents before it decides that the GDNs will out-perform.
- Disaggregating RPI into eight main subcomponents reveals that prices in the goods sector have been stable (i.e. constant in nominal terms) over a number of years. In this part of the economy shifts in production from western countries to the developing world have led to steep reductions in the prices of food and manufactured, traded goods. Asking any company to match the productivity gains and input price control that firms in these sectors are achieving represents a formidable challenge.
- Within the service sector of the UK economy, it is clear that very few companies have been able to even hold their costs constant in real terms. Companies that rely on a skilled, UK-based labour force typically exhibit lower productivity gains and/or much higher input price inflation and so see their costs rise well in excess of RPI-measured inflation.
- In understanding what might be expected of the GDNs, it is helpful to benchmark against comparable firms elsewhere in the UK economy. Under two different benchmarking approaches – one that involves excluding the contribution to RPI-measured inflation of firms that have obviously different cost drivers and one that involves creating a new, more applicable inflation index from scratch – it is apparent that firms with similar characteristics to the GDNs have in recent times been seeing unit costs rise by around 2% above inflation.
- Before applying such comparisons to the setting of frontier shift assumptions, it is necessary to make adjustments for economies of scale/volume growth, the capital-labour mix and the effects of comparative competition. Accounting for these factors produces estimates for the underlying trend in GDN opex in the range of zero to +0.5% per annum (in real terms). However, they fall well short of substantiating an assumption that it should be possible for opex to fall in real terms.
- Although this may at first seem a counter-intuitive result, it is important to stress that it does not in any way imply that the GDNs will not become more efficient during the course of the next control period. It simply highlights that real terms cost reductions are only deliverable if a firm is able to out-perform other companies whose products are included in the RPI basket. At a point in time when certain industries are demonstrating exceptional cost control, it is vital that Ofgem accepts that the costs of even the most efficient regulated company can easily move on an above-RPI trend.

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## 1. Introduction

On 26 March 2007, Ofgem published a consultation document setting out its initial analysis of the scope for Great Britain's eight gas distribution businesses to reduce opex over the period 2008/09 to 2012/13. The evidence that Ofgem has assembled includes a number of different studies, some of which look at companies individually and some of which examine the potential for the sector as a whole to make efficiency savings. This report concentrates on the second of these areas and is intended to add to the pool of information that Ofgem can draw when it comes to reach its initial proposals in May.

The report is structured into four main sections, as follows:

- section 2 describes the links between RPI, productivity growth and changes in input prices, and examines how far these relationships have been acknowledged in the evidence that Ofgem has gathered so far;
- section 3 probes the composition of RPI-measured inflation in order to identify more clearly what sort of a benchmark RPI currently represents;
- section 4 draws comparisons between the GDNs and selected components of the RPI basket in an effort to establish whether GDN costs are likely to move on an above- or below-RPI trend ; and
- section 5 concludes with our recommendations for the assumptions that Ofgem should build into its price control proposals.

The key question our report asks is: why should network businesses that by the start of the next control period will have been in the private sector for more than 20 years be expected to go on reducing opex in real terms? This is a subject which regulators have had to give considerable thought to in recent years as companies privatised in the 1980s come to their fourth and fifth periodic reviews. In the long term, it is not something that regulators can simply take for granted – as the subsequent analysis explains, some types of firms typically see costs rise in real terms while others see costs fall. The task that this report sets out to tackle is to determine which category the GDNs most naturally fall into.

In approach, our report most closely resembles the analysis that Europe Economics put forward in their top-down study. Our focus is on the underlying scope for cost reductions across the sector as a whole, rather than the efficiency targets for individual companies, and for this reason we deliberately concentrate on the broad nature of work that a GDN undertakes rather than the particular circumstances of any one company. We believe that the work is especially relevant to Ofgem's 'frontier shift' assumption, although it also sheds light on the overall efficiency challenge which companies should be given by Ofgem in the next five-year period.

## 2. Methodology

This section sets out the basic principles on which top-down analysis of sector-wide cost trends is based. It begins by describing the relationship between changes in RPI and improvements in efficiency, before explaining how this relationship can be used to guide the setting of future cost reduction targets.

### 2.1 The relationship between RPI and efficiency targets

Efficiency assumptions that appear in periodic review determinations are deliberately expressed by regulators in terms of annual real terms reductions in opex. This is a natural consequence of the RPI – X form of regulation and the conscious decision that regulators make to index allowed revenues (and the individual building blocks within the calculation of allowed revenues) in line with the out-turn rate of growth in RPI.

At one level, indexation can be thought of as a simple protection for regulated companies against unexpected changes in the general level of prices – a mechanism that ensures that companies' revenues maintain their value in the face of inflation. In the specific context of setting opex allowances, however, indexation has additional significance. This is because the rate of growth in RPI is inextricably linked to the rate at which businesses in general are improving productivity and holding down input prices. The key relationship, often quoted by regulators, is as follows:<sup>1</sup>

$$\Delta \text{RPI} \approx \text{average } \Delta \text{ input prices} - \text{average } \Delta \text{ total factor productivity}$$

The logic here is quite straightforward. If input prices in a particular industry rise, the increase in costs will be reflected in the prices that firms within that industry charge for their products. Similarly, if those firms are able to improve productivity (i.e. they are able to produce more output for a given level of inputs, or they are able to produce the same output using a lower quantity of inputs), unit costs will fall and feed into lower prices for customers as a result of competition between firms. Since RPI is simply an aggregate index that measures changes in prices among a representative basket of goods and services, it follows that the annual change in RPI will represent the average pace of input price inflation less the average rate of improvement in total factor productivity (TFP).

This relationship is important because it means that the annual rate of growth in RPI can be thought of as a benchmark. If, for example, firms outside the utility sector start to improve productivity more quickly than in the past, the rate of growth in RPI will fall and a regulated company will automatically be forced to match these improvements in productivity in order to hold their own costs in line with RPI-measured inflation. Conversely, if productivity growth starts to decline in other sectors of the economy, the rate of growth in RPI will increase and a regulated business can get away with making less demanding efficiency improvements of its own while still holding costs constant in real terms. Similar relationships hold true for changes in input prices.

In this context, an efficiency target represents the extent to which a regulator expects a regulated company to be able to out-perform the rate at which other firms supplying UK households with goods and services are able to improve productivity growth and constrain increases in input prices. Importantly, it is not a measure of absolute improvement in efficiency – it is entirely conceivable, for example, that a firm could deliver improvements in productivity and still see its costs rise in real terms (because other industries are seeing faster improvements in productivity).

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<sup>1</sup> Strictly speaking, this relationship holds only if there is perfect competition in all sectors of the economy.

This is now well understood by regulators and is something that they often refer to in published documents.<sup>2</sup> It has been an especially important insight during work to establish the rate of frontier shift in previous assessments of opex, where considerable effort has gone into establishing whether and by how much leading utility companies are likely to out-perform other firms from outside the utility sector.

## **2.2 Benchmarking exercise**

### **2.2.1 Approach**

The underlying relationship between a regulator's efficiency target and productivity growth/input price control among other firms lends itself naturally to a detailed benchmarking exercise. That is, a process by which opex allowances are set with reference to the cost trends exhibited by similar, but unregulated firms. The analysis would proceed as follows:

- in an index like RPI, there will inevitably some component parts experiencing above-average cost increases and other component parts where costs are increasing more slowly;
- in order to understand whether the GDNs are likely to out-perform the average rate of productivity improvement and the average level of input price control, it is instructive to look at the recent performance of firms with similar characteristics undertaking similar activities;
- evidence that these comparable firms generally out-perform would seem to imply that the GDNs ought to be able to reduce opex in real terms; however
- evidence that the comparators tend to improve productivity more slowly than the average and/or face higher input price inflation would imply that the GDNs' opex is likely to increase in real terms.

### **2.2.2 Europe Economics' methodology**

This is exactly the logic that underpins Europe Economics' recent report to Ofgem. As in earlier work carried out by the same consultants, the benchmarking takes the following form:

- the consultants first describe the nature of work that the GDNs undertake;
- using this description, they construct a comparator by weighting together a deliberately selected subset of industries from within National Institute of Economic and Social Research data set;
- they then compare the trend rate of TFP improvement exhibited by their comparator relative to the UK economy as a whole; and
- finally, they make adjustments for relative input price inflation and a number of other factors which they suspect might cause the GDNs' opex to move on a different trend from their comparator.

The calculations in Europe Economics' report are reproduced in Table 1, below.

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<sup>2</sup> In Ofgem's case, a similar discussion to that set out above can be found in a 2004 report from CEPA that Ofgem used in the 2004 DNO review.

**Table 1: Europe Economics' calculation of the trend in sector-wide opex, 2008 to 2013 (% , real terms)**

	Range
Construction industry TFP out-/under performance x 0.27	+0.1
Machinery and equipment industry TFP out-/under performance x 0.25	-0.3
Utility industry TFP out-/under performance x 0.27	-0.4
Communications industry TFP out-/under performance x 0.04	-0.1
Business services industry TFP out-/under performance x 0.17	+0.1
Aggregate TFP out-/under-performance	-0.6
Input price out-/under performance	+0.4
Capital substitution effect	-1.2 to -1.5
Long-term trend In GDN costs	-1.4 to -1.7
Short-term privatisation effect	-0.5 to -2.0
Scope for real terms opex reductions in next five-year period	-1.9 to -3.7

*Source:* Adapted from table 4.6 in Europe Economics' report to Ofgem.

*Note:* out-performance is denoted by a negative number; under-performance by a positive number.

The table shows that Europe Economics' conclusion – that the GDNs as a sector will be able to make significant real terms reductions in opex – can be reduced to a function of four distinct statements:

- first, the GDNs benefit, in part, from the same inherent advantages as utilities and firms in the machinery and equipment industry and should therefore be able to be able to improve TFP productivity more quickly than the rest of the UK economy;
- second, although the rate of input price inflation which the GDNs must deal with exceeds the UK average, the overall impact on costs is relatively small;
- third, other things being equal, capital substitution will cause opex to fall; and
- fourth, the GDNs should continue to reap one-off cost savings arising directly from the privatisation of British Gas back in 1987.

Having reviewed Europe Economics' methodology and calculations, we find that we cannot agree with the conclusions presented in table 1.

Our first and most important criticism is that the 'averages' that Europe Economics use to calculate out- and under-performance are not the averages that are embedded in RPI-measured inflation. Since RPI is built from the goods and services that are purchased by a representative UK household, the average rate of productivity improvement and average level of input price control used in steps 1 and 2 of the above calculation should accurately reflect the cost drivers affecting only those firms that supply the relevant goods and services. This is not the case. Instead, the Europe Economics' averages relate to the experience of all UK firms – a fundamentally different data set comprising companies that produce their goods and services within the country's national borders.

At a time when an increasing number of the goods that UK households purchase are produced overseas, the mismatch between the Europe Economics averages and the RPI data set averages are not trivial. One of the features of globalisation is the opportunity to access much cheaper foreign labour. Another is that the UK economy is restructuring towards the service sector and away from the goods sector (where rates of productivity growth are historically higher). By ignoring completely the impact that overseas economies are having on RPI-measured inflation, Europe Economics have almost certainly over-stated the average rate of input price inflation and under-stated the rate of productivity growth that are already captured by indexation. Annex 2 provides some specific illustrations of this point.

A second concern, which is closely related to this, is that the NIESR data set ends in 1999. Extrapolating from these increasingly dated figures provides relatively limited insights into future cost trends in industries that have seen significant change during the last ten years. This is a particular concern when one considers some of the factors that lie behind the emergence of low and stable inflation – cheap imports, benign food prices, rapid technical progress. The industries that have helped to bring about this stability, which must ultimately relate back to productivity growth and input price trends, are not likely to be easy to detect in data from the 1950s to the 1990s. There is therefore a real danger that the out-performers of the 21st century will be quite different from the out-performers in a 20th century data set.

A third and more specific issue that we have concerns about is the choice of comparator industries in the ‘nature of work’ TFP analysis. The inclusion of the machinery and equipment industry (which Europe Economics misleadingly labels ‘engineering’ in its report) is one oddity, given that this is supposed to be an analysis of trends in opex. More substantively, the inclusion of the utility sector creates circularity, eventually leading the consultants to conclude that network businesses will improve productivity because they seem similar to network businesses.

A fourth and final concern is the scale of the privatisation effect. Europe Economics acknowledge that their calculation relies on work that they carried out for Ofwat in 2003 using pre-2002 data. While it is debatable whether or not there was evidence of an ongoing privatisation affect at that time, we think that there is now clear evidence of an exhaustion of privatisation-related efficiencies in a range of infrastructure industries (the analysis underpinning this view is set out in section 4 of this report). In any case, it hardly seems credible at an intuitive level that a privatisation effect will still be influencing costs some 25 years after British Gas’s transfer from the public sector.

Due to all of these limitations, we do not think that it is possible to have any confidence that Europe Economics’ study has correctly identified the underlying direction in GDN costs. Although many of the underlying principles are sound, the consultants have, in our view, produced spurious and inaccurate results by relying on wholly inappropriate data in several parts of their calculation.

### **2.2.3 Our methodology**

A much better approach would be one which uses an up-to-date data set that directly captures the average rate of productivity improvement and input price control embedded in RPI-measured inflation. In fact, it is not difficult to identify and obtain such information. When publishing the retail prices index, the Office of National Statistics (ONS) releases a very detailed breakdown of price changes among the 650 or so goods and services which make up the index. From this data set it is possible to identify which industries have contributed to inflation and which have helped to contain it. It is also straightforward to track how the rate of inflation affecting different industries is changing over time and, hence, how the nature of the benchmark which RPI-measured inflation represents is also changing.

Based on this information, there is an alternative, two-step benchmarking exercise that regulators can undertake:

- in step one, those components of the index where there are at least some similarities to the activities that a GDN undertakes are identified; and
- in step two, the average rate at which prices in those components have been changing are compared to the rate of RPI-measured inflation.

Evidence that prices in this subset of goods and services appear to increase more slowly than RPI as a whole can be taken to imply that there is scope for the GDNs to deliver real, annual opex reductions. If, however, prices in the sample appear to rise in line with or faster than RPI, this would tend to suggest that there is unlikely to be obvious scope for ongoing real terms cost reductions (or even that real terms increases in opex are likely). In either

case, the underlying cost trends that Ofgem should build into its price calculations can be taken as the difference between annual prices increases among the selected sample and RPI-measured inflation.

It is this approach which we develop in this report. From the outset, it is important to note that our methodology ought to capture both productivity improvement and input price inflation together. For this to be the case, the selected sample from step one must contain a broad range of goods and services which are somehow similar or comparable to the activities that can be seen in gas distribution opex. For the avoidance of doubt, the sample is not intended to capture the goods and services that a GDN will buy and, hence, it should not be confused with an index of input prices.

The results that our approach produces ought to be more credible than those that have been put forward by Europe Economics. We are using the very latest data, we are attempting to capture the full range of drivers of RPI-measured inflation and we are deliberately trying not to separate artificially the impact of (global) productivity improvements and (global) input price changes. While there can inevitably be a debate about which goods and services should be included and excluded from the comparisons, we believe that the basic methodology itself ought to be considered one that produces objective and unbiased results.

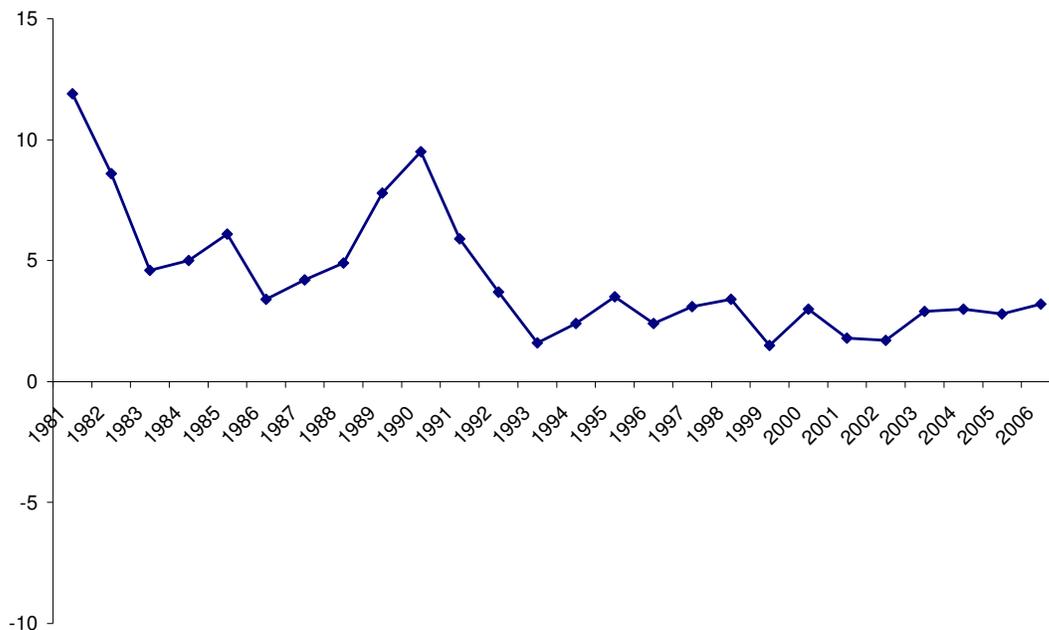
### 3. The Retail Prices Index

This section summarises key features of the data set from which many of the insights in the subsequent analysis are ultimately drawn.

#### 3.1 Inflation and its main components

Figure 1 shows the annual rate of inflation in the UK over the period 1981 to 2006. A key feature of the graph is the stability in inflation since 1993/4, starting with the UK's exit from the ERM and the introduction of a formal government inflation target. During the previous decade, annual RPI-measured inflation reached as high as 10.9% per annum and fell as low as 2.4%. Since 1994, annual inflation has averaged almost exactly 2.5% per annum and has not been more than +/- 1% from this average in any calendar year.

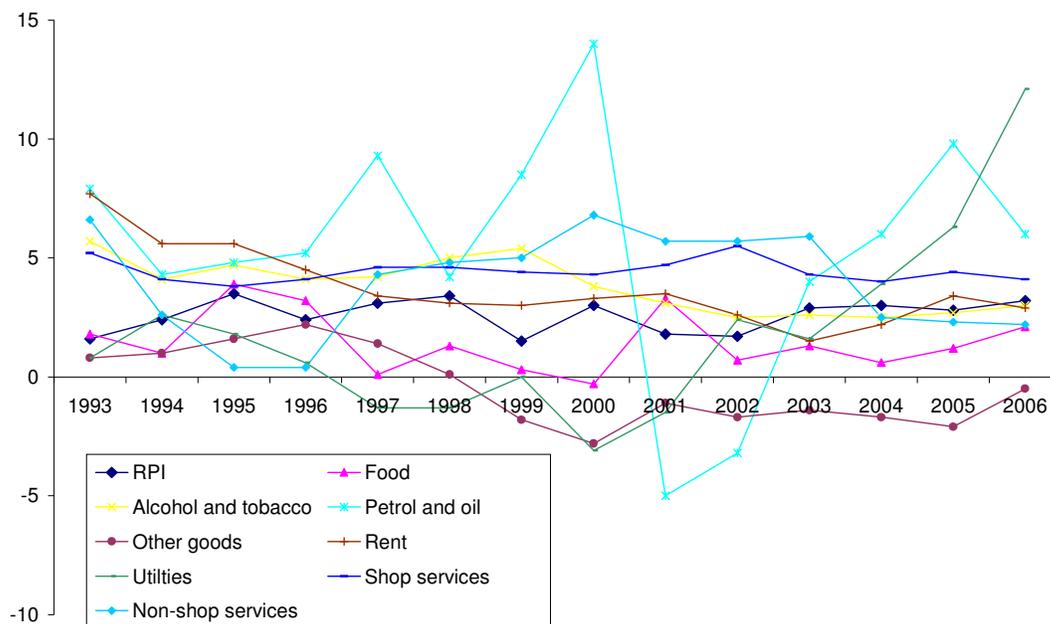
**Figure 1: Annual rate of growth in RPI (%)**,



Source: ONS (2006), 'Focus on Consumer Prices'.

Inevitably, the stability in the headline rate of inflation over the last decade masks much greater volatility in prices in individual sectors. Figure 2 separates RPI into the eight main sectors that the ONS divides the economy into in its monthly 'Focus on Consumer Prices' report. Among these sectors, it is possible to see the rate of sector-specific inflation accelerating and decelerating over time, with growth in RPI being driven by different sectors at different points in the period.

**Figure 2: Annual rate of growth in RPI by component (%), 1993 to 2006**



Source: *ibid.*

The relevance and importance of these sectoral trends depends primarily on the weight which individual goods and services have in the calculation of RPI. In total, around 650 goods and services bought by a representative UK household are included within the index, each of which is given a weight that reflects how much a typical household will spend on those products. Annex 1 at the end of this report provides a full list of list of the current weightings, while table 2 below shows the aggregate weights which can be attached to the groupings depicted in the above chart.

**Table 2: Weight given to different sectors in the calculation of RPI, 1994 to 2006**

Sector	Weights, 1994	Weights, 2006
Food	0.142	0.106
Alcohol and tobacco	0.111	0.096
Petrol and oil	0.039	0.043
Other goods	0.286	0.259
Rent	0.042	0.045
Utilities	0.074	0.071
Shop services	0.131	0.136
Non-shop services	0.101	0.112
Mortgage interest rates, council tax, depreciation	0.074	0.132

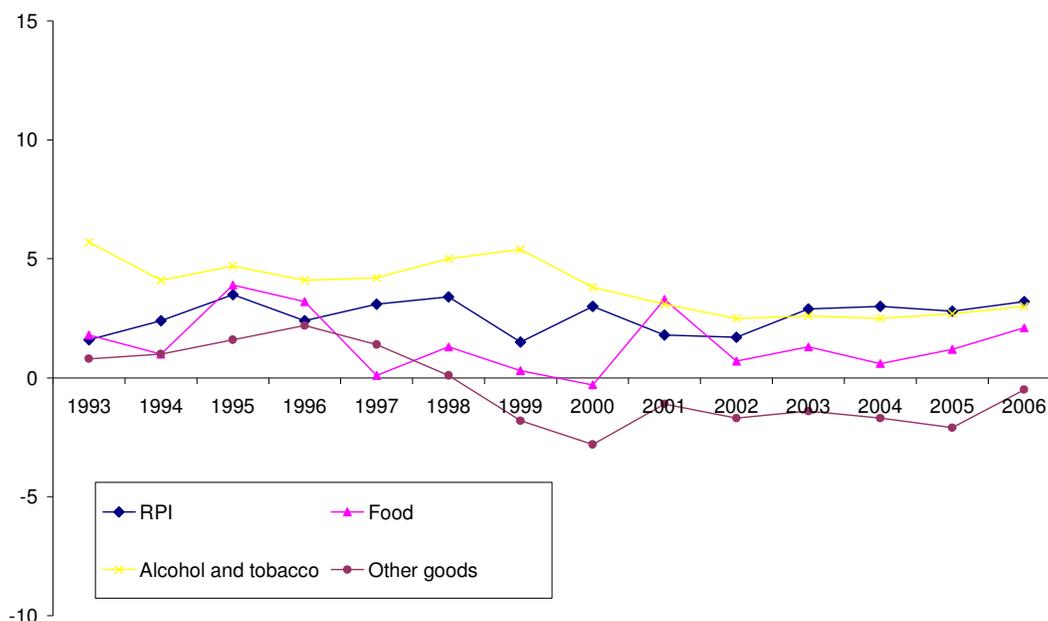
Source: *ibid.*

Table 2 is important because it reveals the ultimate source of the RPI benchmark that the GDNs are being compared to when Ofgem sets its efficiency targets. By indexing allowed revenues in line with RPI, the GDNs are being asked automatically to meet the average rate of productivity improvement and input price control among firms supplying the goods and services shown in the table. Assuming that the GDNs will be able to reduce costs in real

terms in effect means that the GDNs can be expected to out-perform that specific group of industries.

A more detailed analysis of the component parts can be used to judge the sort of challenge that this might represent. Figure 3 isolates the contribution that comes from the food, alcohol and tobacco, and other goods<sup>3</sup> sector of the economy. Together these products make up just over half of RPI.

**Figure 3: Annual price changes among goods-sector components of RPI (%), 1993 to 2006**



Source: ibid.

In recent years, changes in prices in all three sectors have fallen short of RPI-measured inflation. For alcohol and tobacco this is a relatively recent phenomenon, while the prices of food and other goods have consistently increased more slowly than RPI or even fallen in nominal terms. Some of the factors that might be relevant to these trends include:

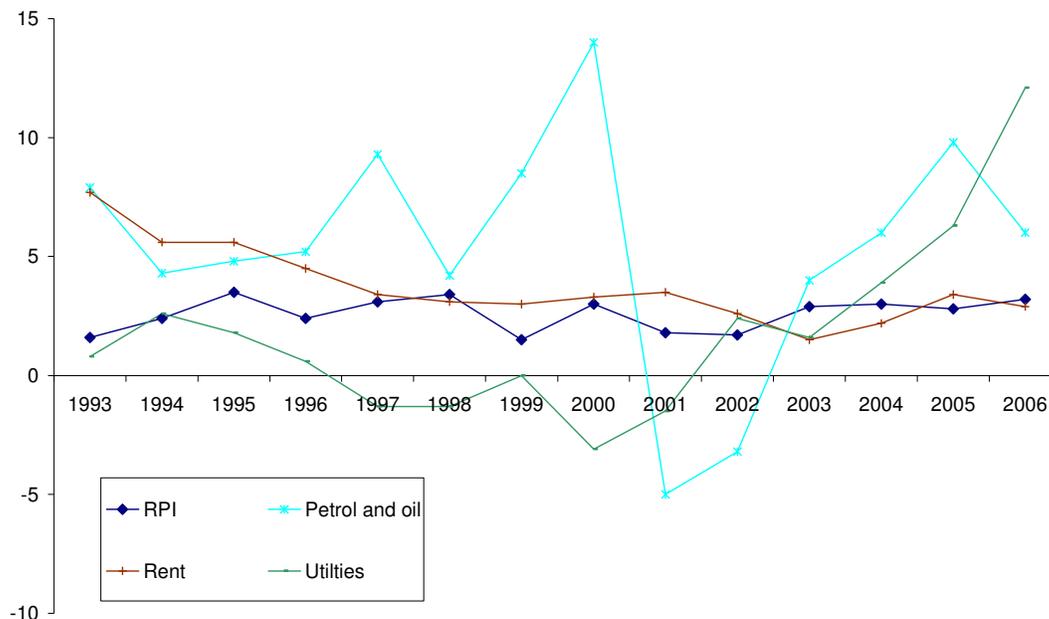
- the shift of production of many goods from developed economies to the developing world, where labour costs are considerably cheaper;
- the rise of the supermarkets, who many commentators consider to have benefited from sizeable economies of scale and a resulting ability to squeeze lower prices out of suppliers;
- the rapid pace of technological progress that affects many manufactured goods; and
- moves within government to scale back the annual increases in duties levied on beer, wines, spirits and tobacco.

Overall, these are sectors in which firms are benefiting both from substantial productivity improvement and low or even negative input price inflation. These phenomena have made a significant contribution to keeping RPI-measured inflation low during recent years and are ones that we think it is reasonable to expect to continue into the next ten years. Accordingly, they represent a formidable benchmark against which to compare other firms.

<sup>3</sup> Comprising DIY materials, coal and solid fuels, household goods, clothing and footwear, personal articles, chemist goods, purchase of motor vehicles and leisure goods.

Figure 4 isolates the contribution to RPI from petrol and oil, rent and utilities. In total, these purchases comprise around 15% of the index.

**Figure 4: Annual price changes among raw input components of RPI (%), 1993 to 2006**



Source: *ibid.*

Here the picture is much more mixed:

- the price of petrol and oil exhibits huge volatility, driven at any point in time by a whole variety of geopolitical events;
- rents have generally tracked RPI reasonably closely; and
- utility prices have recently been rising in real terms, driven in particular by higher energy bills, after a prolonged period during the 1990s of price reductions for customers.

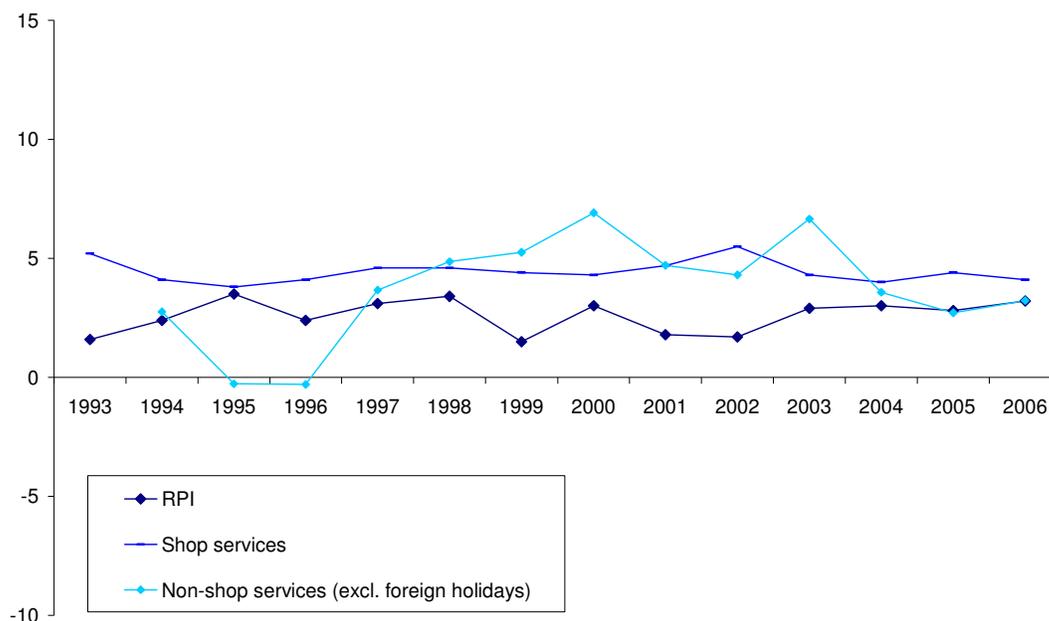
Among these categories of household expenditure, the story is mainly one of variations in raw input costs over time. The future direction of prices in each of the sectors is the subject of very detailed analysis and conjecture and it is beyond the scope of this report to arrive at any detailed forecasts of future rates of inflation. However, it seems reasonable to argue that there is currently an historically high degree of uncertainty as to the direction of future price movements, with potential for both above- and below-RPI changes in the next five years.

Figure 5 shows the contribution that comes from the two main service-sector components of RPI. Combined together, shop services<sup>4</sup> and non-shop services<sup>5</sup> make up one quarter of the index.

<sup>4</sup> Comprising catering, repairs and maintenance, domestic services, personal services, maintenance of motor vehicles, TV licence and rentals, and entertainment and recreation charges.

<sup>5</sup> Comprising dwelling insurance and ground rent, fees and subscriptions, vehicle tax and insurance, bus and coach fares, other travel costs, foreign holidays and UK holidays.

**Figure 5: Annual price changes among service-sector components of RPI (%), 1993 to 2006**



Source: *ibid.*

The products that fall into these categories are ones where price increases have historically run ahead of RPI-measured inflation (although reductions in insurance premia and the cost of foreign holidays have helped reduce inflation in the non-shop services index during the last three years). Although these two components of the index cover a varied range of services, two fairly common features of the constituent parts are:

- the labour-intensive nature of the services in question; and
- the absence of any real opportunity to source the services from overseas markets.

These characteristics mean that the service sector has not been exposed to competition from low cost overseas producers as much as the goods sector of the economy. Changes in prices are therefore closely linked to conditions in Britain's labour market and the underlying rate of productivity growth achieved by UK-based firms generally. With real wage inflation averaging between 1.5% and 2.0% over the last decade and the UK's recent productivity record considered by many as disappointing, it is perhaps not surprising that this a part of the economy where prices are increasing more quickly than RPI.

### 3.2 Implications

The preceding analysis suggests that the headline rate of RPI growth aggregates and averages three quite different trends affecting products within the index:

- very low and decelerating inflation in the goods sector of the economy, driven by rapid productivity improvements and benign input prices;
- volatile raw input costs; and
- above-RPI inflation in the service sector, reflecting the labour-intensive and non-tradable nature of services in general.

Figure 6 helps to demonstrate this more clearly by comparing the changes in the prices of goods and services as a whole since 1993. The graph shows not only that service sector inflation is running ahead of goods sector inflation, but also that the gap has grown since the late 1990s.

**Figure 6: Annual price changes in the goods and service sectors, 1993 to 2006**

Source: *ibid.*

The analysis has three main implications for the efficiency targets that Ofgem sets the GDNs in the next control period:

- indexing allowed revenues in line with RPI requires companies to match not only the productivity improvements and input price control achieved by firms elsewhere in the service sector, but also to compete with the very significant advances achieved by the likes of supermarkets and overseas manufacturers. Ofgem's efficiency targets can be taken to indicate how far the regulator expects network businesses to meet, exceed or fall short of this challenge;
- the achievements of other regulated firms during the 1980s and 1990s might not provide a particularly good guide to what can be expected of the GDNs in future. Given evidence of major changes in the drivers of inflation in different sectors and a growing gap between goods- and service-sector inflation, the economic environment today can be said to be quite different to that of, say, ten years ago; and
- it is therefore important for Ofgem to consider the comparability and relevance of the recent trends in each of the sectors identified above to a network business in the energy sector. Where goods or services seem close comparators, it seems reasonable to ask the GDNs to match the productivity improvements and input price control seen currently in those sectors. Where, however, there is no obvious resemblance in cost drivers, it is necessary to consider whether the goods and services in question are either holding RPI down or actively contributing to inflation and to make allowance for this when setting efficiency targets.

In principle, it is possible to extend this exercise further by compiling sector-by-sector forecasts of future price changes. Given the inherent subjectivity in this type of analysis, this is not a task that we go on this report to tackle. Instead, we extrapolate from the experience of the last five to ten years to ask the following question: does the nature of the activities that the GDNs undertake suggest that they are likely to hold their costs below, in line with or above RPI-measured inflation? The answer to that question will help us to determine whether and by how much the sector should be expected to out-perform the productivity

growth and input price control seen on average among other firms supplying UK households with goods and services.

## 4. Estimating Future Cost Trends

This section attempts to quantify the rate at which gas distribution opex should be expected to change over the course of the next control period. We first identify the defining characteristics of GDNs' operating activities, then seek to ascertain how firms with similar cost bases perform relative to RPI, and conclude the analysis by examining whether any additional considerations ought to be brought into the analysis.

### 4.1 Nature of work

The GDNs' operating cost base, as defined by Ofgem in its business plan questionnaire, relates to four main activities:

- work management – asset, operations, contractor and customer management;
- emergency and repairs – responding to and repairing gas escapes;
- maintenance and other – maintenance and leakage control activities; and
- support services and indirect opex – overheads in areas such as finance, IT and facilities.

Across the sector as a whole, costs are divided relatively evenly between these four activities. Table 3 shows the rough break down of costs in 2005/06.

**Table 3: Approximate composition of gas distribution opex, 2005/06 (%)**

	Percentage contribution
Work management	30
Emergency and repairs	25
Maintenance and other	15
Support services and indirect opex	30

*Source:* Adapted from Europe Economics' report to Ofgem.

Our discussions with the GDNs has revealed that this cost base has a number of notable characteristics:

- expenditure is dominated by employment costs. Including national insurance and pensions, just under half of total opex may be attributed to directly employed labour. This figures increases substantially if indirect labour is considered;
- most of the staff are skilled and professional workers;
- the age profile is heavily skewed to older workers;
- this is almost exclusively a UK-based workforce. Opportunities to replace UK staff with overseas workers are extremely limited; and
- outside of labour costs, the other main type of expenditure is on materials. Transport, rent, insurance, shrinkage and IT also contribute some costs.

In general terms, these are characteristics that are shared by most regulated companies. In the water sector, for example, previous studies have estimated that staff costs make up around three quarters of total operating expenditure. Elsewhere among the goods and services that are included in RPI one generally encounters firms that are much less labour intensive and/or whose costs are much more obviously biased towards unskilled or even foreign labour.

## 4.2 Benchmarking

### 4.2.1 Methodology

As set out in section 2, our approach to assessing how the costs of a business with the characteristics of the cost base identified above might behave relative to RPI is to examine the performance of companies with similar features. This is necessarily an exercise that involves a degree of subjectivity and judgment – as the analysis in section 3 demonstrates, different goods and services have their own unique cost drivers and it is impossible to find comparator companies with identical characteristics to those of the GDNs.

In order to minimise the extent to which the benchmarking will be subject to error, we set out below two alternative ways of identifying comparators:

- the first approach we describe as ‘top-down’ in that we start with the full basket of goods and services that forms the basis for RPI and take out products where there is obvious grounds to suspect unique and incomparable cost drivers; and
- the second we call ‘bottom-up’ in that we select components of the RPI which seem to be sensible comparators and build from scratch a new aggregate price index.

Both approaches can be said to amount to creating a sub-index within RPI. The differences between movements in these sub-indices and the rate of RPI-measured inflation can be taken as estimates of the rate of frontier shift that are likely to influence changes in a GDN’s opex over time.

The data that we use in this exercise comes directly from the ONS family expenditure survey and the indices reported in the monthly ONS publication ‘Focus on Consumer Prices’. Since the drivers of inflation vary with time, the period over which we measure changes in prices is a crucial input into the subsequent analysis. Ideally, the period chosen should be representative of the economic conditions that might be expected to prevail during the next five-year control period, 2008 to 2013. In effect, we are using past experience to predict the future and there is a careful balance to be struck between, on the one hand, using a series of data that is long enough to smooth out one-off anomalies and, on the other, ensuring that the data does not go as far back as to include periods in which different drivers of inflation were present.

With this in mind, our chosen data set is the average annual increase in prices over the period 1998 to 2006. The logic behind this start date is best explained with reference to figures 1 and 6 in section 3. Figure 1 shows that it is only since around 1993 or 1994 that the UK has come to enjoy low and stable inflation – in our judgement, economic conditions before this time are not especially comparable to those that exist today. Figure 6 then shows some sort of structural break in the composition of inflation in the late 1990s. The exact point at which this break becomes apparent is a matter for debate, but we think it is reasonable to take 1998/9 as the point at which the main drivers of inflation that exist now can first be identified.

There is, of course, no guarantee that the economy will in future continue to be affected by the same influences as in the last seven or eight years. A more detailed forecasting exercise may well reveal specific areas in which commentators expect major changes within the period covered by the new price controls. In the time available for this work, we have not been able to be this ambitious. However, we would argue strongly that the results which we present below are representative of what is happening in the economy today and that experience since 1998 is as valid as any other predictor of the future. Annex 3 discusses this issue in more detail.

#### 4.2.2 Top-down approach

The first of our two approaches involves taking out from RPI goods and services where cost drivers bear little resemblance to what is happening to network businesses. The sub-index that remains can then be considered one that better reflects the level of productivity savings and input price control that Ofgem might expect of the GDNs during the next control period.

Based on the analysis in section 3, there appear to be two main categories of household expenditure that could be excluded from this sub-index. The first comprises expenditure on goods, namely:

- food, where prices have been materially affected by cheap imports, the growth in the supermarkets' market share and the associated squeeze on input prices; and
- products in the 'other goods' ONS series, which are typically traded, manufactured goods whose prices are increasingly driven by shifts in production to low cost developing countries.

Since 1998, the average annual rate of inflation affecting food prices has been around 1%, while prices of other goods have declined by an average of almost 2% per annum. Prior to this, prices in both categories of household expenditure rose at a noticeably faster pace, suggesting that the above factors have played a hugely important role in constraining inflation during recent years. In our view, the productivity savings and input price control that suppliers in these industries have benefited from simply aren't available to firms operating in other parts of the UK economy. This is particularly the case for a UK-based, labour-intensive business with a skilled workforce, which the activities that contribute to a GDN's opex can be said to resemble.

The second category of expenditure with its own unique set of cost drivers is what might be described as household purchases of raw inputs, whose prices are driven primarily by one or at most two exogenous factors. This includes:

- oil and petrol;
- electricity and gas bills;
- mortgage interest payments; and
- rent.

Annual inflation in these components of RPI reveals little more than what has happened to commodity prices, asset prices and interest rates during recent years. As such, they do not provide especially relevant benchmarks of productivity savings and input price control achieved by firms that are having to combine a much broader basket of inputs into a final product of their own. That is not to say that rises in the prices of these inputs ought to be ignored in this analysis. Many of the suppliers of other goods and services within RPI use fuel, electricity, gas or accommodation and their own final prices will reflect changes in the prices of these inputs over time. Accordingly, the sub-index that is created by the removal of the direct contribution from these purchases still captures the input price pressures that face a typical firm.

The two types of exclusion eliminate just over half of the products within the RPI basket and leave a sub-index that is dominated by the service sector. This sub-index is likely to capture the productivity savings and input price control that are brought about by firms with broadly similar characteristics to those identified at the start of this section. Table 4 shows the effect that each of the exclusions makes.

**Table 4: 'Top-down' index**

Item	Average Weight	Average annual change in prices (%), 1998 to 2006
Exclusions:		
Food	0.114	1.1
Other goods	0.272	(1.6)
Oil and petrol	0.040	4.8
Electricity and gas	0.028	5.6
Mortgage interest payments	0.043	4.7
Rent	0.045	2.8
Total exclusions	0.542	0.7
RPI basket	-	2.5
Residual sub-index only	-	4.6

Source: ONS (2007), 'Focus on Consumer Prices' and First Economics' calculations.

The calculations in table 4 show that without the contribution from food, other goods, oil and petrol, electricity and gas, mortgage interest payments, and rent, the underlying rate of inflation in the UK since 1998 is approximately 4.6% per annum rather than 2.5% per annum. Higher-than-average productivity growth and lower-than-average input price increases in the food and other goods sectors, in particular, have effectively offset much less impressive productivity improvement and input price control in the service sector. When these contributions are stripped out, the trend rate of productivity growth minus input price inflation affecting the remainder of UK firms is revealed to be much higher than the headline rate of RPI-measured inflation would suggest.

The logical implication of this is that UK firms which do not enjoy the advantages available to food retailers and overseas manufacturers are likely to be seeing their costs rise in real terms. To the extent that the sub-index in table 4 is a reasonable benchmark against which to compare trends in a GDN's opex, Ofgem should adopt efficiency targets that allow for real terms underlying increases in costs over time.

#### 4.2.3 Bottom-up approach

In taking out six large, but seemingly atypical components of the RPI basket in the top-down approach, we are left with a sub-index that better reflects productivity growth and input price control facing the majority of UK-based firms. However, among the items that remain in this sub-index there will inevitably be individual goods and services that seem poor comparators for a gas distribution business.

The bottom-up alternative that we outlined earlier attempts to deal with such concerns by constructing from scratch an index of comparator firms. Goods and services that are included within this index need to exhibit at least some of the following characteristics:

- a reliance on activities that are based primarily or wholly in the UK;
- relatively high labour intensity; and
- ideally, the need for a predominantly skilled or professional workforce.

This represents a challenge because many of the firms in the UK with these characteristics produce intermediate products – i.e. products that are bought by other firms – rather than goods and services purchased by UK households. However, within the RPI basket (itemised in annex 1) there are a small number of components that fit parts of the above description:

- repairs and maintenance charges;
- telephones, telemessages etc.;
- domestic services;
- fees and subscriptions;
- personal services;
- maintenance of motor vehicles;
- books and newspapers;
- entertainment and other recreation; and
- restaurant meals, canteen meals, takeaways and snacks.

Individually, it is possible to identify reasons why the costs of firms operating in these sectors will be affected by certain influences which differ from those affecting network businesses – as we acknowledged earlier, there is no such thing as an exact comparator. However, we do not believe that there is any systematic bias that would mean that the average rate of inflation within our sub-index over- or under-states the rate of productivity improvement and input price pressures which might also be affecting the GDNs.

Table 5 calculates the rate of inflation that is seen on average in this basket of products. We have used a simple average rather than weight the individual components in line with their RPI weightings because we do not believe there is any reason why products that attract more of a typical households income should be given more importance than those that account for a smaller proportion of household expenditure. As a sensitivity check, we have also run the calculations with the RPI weightings and confirmed that this assumption has no material impact on the results.

**Table 5: ‘Bottom-up’ index**

Component	Average annual change in prices (%), 1998 to 2006
Repairs and maintenance charges	6.3
Telephones, telemessages etc.	(1.8)
Domestic services	5.4
Fees and subscriptions	6.0
Personal services	5.2
Maintenance of motor vehicles	5.3
Books and newspapers	3.5
Entertainment and other recreation	5.3
Restaurant meals, canteen meals, takeaways and snacks	3.3
Average	4.3

Source: ONS (2006), ‘Focus on Consumer Prices’ and First Economics’ calculations.

The analysis shows that our sub-index has exhibited annual inflation of 4.3% since 1999, almost 2% above the headline rate of RPI-measured inflation. This implies that productivity improvement has been much slower than in the rest of the economy and/or that input prices have increased much more rapidly. To the extent that the sub-index in table 5 is a reasonable benchmark against which to compare trends in a GDN’s opex, Ofgem should adopt frontier shift assumptions that allow for real terms underlying increases in costs over time.

### 4.3 Other considerations

The two sub-indices set out above both exhibit cost trends running at around 2% above RPI. Before reaching firm conclusions on the implications for Ofgem's price control allowances, it is important to consider whether any variables omitted from the analysis might materially affect the results. In previous top-down studies, the following factors have all attracted attention:

- the effect of economies of scale;
- the mix of capital and labour inputs; and
- the privatisation effect.

#### *Economies of scale*

The indices we constructed in section 4.2 are price indices and, hence, reveal information about unit costs. By contrast, Ofgem's efficiency targets are to be applied to total opex. In the presence of volume growth and economies of scale, the comparison is not like-for-like – an adjustment is required in order to translate unit cost trends in other sectors into an equivalent profile of total expenditure (because unit costs will increase more slowly than total opex when volumes are growing).

Estimating the scale of this adjustment is a complex calculation. We ideally need to know how much of an influence volume growth and economies of scale are on the firms in the 'top-down' and 'bottom-up' indices (to ascertain what level of associated productivity savings are captured by these indices) and how volume growth and economies of scale affect gas distribution opex (to determine what further adjustment should be made when applying these indices to the GDNs). Certain points of reference can be found in earlier top-down efficiency studies. For example, in the work carried out by Europe Economics for Ofwat in 2003, the consultants assumed that there is no systematic difference between economies of scale in the utility sector and in the economy as a whole.<sup>6</sup> In its 2004 report for Ofgem, CEPA assumed that the elasticity of opex with respect to volumes for a typical network business is around 0.85 (i.e. for every 1% increase in volumes, costs rise by only 0.85%).<sup>7</sup>

The limited time that has been available for this work means that we have been unable to investigate gas industry volume growth forecasts in any detail. Accordingly, we are unable to provide a precise estimate of the appropriate adjustment. We can nevertheless state with some certainty that the figures in section 4.2, as measures of price/unit cost, understate the equivalent change in total expenditure and that it is appropriate to make a small upward adjustment to those figures when applying them to total gas distribution opex.

#### *Capital-labour mix*

The analysis throughout this paper has focused on changes in final prices and the changes in total factor productivity and input price inflation that drives those changes. In applying this analysis to future trends in opex, we need to recognise that we are interested ultimately in just a subset of the GDNs' costs.

Europe Economics' adjustment, shown in table 1, is simply cut and paste from the report that they produced for Ofwat in 2003.<sup>8</sup> It is not directly applicable to our calculations because of the different methodologies that we have adopted. In particular, the Europe Economics adjustment is tailored to a calculation in which the 'nature of work' benchmark is a

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<sup>6</sup> Europe Economics (2003), 'Scope for Efficiency Improvement in the Water and Sewerage Sector', p.15.

<sup>7</sup> CEPA (2003), 'Productivity Improvement in Distribution Network Operators', p.11.

<sup>8</sup> Europe Economics (2003), 'Scope for Efficiency Improvement in the Water and Sewerage Sector', appendix 2.

reasonably capital intensive comparator. Our own top-down and bottom-up indices are deliberately more labour-intensive benchmarks. For this reason, we cannot simply take the Europe Economics figures in our own analysis.

We do nevertheless recognise that the annual change in our total cost indices is likely to exceed the annual change in the opex component of these benchmarks. Ideally, we would want to undertake a detailed analysis of the capital-labour mix among firms in our two sub-indices and measure how far the inclusion of capital productivity within our two sub-indices distorts the figures. In the limited time that we have had for this study, we have not been able to investigate these issues further. We therefore make a high-level adjustment equal to half of the Europe Economics range – i.e. 0.6% to 0.75% per annum.

We caution that the GDNs have told us that this overstates the impact that their capital programmes are likely to have on opex in the next five-year control period. We are not qualified to review the capex/opex trade-offs in companies' business plans, but we believe that this issue merits further investigation. For the purposes of our report, we note simply that the proposed adjustment seems more likely to overstate than understate the underlying trend in GDN costs.

#### *Privatisation effect*

Europe Economics also make allowance for what they describe as an ongoing privatisation effect. As we noted earlier, the adjustment – which is relatively large at 0.5% to 2.0% per annum – is taken from the work that the consultants carried out for Ofwat in 2003 and their conclusion at that time that 'there is no evidence of a systematic slow-down in the efficiency improvements being achieved by UK privatised infrastructure companies'.<sup>9</sup>

As a matter of principle, we are extremely reluctant to include such an effect in our conclusions. British Gas was privatised 20 years ago; by the end of the next control period, the time that has elapsed since Vesting will have grown to more than 25 years. It is difficult for us to accept that the one-off boost from privatisation will still be affecting cost trends within the industry a quarter of a century after companies left the public sector. For this to be the case, one has to believe that successive management teams have in this time failed to identify and capture savings that would be apparent to firms operating elsewhere in the private sector (despite being heavily incentivised by shareholders and the RPI – X form of regulation to bring costs down and despite three major company restructurings during that period). This does not seem credible.

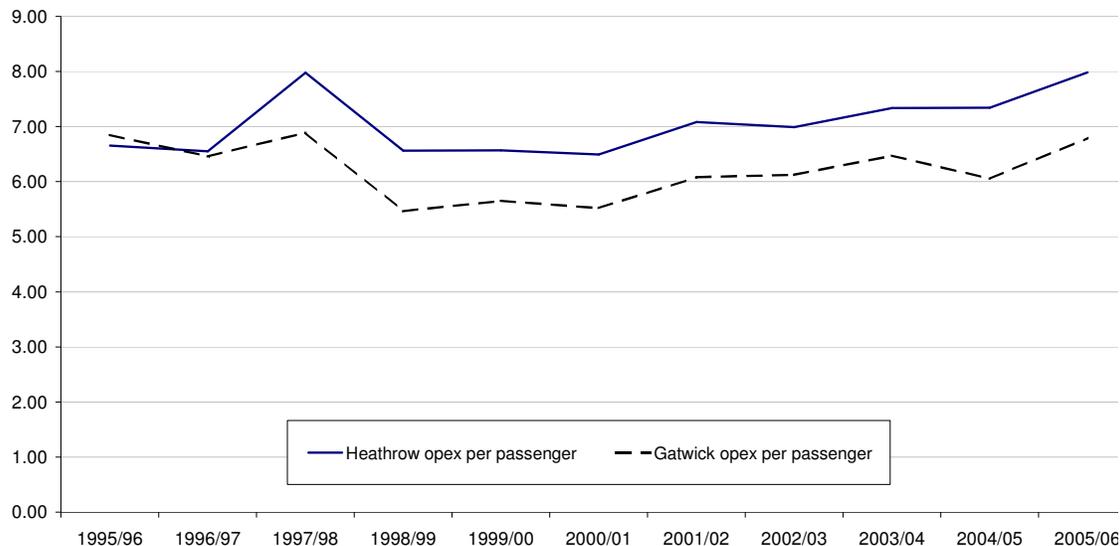
In our view, the privatisation effect is relevant for the first two, possibly three, price controls that are set by a regulator. We believe that this is supported by the experience of the other infrastructure companies that were privatised at around the same time or just after British Gas.

Figure 8 depicts BAA's recent cost performance. It shows two airports whose opex is gradually increasing each year in real terms despite what we assume are economies of scale in airport costs. Although the airports were both affected by the downturn in traffic after 11 September 2006, it is notable that it cost BAA more to handle the same number of passengers and flights when volumes in 2004 returned to the levels seen prior to the terrorist attacks (and that opex per passenger has continued to climb). It is also notable that the CAA has found BAA to be broadly efficient, and in some cases an excellent performer against external benchmarks, in its current price review.

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<sup>9</sup> Europe Economics (2003), 'Scope for Efficiency Improvement in the Water and Sewerage Sector', p.88.

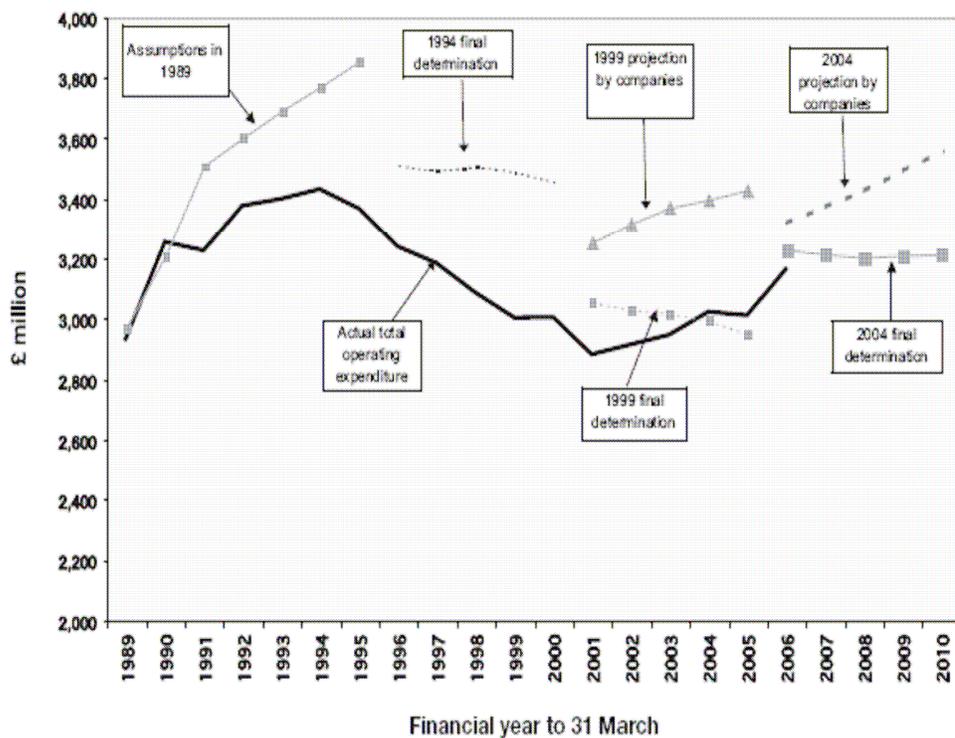
**Figure 8: Opex per passenger at Heathrow and Gatwick airports (£, 2004-05 prices)**



Source: BAA's regulatory accounts and First Economics' calculations.

Figure 9 presents a similar picture in the water and sewerage sector. The most notable feature of this chart is the industry's under-performance in the latter part of the 2000-05 control period. Although companies found it relatively easy to beat Ofwat's efficiency targets at the start of the last price control, subsequent cost pressures were such that companies were overspending when prices were reset. The upward drift in costs, against Ofwat's assumption of continued real terms cost reductions, casts considerable doubt on the existence of an ongoing privatisation effect.

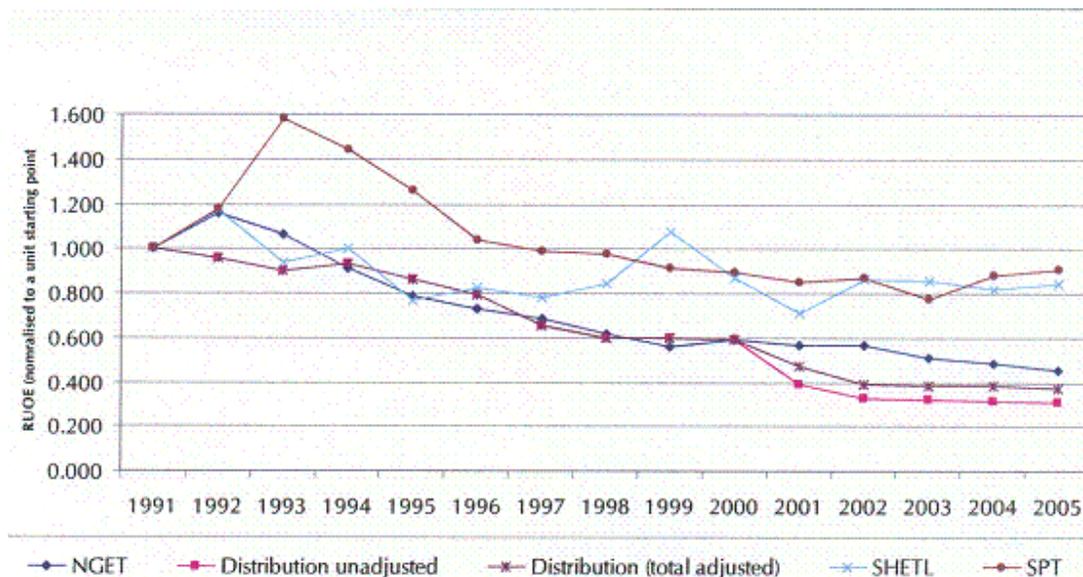
**Figure 9: Total water and sewerage operating costs (2005/06 prices)**



Source: Ofwat (2007), 'Water and sewerage service unit costs and relative efficiency 2005-06 report'.

Figure 10 is taken from Ofgem’s third transmission price control review consultation document last year. It depicts a sector in which year-on-year cost reductions gave way to a flat trend in real unit opex. More recently, Ofgem’s 2005/06 Electricity Distribution Cost Review has revealed that total DNO opex increased in real terms between 2004/05 and 2005/06 and that the sector as a whole overspent by around 5% against Ofgem’s DPCR4 opex allowances in the first year of the new control period.

**Figure 10: Real unit operating costs in the electricity sector**



**Source:** Ofgem (2006), ‘Transmission price control review: third consultation paper’.

These pieces of information, when looked at together, suggest there is no obvious basis for Europe Economics’ assertion that companies privatised 20 years ago ought to be enjoying one-off, privatisation-related efficiency savings of between 0.5% and 2.0% per annum. If anything, they help to back the more common-sense view that the privatisation effect can be expected to last for three control periods at most. We believe that if Europe Economics had updated their 2003 analysis for four additional years worth of data they would have drawn similar conclusions – using their language, there is now evidence of a systematic slow-down in the efficiency improvements being achieved by UK privatised infrastructure companies.

For these reasons, we do not believe it is appropriate or necessary to include a privatisation effect in our calculations.

*Impact of comparative competition*

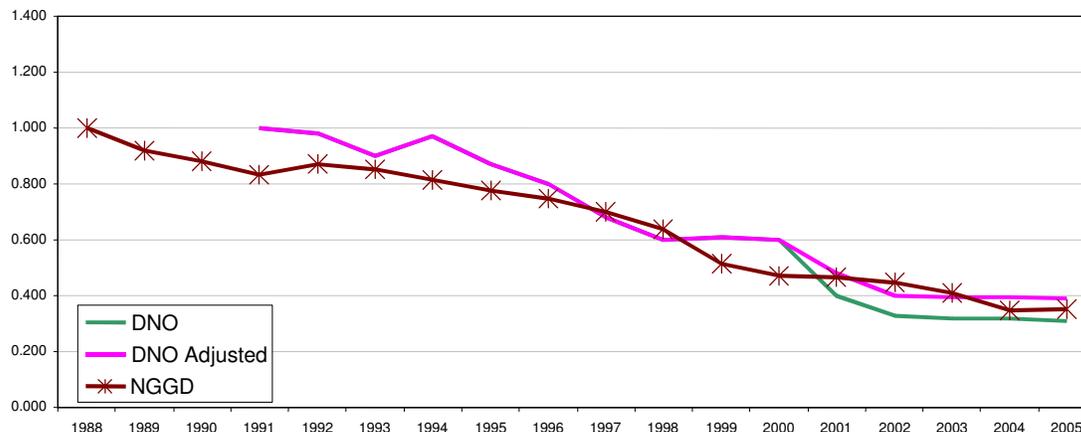
A slightly different issue is the impact of the GDN sales and the effect that comparative competition will have on future efficiency savings. There is a valid argument that says benchmarking and inter-industry comparisons will spur the GDNs to greater efficiency savings than the RPI – X regime as applied to National Grid alone. However, there is also a danger that predictions of more rapid efficiency improvement become a self-fulfilling prophecy.

Ideally, a regulator would allow for a process of discovery in which yardstick competition between GDNs reveals the industry’s efficiency frontier and savings are subsequently passed on to customers at each successive review. We recognise, however, that in this particular industry there is a case for earlier sharing with customers given that administrative

costs were incurred during and after the sale. For this reason, we are satisfied that it is appropriate to make an adjustment to our calculation reflecting the expected impact of comparative competition.

Figure 11 provides some insights into the scale that this adjustment should take. It shows that the cumulative efficiency savings achieved by the electricity DNOs since privatisation fall slightly behind the cumulative cost reductions delivered by National Grid Gas Distribution. This implies that any detriment that gas customers have experienced from the absence of comparative competition is relatively small.

**Figure 11: Real unit operating costs for electricity and gas distribution networks**



Source: Data provided by National Grid.

Putting a precise figure on the effect that comparative competition will have on frontier shift in future is ultimately a matter of judgment. We believe that an adjustment of 1.0% could be said to strike a reasonable balance between early sharing of benefits and allowing for the revelation, rather than imposition, of the sector’s efficiency frontier. However, we would expect this issue to be the subject of a much more detailed debate during the remainder of the review.

## 5. Conclusion

Table 6 sets out our calculations of frontier shift based on the analysis in section 4.

**Table 6: First Economics' calculation of the long-term trend in total GDN opex**

	Annual % real terms change in total opex
Benchmarking results	+1.8 to +2.1
Adjustment for economies of scale	small upward adjustment
Adjustment for capital-labour substitution	<i>minus</i> 0.6 to 0.75
Adjustment for privatisation effect	zero
Adjustment for comparative competition effect	<i>minus</i> 1.0
Frontier shift	+0 to +0.5

*Source:* First Economics' calculations.

The table shows that the gap between RPI and the productivity improvement and input price inflation among the firms in our sub-indices is reduced somewhat by the three additional factors identified in section 4.3. However, the adjustments fall short of exposing any potential for real terms reductions in opex.

Our estimate of flat or marginally positive real terms changes in opex is driven primarily by the results of our benchmarking analysis. This showed that firms supplying UK households with goods and services typically fall into one of three categories:

- firms whose costs are driven largely by a single exogenous factor, such as international commodity prices or interest rates;
- companies competing in the goods sector of the economy, where for the last seven or eight years prices have generally been stable; and
- the service sector of the economy, where prices have been increasing well above the rate of RPI-measured inflation.

The activities that are reflected in the GDNs' opex compare most naturally to the third of these categories. It is therefore only natural that we have reached the conclusion that it will be a considerable challenge for the sector to hold its opex in line with RPI. As section 3 and annex 1 show, the only substantive parts of the economy where the sum of input price inflation less productivity improvement has fallen below RPI in recent years relate to food and manufactured, tradable goods. Food shoppers have been getting considerable benefits from cheap imports, economies of scale and the supermarkets' purchasing power, while consumers of tradable goods are seeing the benefits of globalisation. None of these phenomena are likely to be ones that have a discernible impact of the costs of an efficiently managed gas distribution business.

Our conclusion contrasts starkly to Europe Economics' recommendation that there is an underlying downward (real terms) trend in GDN opex worth around 1.5% per annum, plus a temporary privatisation effect which would take the total savings available to the companies up to as much as 3.7% per annum. To be clear, our analysis differs from Europe Economics' in only two significant respects:

- first, we have used the correct 'averages' to assess the long-term scope for out-/under-performance relative to RPI; and
- second, with the benefit of four additional years of data on cost trends in a range of infrastructure industries, we have chosen not to include a privatisation effect in our calculations.

We recognise that it at first seems counter intuitive to argue that a privatised company's costs might rise not fall. RPI – X regulation by its very name has come to be synonymous with year-on-year cost reductions passing through to users. However, it is important to distinguish our conclusions from any suggestion that GDNs will stop improving efficiency during the next five-year control period. We are not in any way arguing that productivity will not continue to improve, we are simply pointing out that the implications for opex (in real terms) depend not on the absolute level of efficiencies that the GDNs deliver but on the relative scale of productivity improvement and their ability to hold down input prices relative to all other firms that supply UK households with goods and services. At a time when almost every service-sector firm is finding that it cannot beat the impressive performance of firms in the goods sector of the economy, regulators have to come to accept that costs might increase in real terms rather than decline.

This requires regulators collectively to revisit earlier top-down efficiency studies in light of the analysis in this report. The CAA's approach in the current airport price review provides a good comparison in this respect. In its December 2006 proposals,<sup>10</sup> the CAA acknowledges that there is no obvious reason why BAA should be expected to out-perform the likes of food retailers, car producers and clothing manufacturers. For this reason, it has suggested that the long-term trend in airport opex will be flat in real terms.

Compared to the CAA, Ofgem's indicative 2% per annum frontier shift assumption appears far too demanding. The only obvious way for an already efficient GDN to live within such allowances would be to cut wages and/or eliminate staff that would otherwise have important roles to play. In the short term – perhaps even an entire five-year control period – this might be achievable. However, in the long-term, attempts to match the sort of cost control seen in the goods sector of the economy will have serious implications.

Seen in this way, the approach that Ofgem takes in its initial price control proposals has important implications for the development of the industry. The analysis in this paper shows clearly that industries in which real terms cost reduction are being delivered have characteristics that bear little resemblance to the network utility sector. Price control arrangements that better reflect cost drivers in the UK-based service sector would in our view better suit the interests of both customers and shareholders.

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<sup>10</sup> CAA (2006), Airports price control review – initial proposals for Heathrow, Gatwick and Stansted.

**Annex 1: Detailed RPI components (taken from ONS 'Focus on Consumer Prices')**

Item	2006 weight (parts per 1000)	Average annual change in price, 1998-2006
Food:		
Bread	4	2.5
Cereals	3	0.2
Biscuits and cakes	6	1.1
Beef	4	0.8
Lamb	2	3.3
Pork	1	2.2
Bacon	2	2.4
Poultry	4	(0.2)
Other meat	7	1.4
Fish	4	2.4
Butter	1	0.2
Oils and fats	1	0.1
Cheese	3	1.1
Eggs	1	1.5
Milk, fresh	5	2.3
Milk products	4	0.2
Tea	1	(1.0)
Coffee and other hot drinks	1	(0.9)
Soft drinks	10	0.4
Sugar and preserves	1	0.7
Sweets and chocolates	10	3.0
Potatoes	4	0.6
Vegetables other than potatoes	8	1.8
Fruit	7	1.2
Other foods	11	0.4
Catering:		
Restaurant meals	27	3.2
Canteen meals	4	4.6
Take-aways and snacks	19	3.1
Alcohol:		
Beer	36	2.4
Wines and spirits	31	1.7
Tobacco:		
Cigarettes	26	5.6
Other tobacco	3	4.4
Housing:		
Rent	45	2.8
Mortgage interest payments	50	4.7
Depreciation	44	10.8
Council tax and rates	39	6.8
Water and other charges	12	3.3
Repairs and maintenance charges	12	6.3
Do-it-yourself materials	13	0.3
Dwelling insurance and ground rent	7	5.0

Fuel and light:		
Coal and solid fuels	1	4.8
Electricity	15	4.2
Gas	14	7.3
Oil and other fuels	3	12.9
Household goods:		
Furniture	26	1.8
Furnishings	11	1.1
Electrical appliances	8	(3.3)
Other household equipment	5	(0.4)
Household consumables	14	0.0
Pet care	7	1.7
Household services:		
Postage	1	2.7
Telephones, telemessages etc.	24	(1.8)
Domestic services	12	5.4
Fees and subscriptions	29	6.0
Clothing and footwear:		
Men's outward	10	(2.5)
Women's outward	17	(5.0)
Children's outward	6	(3.7)
Other clothing	7	(0.7)
Footwear	9	(1.1)
Personal goods and services:		
Personal articles	12	1.3
Chemist goods	16	(0.1)
Personal services	13	5.2
Motoring expenditure:		
Purchase of motor vehicles	56	(3.4)
Maintenance of motor vehicles	20	5.3
Petrol and oil	40	4.4
Vehicle tax and insurance	24	3.7
Fares and other travel costs:		
Rail fares	5	3.1
Bus and coach fares	4	4.0
Other travel costs	10	3.7
Leisure goods:		
Audio-visual equipment	9	(13.7)
CDs and tapes	4	(2.4)
Toys, photographic and sports goods	12	(3.4)
Books and newspapers	10	3.5
Gardening products	6	0.1
Leisure services:		
Television licenses and rentals	12	3.0
Entertainment and other recreation	17	5.3
Foreign holidays	30	4.0
UK holidays	8	4.7

## **Annex 2: The Flaws in Europe Economics' Calculations**

In section 2.2 of the main paper we argued that that Europe Economics have used incorrect 'averages' when investigating whether the GDNs would deliver above-average productivity growth and experience above-average input price inflation. The source of this error, and its consequences, can be illustrated using some simple examples.

### **A2.1 Input price inflation**

Europe Economics' adjustment for input price inflation focuses on the extent to which the GDNs' opex has a higher-than-average labour component. Since wage inflation tends to outstrip increases in other input prices, firms with high labour intensity tend to face greater cost pressures than firms that are more capital intensive. It is for this reason, and this reason alone, that there is an explicit upward adjustment in the calculations set out in table 1.

A natural corollary of Europe Economics' analysis is that a firm with an average mix of labour and capital inputs ought to be capable of holding its costs constant in real terms (all other things being equal). This is over-simplistic. To understand why, consider the type of workforce that different industries employ. At one end of the scale might be firms making clothing and footwear – a sector that makes up about 5% of the RPI basket of goods and services. Nowadays most of the labour in this industry are relatively unskilled overseas workers. At the other end might be firms engaged in the maintenance of motor vehicles – an industry that contributes about 2% to the RPI basket of goods and services. The workforce in this industry will be predominantly UK-based skilled and semi-skilled labourers.

If one supposes for a moment that both these sectors have the same capital-labour mix and that this mix broadly matches the composition of the RPI basket as a whole, the Europe Economics approach would imply that both will experience the same rate of input price inflation. This does not seem credible. Suppliers of clothing and footwear have proven incredibly successful at holding down wage rates in countries where there is an abundant supply of cheap labour. It is hardly a surprise then that prices have fallen by an average of more than 3% per annum since 1998. Firms that repair motor vehicles, by contrast, have had to deal with wage inflation in line with or slightly above the UK-wide rate of growth in average earnings. Unsurprisingly the price that car owners pay to service their vehicle has risen by 5% per annum over the same period.

This example demonstrates very clearly that the rate of wage inflation already captured in RPI cannot simply be the RPI + 2% rate of increase in UK average earnings that Europe Economics use in their calculations. Like the suppliers of clothing and footwear, there is a whole range of firms represented in the RPI basket who buy from entirely different labour markets. Many of these firms benefit from access to cheap foreign labour, where wage pressures are low or non-existent.

It follows that the 'average' that the GDNs ought to be compared against is almost certainly much lower than the benchmark that Europe Economics have chosen. If the consultants are right and the GDNs face annual wage inflation equal to the RPI + 2% trend in average UK earnings, this would imply that the GDNs will under-perform the level of cost control already captured by RPI. By itself this would mean that opex is likely to rise in real terms, rather than fall. If, as Europe Economics also suggest, GDNs has a higher-than-average labour content, the upward pressure on expenditure will be well in excess of the +0.4% per annum that Europe Economics have put forward.

### **A2.2 Productivity growth**

Similar arguments can be made in relation to the analysis of productivity growth. Europe Economics assume that the rate of productivity improvement already captured by RPI is the 1.2% per annum trend in UK-wide TFP growth. It seems most unlikely that is correct:

- first, the UK economy has a service-sector bias. As a nation, we are a net importer of goods and a net exporter of services; and
- second, it is widely acknowledged that the rate of productivity growth in the service sector lags behind the rate of productivity growth in the goods sector. It therefore follows that the annual change in TFP across the basket of goods and services that UK households purchase exceeds the annual rate of productivity improvement achieved by the UK as a producer.

Another simple example helps to illustrate this point. Among the goods and services that UK households buy, purchases of electrical appliances and audio-visual equipment constitute approximately 2% of annual household expenditure. The UK is a net importer of these goods – most electronics firms have set up factories in Asia for the bulk of their production. It just so happens that the rate of productivity growth in these industries is probably faster than in any other major industry. As a consequence, prices have been falling by on average 8% since 1998 – a phenomenon that makes a very important contribution to the UK’s inflation rate. Despite this, the productivity achievements of electronics firms is omitted almost completely from Europe Economics’ ‘average’ (i.e. the rate of productivity growth achieved by the UK economy).

This example demonstrates very clearly that the rate of productivity improvement already captured in RPI cannot simply be the 1.2% UK trend TFP growth that Europe Economics use in their calculations. Like the manufacturers of electrical appliances and audio-visual equipment, there is a whole range of firms represented in the RPI basket who manufacture their goods overseas. Many of these firms benefit from rapid technical progress, helping to deliver strong year-on-year productivity growth and stable or falling prices.

By omitting the full contribution that these sectors make to RPI-measured inflation, Europe Economics have under-stated the ‘average’ that the GDNs ought to be compared to and over-stated the results of their nature of work comparisons. The figure of 0.6% in table 1 ought therefore to be reduced considerably.

### A2.3 Summary

The flaws that we have set out in this annex can be summarised in the following expressions. The first line reflects the common starting point that we referred to at the start of section 2 of the main paper. The second and third lines then disaggregate RPI-measured inflation one stage further by splitting the 650 goods and services in the RPI basket into intrinsically UK-produced items and intrinsically global products (the weights  $\alpha$  and  $\beta$  sum to 1 and reflect the relative contribution of each category). It is our contention that Europe Economics have overlooked entirely the second term in bottom line of the formulae.

$$\begin{aligned}\Delta \text{RPI} &\approx \Delta \text{input prices}_{\text{S}_{650}} - \Delta \text{TFP}_{650} \\ &\approx \alpha \cdot \Delta \text{input prices}_{\text{UK}} + \beta \cdot \Delta \text{input prices}_{\text{overseas}} - \alpha \cdot \Delta \text{TFP}_{\text{UK}} - \beta \cdot \Delta \text{TFP}_{\text{overseas}} \\ &\approx \alpha \cdot (\Delta \text{input prices}_{\text{UK}} - \Delta \text{TFP}_{\text{UK}}) + \beta \cdot (\Delta \text{input prices}_{\text{overseas}} - \Delta \text{TFP}_{\text{overseas}})\end{aligned}$$

This error introduces a systematic upward bias into Europe Economics’ proposed efficiency targets. This is for three reasons:

- wages tend to rise more quickly in the UK than in other countries;
- the rate of productivity improvement in the service-sector-dominated UK economy lags behind the rate of goods sector TFP growth; and
- in recent times  $\alpha$  has been declining and  $\beta$  increasing, introducing a substitution effect which serves to reduce both costs and prices.

All three of these factors serve to make the 'averages' used by Europe Economics tougher than they ought to be. After adjusting for these omissions, it is far less easy to argue that the GDNs will out-perform the rate of productivity improvement underpinning RPI or that the input price inflation they experience will be so close to that which an average firm in the RPI basket must deal with.

### Annex 3: Interpreting Recent Inflation Data

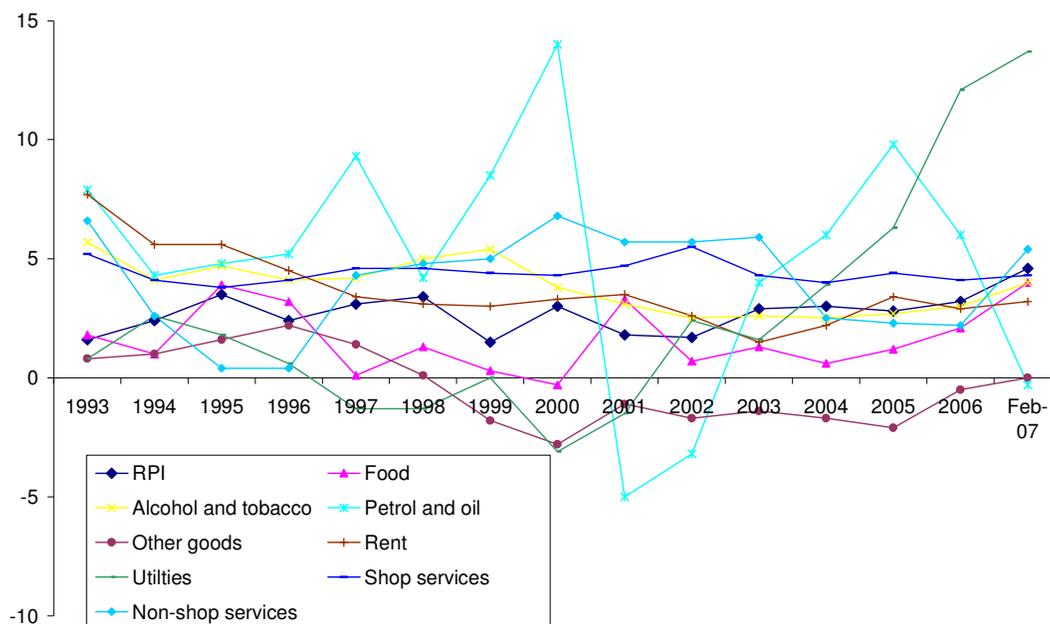
The analysis in this report, like that in Europe Economics' report to Ofgem, uses experience from the recent past to guide expectations as to what might happen in the next five years. We recognise, however, that in any exercise that uses extrapolation techniques there is a danger that the future might turn out to be very different from the past. It is therefore appropriate to consider whether there is any reason why one might expect to see some sort of structural break in the data which might undermine the usefulness of the estimates we have put forward.

The key factor to consider in a piece of work built around the RPI data set is the recent and unexpected jump in the rate of inflation. RPI-measured inflation at the time of this report was running at 4.6% per annum, its highest level in 15 years and well above the 2.5% trend that we refer to in several places in the report. This jump appears to be a consequence of at least four different developments:

- a 22% jump in mortgage interest payments following three increases in interest rates in quick succession;
- annual increases in household gas and electricity bills of 40% and 26% respectively;
- a 4.0% increase in food prices versus the ten-year trend of 1.1% per annum; and
- zero change in the price of 'other goods' compared to ten years of continual price reductions averaging more than 1% per year.

It is the third and the fourth of the items on this list that have most relevance to the analysis we have conducted. Figure A1, for example, revises Figure 2 from the main report to take account of the February 2007 inflation data. It shows a narrowing of the gap between the goods and services sectors.

**Figure A1: Annualised Annual rate of growth in RPI by component (%), 1993 to February 2007**



Source: ONS (2006), 'Focus on Consumer Prices'.

The question to ask is: does the trailing 9-year trend or the more up-to-date February 2007 data provide the better guide to the composition of RPI-measured inflation in the five-year period from April 2008? To an extent, this question is similar to one that Ofgem is

confronting elsewhere in the GDN review as it examines the appropriate values for the risk-free rate and the cost of debt. Here Ofgem has consistently argued that longer term averages provide a better guide to the future than spot rates.

Should similar logic apply when making opex allowances? Our view is that it should. Although we are by no means experts in forecasting inflation, our reading of the Bank of England's latest Inflation Report, published in February 2007,<sup>11</sup> is that the UK experienced a series of one-off shocks during the last year rather than a once-and-for-all restructuring. The Inflation Report describes the outlook for the UK economy in the following terms:

Global costs and prices — in particular, rising prices for energy and imports — have had a substantial impact on the costs faced by UK companies in the recent past. More recently, those pressures have begun to subside.

Oil prices have fallen back sharply since the summer of 2006 ... Unlike in previous winters — when gas prices have typically risen in response to increased demand — wholesale gas prices have fallen in recent months ... The upward pressure on business costs from rising import prices has also eased somewhat. Recent trends in import price inflation have been heavily influenced by movements in commodity prices. But, stripping out the direct effect of energy and metals prices, underlying import price inflation has also moderated. That is likely to reflect both the appreciation of sterling and the impact of lower energy prices in reducing the production cost of other imports. Falling energy prices, and weaker import price inflation, have already begun to show up in measures of UK companies' input prices. In the manufacturing sector, annual input price inflation fell from around 15% at the start of 2006 to 2% in December. And the net percentage of companies reporting higher input prices in the CIPS services survey fell during the second half of 2006.

In light of these factors, the Bank of England Inflation Report places less emphasis on the prospect of a sustained energy/import price shock and more emphasis on inflation expectations, and hence the behaviour of domestic workers and domestic firms, when forecasting future inflation. Indeed, the latest Report states explicitly that import prices fall back quickly in the Bank's central projection as lower energy costs and the rise in sterling impact on foreign exporters.

The Governor of the Bank of England's open letter to the Chancellor on 17 April 2007 confirms that its current views remain in line with the February Report. For these reasons, we are content that the analysis in the main paper continues to provide robust insights into the RPI benchmark. Although we cannot claim to know what will happen after April 2008, the Bank of England's analysis would appear to suggest that the February 2007 figures should be treated as a blip.

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<sup>11</sup> Bank of England, 'Inflation Report: February 2007'.

**First Economics**

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