Water Industry Input Price Inflation and Frontier Productivity Growth

A report prepared for South East Water

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FIRST ECONOMICS

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Executive Summary

- This report provides South East Water with estimates of input price inflation and offsetting frontier productivity growth for the period 2013/14 to 2019/20.

- Our forecasts of future input price inflation are set out in table A.

Table A: Input price forecasts (nominal, % per annum)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Labour – general	1.8	2.9	3.8	4.0	4.0	4.25	4.25
Labour –specialist	3.05	4.15	5.05	5.05	5.05	5.5	5.5
Materials – machinery	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Materials – civils	3.5	4.5	4.5	4.5	4.5	4.5	4.5
Power	17.3	13.5	9.4	9.7	3.4	4.9	4.2
Chemicals	3.0	5.0	5.0	5.0	5.0	5.0	5.0
Plant and equipment	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Business rates	2.6	3.3	2.8	3.2	3.6	3.9	3.4
Bad debt	3.1	2.9	3.3	3.7	4.0	3.4	3.4
EA charges	3.1	2.9	3.3	3.7	4.0	3.4	3.4
Business IT	0.75	0.75	0.75	0.75	0.75	0.75	0.75

- The profile of future price increases shown here reflects the current macroeconomic outlook of a recovery from recession during 2013 and 2014 followed by trend growth thereafter. The forecast of wage inflation comes directly from the Office of Budgetary Responsibility's (OBR) March 2013 forecasts and the power forecast is from DECC; the other estimates are our own extrapolations from recent data.

- The resulting aggregate input price inflation affecting different activities is calculated in table B using weights provided by South East Water.

Table B: Aggregate input price inflation (nominal, % per annum)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Wholesale opex	4.3	4.5	4.3	4.6	3.8	4.1	4.0
Wholesale capex	2.7	3.6	4.0	4.1	4.2	4.2	4.2
Household retail costs	2.2	2.6	3.1	3.4	3.5	3.4	3.4
Non-household retail costs	2.0	2.6	3.2	3.4	3.5	3.5	3.5

- We estimate the rates of frontier productivity growth to be as set out in table C. These estimates are based on evidence of historical productivity growth in a selection of comparator industries and sit broadly in line with the figures that have been used in a number of other price control decisions.

Table C: Rates of ongoing productivity growth (% per annum)

Cost type	Annual cost reductions
Wholesale opex	(1.0)
Wholesale capex	(0.6)
Household retail costs	(0.3)
Non-household retail costs	(0.3)

Contents

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1. Introduction

This report presents the results of a First Economics study into the input price inflation and frontier productivity growth that are likely to impact on South East Water's costs between 2013/14 and 2019/20.

It is intended to be an input into South East Water's December 2013 business plan. We expect that South East Water will wish to allow for the input price inflation and productivity growth that we identify when making projections of future wholesale opex, wholesale capex and retail costs.

The report is structured into five main parts:

- section 2 outlines our methodology;
- section 3 and 4 contain detailed estimates of the rates of input price inflation and productivity growth that are likely to impact upon costs in each year between 2013/14 and 2019/20;
- section 5 brings our analysis together into our overall estimates of cost escalation. We also provide a number of cross-checks to confirm the reasonableness of these estimates.

2. Methodology

Ofwat's July 2013 PR14 methodology document states that all companies must state in their business plans the assumptions that they have made about input price inflation, productivity and efficiency changes. In formulating these assumptions, companies will need to think about three main things:

- the steps that the business can take to eliminate current, company-specific inefficiencies;
- the natural or underlying rate of input price inflation in the sector and the rate at which even efficient businesses ought to be able to improve productivity over time; and
- the costs of new outputs/outcomes.

This report concentrates on the second of these things. It attempts to measure what has sometimes been called 'frontier shift' in previous periodic reviews – i.e. the change that a company sitting on the industry's efficiency frontier would expect to see in its costs absent any changes in outputs.

Our analysis proceeds by:

- identifying the input types that can be found within South East Water's costs;
- investigating the price trends affecting each individual input and forecasting input price growth for each input through to 2019/20;
- aggregating the line-by-line estimates obtained into overall measures of input price inflation; then
- identifying the individual activities that companies undertake;
- benchmarking the scope for productivity growth in each of these different activities with reference to a database on productivity growth trends in different types of UK firm; and
- aggregating the productivity benchmarks into an overall estimate of the rate of productivity growth at the England & Wales frontier.

The results of this bottom-up work ought to give a clear picture of the underlying drivers of industry costs. Section 5 of the paper then brings the component parts together and cross checks our results with out-turn cost data from recent June returns and other regulators' periodic review determinations in order to confirm that the results are a sensible and plausible input into South East Water's business plan.

3. Input Price Inflation

The main expenditures incurred by South East Water in the course of its activities are summarised in table 3.1.

Table 3.1: The water company input mix

Cost type	Main component parts
Wholesale opex	Labour Materials Power Chemicals Business rates EA charges Bulk supplies
Wholesale capex	Labour Materials Plant and equipment
Retails costs	Labour Materials Business IT Doubtful debt

In the analysis that follows we provide estimates of input price inflation for each of the above items.

3.1 Forecasting approach

Our approach to forecasting input price inflation has been set out previously in papers that we have produced for the GB energy network companies[1] and the Northern Ireland Utility Regulator[2], among others. There are three key parts to the analysis.

Input price inflation forecasts are to be anchored against the most likely path for GDP growth

The rate at which prices for labour, materials and other inputs change over time is inextricably linked to the demand for those inputs: all other things being equal, the less that buyers want of a good or service the more difficult it is for the supplier to pass on price increases (and vice versa). The starting point in our work must therefore be a projection of the rate at which demand and output are likely to increase in the economy as a whole, which we can then interpret for each of the individual categories of input that we are having to consider in our analysis.

At the time of writing, the UK is still very obviously recovering from the effects of recession. By contrast, the global economy, powered by demand from outside of the US and the EU, is expanding rapidly. This means that we need to analyse both the national and global outlook

[1] See, for example, First Economics (2011), Real price effects: prepared for the GB transmission networks, available at:
http://www.spenergynetworks.co.uk/serving_our_customers/pdf/2011_SPTL_Narrative_9%20Financial%20Strategy_Appendix%203%20First%20Economics%20RPEs.pdf

[2] First Economics (2012), The rate of frontier shift affecting water industry costs, available at:
http://www.uregni.gov.uk/uploads/publications/ANNEX_D_-_Rate_of_Frontier_Shift_-_PC13_FD.pdf

and consider carefully which provides the most relevant anchor for our analysis of the price increases affecting each individual category of input.

Input price forecasts should be prepared on a nominal basis

Arguably the key methodological issue that has emerged in reviews in other sectors concerns the link between cost increases and RPI-measured inflation. In all of our previous reports we have made forecasts of nominal input price inflation and used a separate forecast of RPI in order to calculate the corresponding real price effects. Others have tended to forecast real terms cost increases more directly, often on the basis of the historical correlations between nominal input price inflation and RPI-measured inflation.

Our approach is considered and deliberate. As an overarching point of principle we do not believe that measures of real wage inflation or real terms material cost increases are sufficiently well-behaved to permit a researcher to estimate input price inflation less the increase in the value of the RPI index in one step. This is for three reasons:

- first, there been a realisation during recent months that technical changes to the ONS' methods of measuring prices have pushed up the long-run equilibrium rate of RPI inflation relative to CPI inflation. Partly, as a result of these changes, RPI has had its designation as a national statistic withdrawn. This means that RPI is not a consistent benchmark. Pre-2010 comparisons of nominal input price inflation relative to RPI will look fundamentally different from post-2013 comparisons of nominal input price inflation relative to RPI;
- second, RPI is heavily influenced by housing costs. This is an especially important consideration at the current time given that a return to 'normal' mortgage interest rates are going to push RPI up in the next 5 years without having any impact on CPI or the Bank of England's ability to meet its 2% CPI inflation target. To imagine that real price effects tend to a constant when measured relative to an oscillating RPI benchmark is not credible at present; and
- third, in an era of inflation targeting it cannot be that increases (or reductions) in RPI feed directly into increases (or reductions) in nominal rates of input price inflation. If they did, the economy would be prone to price spirals in which a shock that temporarily pushed inflation up would generate a second round of price increases as workers and suppliers sought to preserve their real income growth, in turn pushing up RPI still further and generating a vicious circle of ever-increasing input prices and inflation – a phenomenon that would be causing considerable problems at the current time given the elevated level of inflation in the economy. We believe instead that it is medium-term inflation expectations that influence workers' wage demands, whilst we see materials costs very much as a driver of RPI-measured inflation rather than the other way around.

This is not to say that nominal input price inflation and RPI are completely independent. Since RPI measures the rate at which prices in the economy are changing, and since prices over time move in line with costs, it must be that the rates of nominal input price increases and RPI-measured inflation are related. We think, however, that this link is best recognised by giving an overall sense-check to the results of the nominal input price inflation calculations rather than constraining the estimates of real price effects from the outset.

After a period of more than 1-2 years the experiences of the recent past provide the best guide to price increases in the future

No forecaster can ever claim that their predictions are 100% accurate and it is entirely natural for companies in August 2013 to be unclear as to what the 2013-20 period has in store for them, especially when the UK and the global economy is experiencing a period of restructuring.

We would, however, caution against being too believing of stories which maintain that the drivers of inflation from now on will be fundamentally different from the factors that influenced inflation in the years prior to recession. While some change is inevitable, it is impossible to say with any certainty what price pressures will be different and what impacts there will be on the inflation rates that we are analysing in this report. Rather than convince ourselves prematurely that there is to be a structural break from the past, we believe instead that observed pre-recession, pre-2008 data will generally constitute a central or best available estimate of the price increases that one can expect to impact on the water industry once the recovery from recession is over and the UK economy goes back to growing at a 'normal' rate.

In practical terms this means that most of our forecasts can be built up in to two stages:

- we look first of all at the path of prices in the short-term when price increases will be heavily influenced by short-term expectations of economic growth; and
- we then try to identify an underlying trend in the rate of growth in wages and materials prices during normal economic conditions. We then extrapolate from this historical trend to produce medium- to long-term forecasts of (nominal) input price inflation.

We acknowledge that this methodology is not foolproof. However, we believe that the likely error in our forecasts is symmetrically distributed insofar as nobody at this moment in time can claim with any real credibility why it must be that price increases will settle onto higher or lower trends than those that could be observed prior to the onset of recession.

3.2 Macroeconomic outlook

Our detailed August 2013 forecasts start with a brief summary of the current economic outlook.

In previous First Economics reports we have relied on HM Treasury and Bank of England projections of GDP growth. The HM Treasury's forecasts are now produced by the independent Office of Budget Responsibility (OBR), which in our view strengthens the case for using public-sector numbers as the anchor for our calculations.[3]

Table 3.2 and figure 3.3 reproduce figures that may be found in the OBR's March 2013 economic forecasts and the Bank of England's August 2013 Inflation Report.

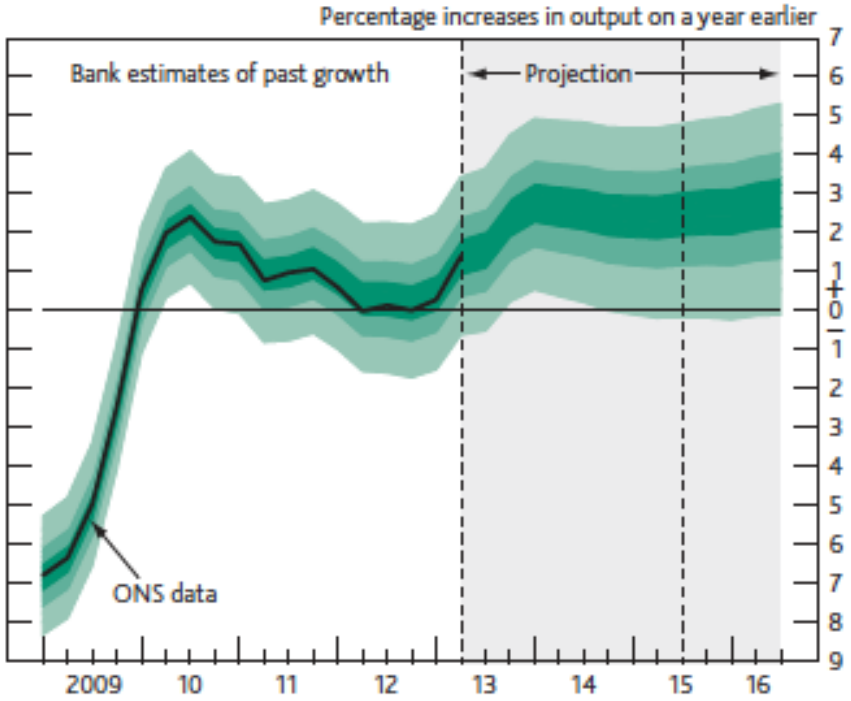
[3] The alternative of using a single private-sector provider of economic forecasts presents a number of dangers. For one, it could be that the selected forecaster takes a view of future economic prospects that sits outside of mainstream consensus. This might give an inappropriately extreme picture of the price inflation that is likely to impact on companies. It could also be that stakeholders come in future to shop around for forecasts that further their interests – i.e. very high price inflation for companies, very low price inflation for customers. We do not think that this would be a positive development.

Table 3.2: OBR's March 2013 forecasts of GDP growth

	Percentage change on a year earlier, unless otherwise stated						
	Outturn	Forecast					
	2011	2012	2013	2014	2015	2016	2017
UK economy							
Gross domestic product (GDP)	0.9	0.2	0.6	1.8	2.3	2.7	2.8
GDP Level (2011=100)	100.0	100.2	100.8	102.6	105.0	107.8	110.8
Nominal GDP	3.4	1.5	2.7	3.8	4.2	4.4	4.6
Output Gap (per cent of potential output)	- 2.7	- 2.7	- 3.6	- 3.7	- 3.4	- 2.9	- 2.3
World economy							
World GDP at purchasing power parity	3.9	3.1	3.4	4.1	4.4	4.6	4.6
Euro Area GDP	1.5	-0.5	-0.5	1.0	1.3	1.7	1.9
World trade in goods and services	5.7	2.5	3.7	5.6	6.0	6.2	6.3
UK export markets[5]	5.9	1.9	3.4	5.2	5.6	5.7	5.8

Source: OBR.

Figure 3.3: The Bank of England's August 2013 forecasts of GDP growth



Source: Bank of England.

The two sets of forecasts tell a fairly consistent story about the path which the UK economy is set to follow. In both cases, there is a year of recovery during 2013, building on the positive economic data seen during recent months. Thereafter the economy gathers pace through the first half of 2014 and starts to exhibit growth of around 2.5% to 3% per annum – i.e. at historical trend – from mid-2014 onwards.

The Bank of England also helpfully identifies the key uncertainties around the central case. The main downside risk is around the challenges within the eurozone, but there are also concerns about the supply of credit and the impact of government spending cuts. Balanced against this on the upside, the Bank hopes that its new 'forward guidance' will make its stimulatory monetary policy more effective. It is also possible that fears about the eurozone

economies have been exaggerated. Figure 3.3 shows a balanced set of risks around the central case, with the downside probabilities no greater than the upside probabilities in the Bank's estimation.

As far as the global economy is concerned, the figures in table 3.2 show a small slowdown in world GDP growth in 2012 and 2013 as the eurozone slowdown and weak growth in the US affect export-oriented economies around the world. However, the scale of this slowdown is not to be overstated and there is a return to very strong global growth from 2014 onwards.

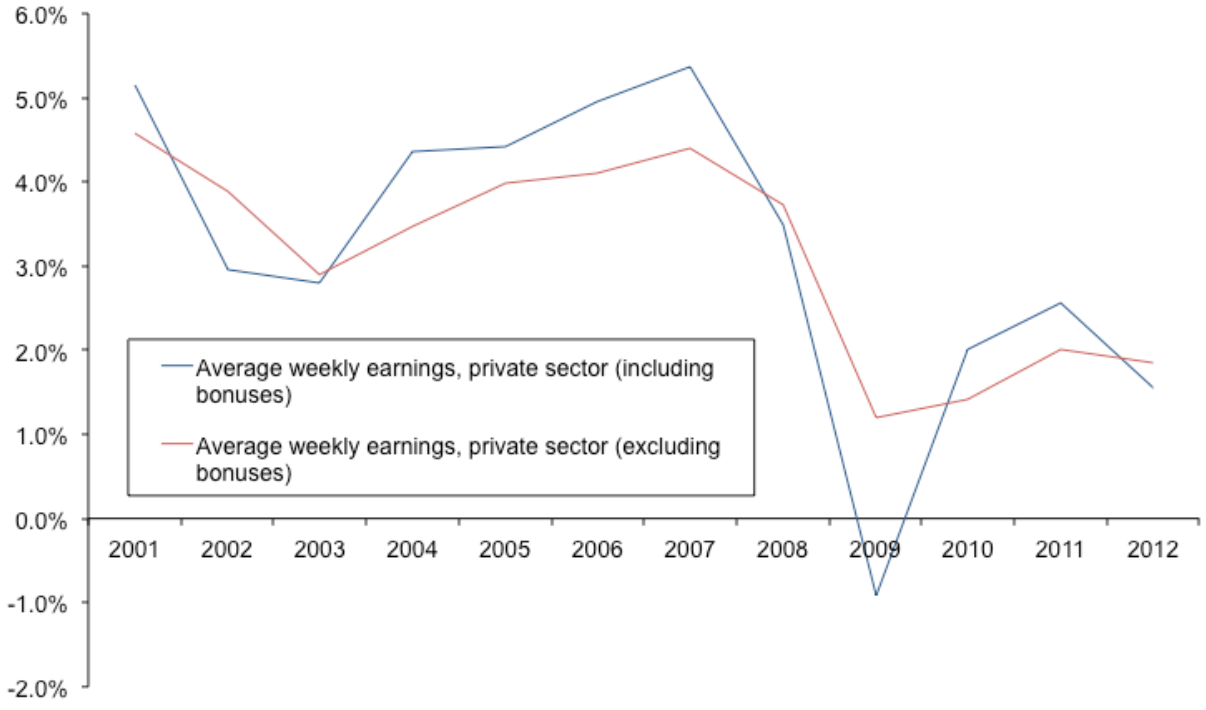
Looked at side-by-side, the implication of these forecasts is that domestic inflationary pressures will start weak before strong global growth and the much-delayed recovery of the UK economy put increasing pressures on prices. We now consider to what extent this is apparent in recent data and what the prognosis is for the 2013/14 to 2019/20 period.

3.3 Detailed input-by-input forecasts

3.3.1 Wages – general labour

Our analysis of wage increases for the majority of people that regulated networks employ has previously been focused around the ONS's average earnings index. This index was discontinued by the ONS in 2010 and observers have been directed instead to the newer average weekly earnings index for information on wage increases across the UK economy. Figure 3.4 plots the series for private sector wages including and excluding bonuses.

Figure 3.4: Private sector wage inflation



Source: ONS.

The chart shows a marked shift in wage pressures due to recession. After growing at an average annual rate of just over 4% on both measures between 2000 and 2008, wages declined in absolute terms in 2009, after accounting for the effects of withdrawn bonuses, and then grew by only 1.5% to 2.5% in 2010, 2011 and 2012. The latest monthly data from June 2013 shows continuing weakness, with annual private-sector wage growth at 2.1% including bonuses and 1.1% excluding bonuses.

Looking forward, the expectation is one of subdued wage growth stretching over a period of up to 3 years. This is based to a large extent on historical experience which shows that pay increases typically lag behind the growth in GDP by several quarters, mainly because recession creates a pool of unemployed workers who compete vigorously for jobs once economic activity picks up and firms resume hiring. Although this recession resulted in fewer redundancies than previous recessions, there are still up to 1m more individuals than normal in unemployment and many more who have been forced onto part-time hours or into jobs that they might not otherwise have taken. This should mean that employers, including water companies, will for a period find that they do not need to offer significant pay increases in order to attract and retain good staff with transferrable skills.

The OBR's March 2013 forecast gives a sense of what sort of increases firms should expect to have to pay during the next five years.

Table 3.5: Labour market forecasts

	Percentage change on a year earlier, unless otherwise stated						
	Outturn	Forecast					
	2011	2012	2013	2014	2015	2016	2017
Labour market							
Employment (millions)	29.2	29.5	29.8	29.9	30.1	30.3	30.5
Wages and salaries	2.7	2.8	2.4	3.1	4.3	4.8	4.8
Average earnings[4]	2.3	2.1	1.4	2.7	3.6	4.0	4.0
ILO unemployment (% rate)	8.1	7.9	7.9	8.0	7.9	7.4	6.9
Claimant count (millions)	1.53	1.59	1.58	1.63	1.59	1.48	1.38

Source: OBR.

The projections have average earnings growth accelerating from 1.4% in 2013 to 4.0% by the end of the forecast period. We use the financial year equivalents as the best available estimates of the wage inflation for workers employed by a water and sewerage company in the period to 2016/17, as set out in table 3.6 below. From 2018/19 onwards we think it is prudent to allow for pay increases in line with the pre-recession growth of average weekly earnings including bonuses of 4.25% per annum.

Table 3.6: General wage inflation

	Average earnings growth
2013/14	1.8%
2014/15	2.9%
2015/16	3.8%
2016/17	4.0%
2017/18	4.0%
2018/19 and thereafter	4.25%

3.3.2 Wages – specialist

In previous reports we have argued that certain types of worker – most notably labour with specialist infrastructure skills like civil engineers, project managers, estimators and surveyors – will be able to extract above-average wage increases. Our contention has been that the coincidence of the ramp up in expenditure and investment that is occurring simultaneously in the different infrastructure industries and the continued existence of skills

shortage in a number of the skilled professions, create a mismatch in supply and demand that gives significant bargaining power to the specialist labour that water companies require. We assumed in the forecasts that we produced that this bargaining power would translate in to a premium of up to 1.5% per annum.

As evidence of these pressures, figure 3.7 compares increases in a BCIS index tracking civil engineering wages to average earnings growth.

Figure 3.7: Wage inflation among civil engineers

Source: ONS, BCIS.

The chart shows that wage increases on the BCIS measure significantly exceeded economy-wide average earning growth between 2002 and 2009. Since 2010, the BCIS measure has increased at a slower rate, mainly due to the contraction of the construction sector.

Going forward, the government has promised £100 billion of expenditure on infrastructure between 2015 and 2020 as part of its comprehensive spending review. Periodic reviews in the energy and rail sectors have provided for a further ramp up in expenditure and the expectation at the time of writing is that PR14 will see investment in the water sector at least remain at current levels. This comes at a time when organisations like Civil Engineering Contractors Association,[4] the Institution of Engineering and Technology[5] the Royal Academy of Engineering[6] are warning of skills shortages.

As a consequence of this competition for specialist skills, wage inflation for specialist labour is almost certain to outstrip average earnings growth. Our reading of figure 3.6 is that it remains prudent to add 1.25% to the base trend in average earnings for the specialist

[4] http://www.ceca.co.uk/media/108089/press_release_-_ceca_-_rising_costs_a_threat_to_growth_-_immed._19th_august_2013.pdf
[5] http://www.theiet.org/factfiles/education/skill-survey-page.cfm?origin=/skills
[6] http://www.raeng.org.uk/news/publications/list/reports/Jobs_and_Growth.pdf

workers in the water sector input mix. This gives inflation expectations for this type of labour set out in the table below.

Table 3.8: Wage inflation for workers with specialist skills

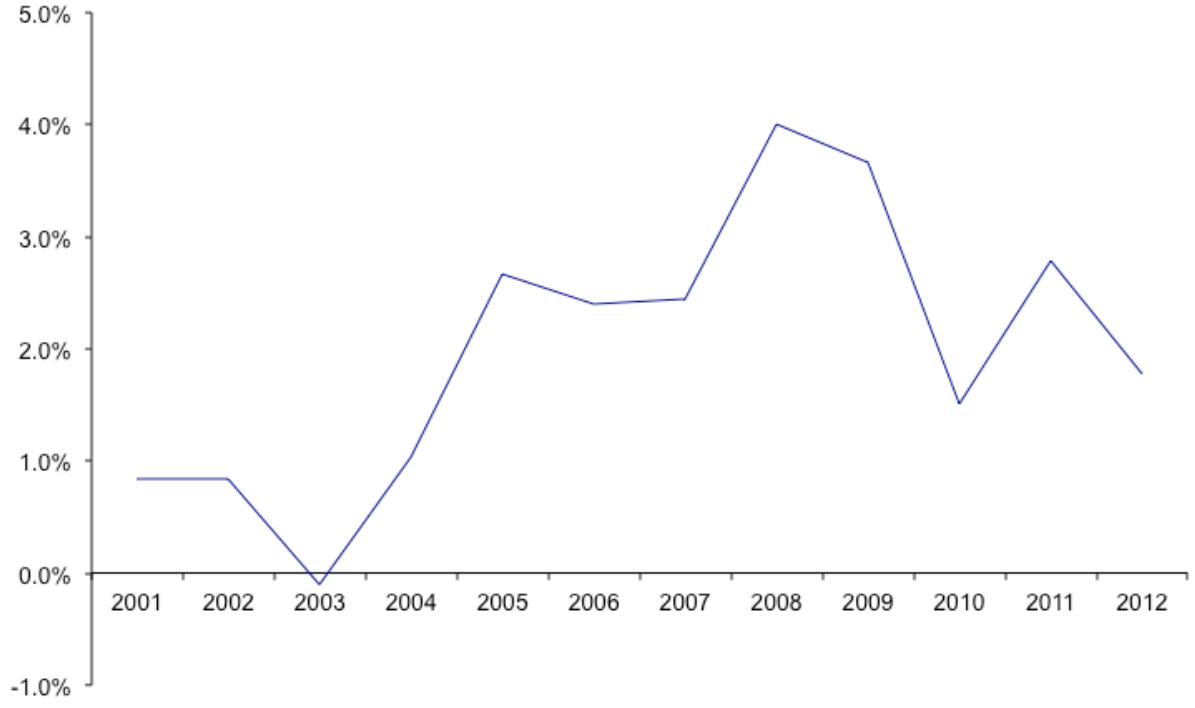
	Specialist wage growth
2013/14	3.05%
2014/15	4.15%
2015/16	5.05%
2016/17	5.25%
2017/18	5.25%
2018/19 and thereafter	4.5%

3.3.3 Materials – parts and machinery

Our analysis of materials input price inflation comes in two parts. We look first at pieces of machinery which are installed on the network. An indication of cost trends in this area can be obtained by looking at the prices that UK firms in general are paying for plant and machinery.

Figure 3.9 plots the annual change in the machinery and equipment component of the ONS's producer input prices index.

Figure 3.9: Annual change in the price paid by firms for machinery and equipment



Source: ONS.

The picture here is very different from the analysis of labour costs. The chart shows that prices have increased quite steadily in recent years even as the UK economy has been in recession. This is to a large extent a reflection of the depreciation of sterling and the consequent 'imported inflation' which buyers of goods have been suffering across the economy.

In making projections of prices during through to 2020, we think it is prudent to assume that cost increases will continue at a similar rate. We therefore allow for annual prices increases of 3% per annum.

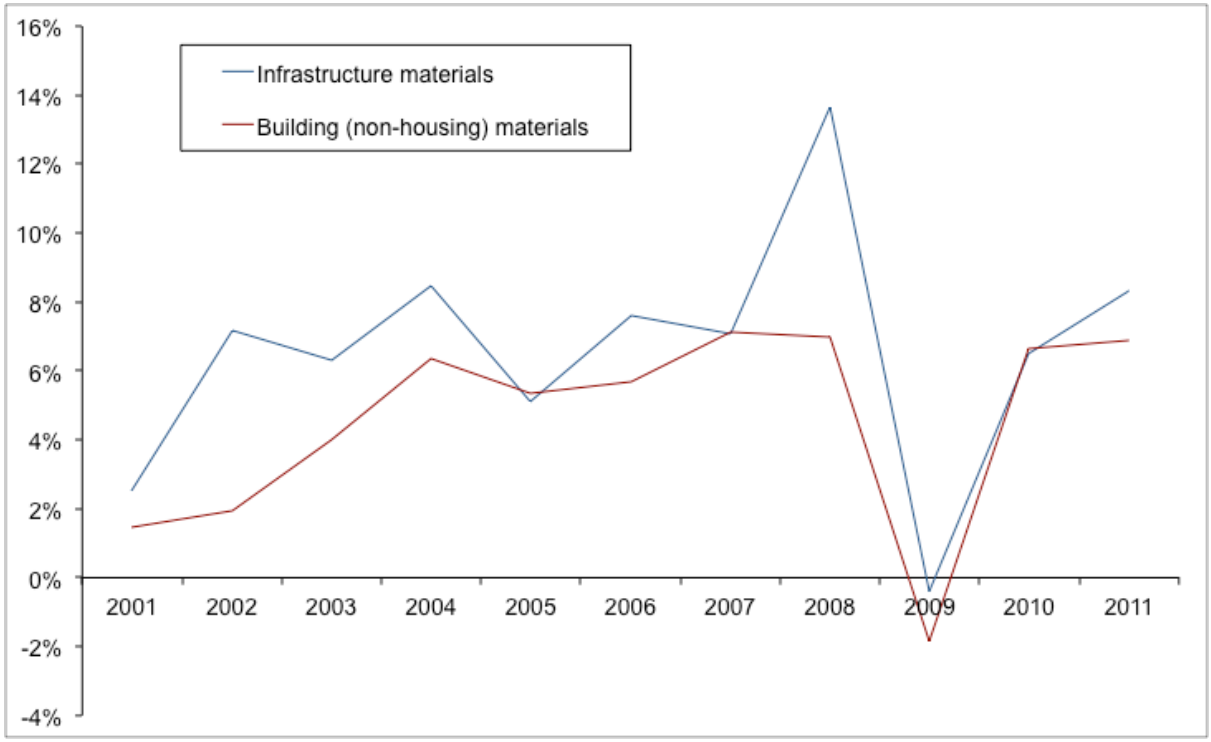
Table 3.10: Forecasts of materials/machinery inflation

	Materials/machinery cost increases
2013/14 and thereafter	3%

3.3.4 Materials – general/civils

A second category of materials comprises the bricks, concrete, metal and plastics that water companies use in construction work. Figure 3.10 plots the BCIS cost of infrastructure materials and cost of construction (non-housing) materials series over the period 2000 to 2012.

Table 3.11: Materials costs



Source: BCIS.

The chart shows that 2009 was the only year since 2002 in which the two indices did not register inflation of more than 4%. Price increases in 2010 and 2011 then exceeded 6%.

We recognise that there is a legitimate view that the price increases that companies have faced since 2005 cannot carry on forever. But at the same time, we do not think it is tenable to argue that price pressures will disappear. We have previously assumed that the rate of increase of general materials costs in steady state is 4.5% and we continue to take the view that this is a reasonable medium-term benchmark to factor into forward-looking price control calculations. In this forecast, we allow for a small slowdown in cost increases in the short term to be consistent with the weakening of global growth over the next year or so.

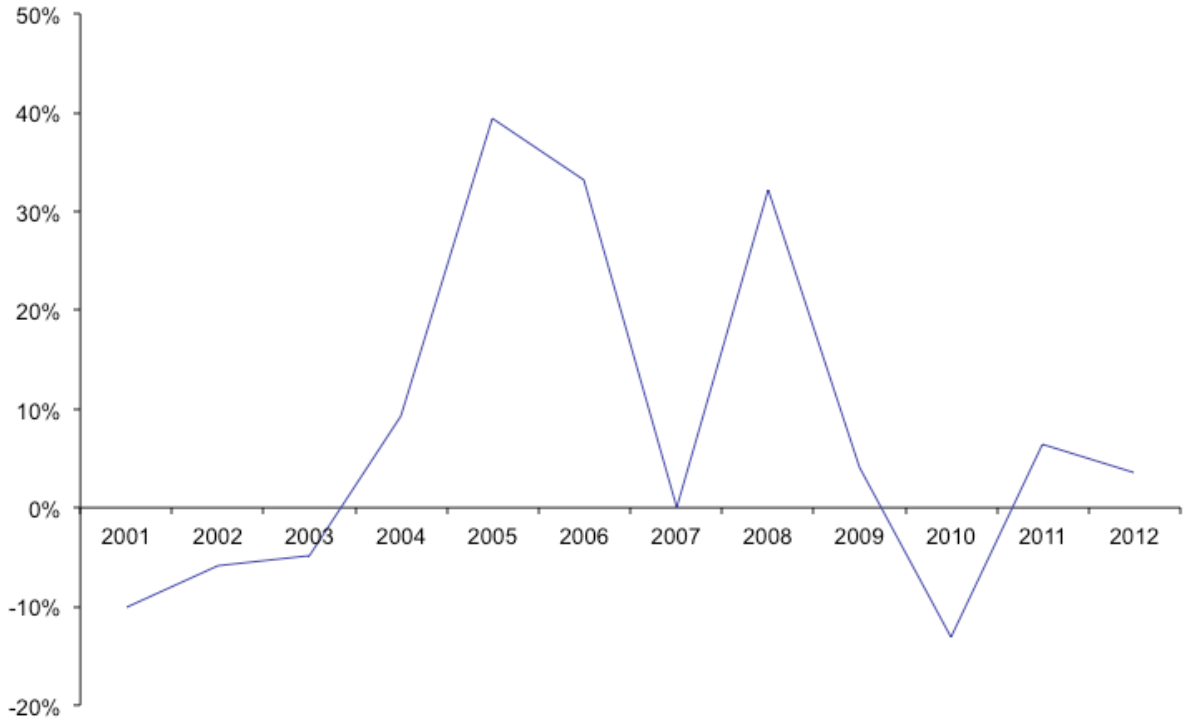
Table 3.12: Forecasts of general/civils materials inflation

	Materials cost increases
2013/14	3.5%
2014/15 and thereafter	4.5%

3.3.5 Power

Power prices have been more volatile than any other input cost in recent years. Figure 3.13 plots DECC's moderately large user electricity purchase cost series.

Figure 3.13: Annual change in electricity purchase costs (p/kWh) for a user with annual demand of between 8.8m kWh and 150m kWh



Source: DECC.

Smoothing out volatility, electricity prices have almost trebled over the last decade. Most of the upward pressure on prices has come from higher fuel costs, but there have also been significant increases in the charges that suppliers must pay to the transmission and distribution networks.

Going forward, the future direction in UK energy prices depends mainly on global oil prices. There is a wide range of available forecasts, reflecting, understandably, considerable uncertainty about the underlying geopolitics. We think that it is prudent to allow for further significant increases in electricity purchase costs in the period to 2019/20. Future volatility will almost certainly mean that such a forecast proves to be too high or too low in individual years, but by allowing for a long term trend increase in costs, we can capture the fundamentals of continued strong global demand and scarcity of supply, the combination of which very clearly points towards price increases.

Our forecast is taken directly from the Department of Energy and Climate Change's (DECC's) October 2012 energy and emissions projections, as interpreted by PwC.

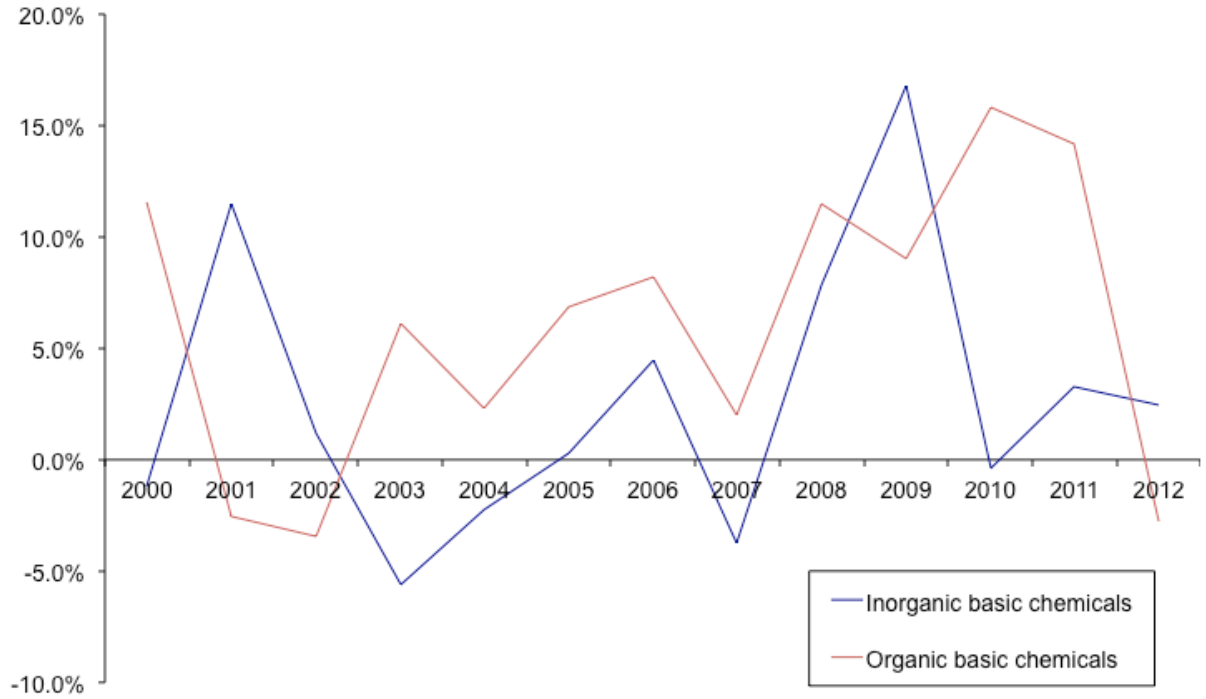
Table 3.14: Forecasts of electricity purchase costs

	Industrial electricity price increases
2013/14	17.3%
2014/15	13.5%
2015/16	9.4%
2016/17	9.7%
2017/18	3.4%
2018/19	4.9%
2019/20	4.2%

3.3.6 Chemicals

The picture for chemicals is also quite volatile. Figure 3.15 plots the annual change in the inorganic chemicals and organic chemicals components of the ONS producer input prices index.

Figure 3.15: Annual change in the price paid by firms for chemicals, chemical products and man-made fibres



Source: ONS.

The charts tell a story of gradually increasing prices, especially for organic chemicals. The ONS indices for 2012 are 23% higher than in 2002 for inorganic chemicals and 100% higher than in 2002 for organic chemicals.

The main driver of cost increases is, once again, growing global demand for raw commodities, driven in turn by rapid economic growth in less developed parts of the world. In forecasting what will happen to these indices in the coming months and years, one has to take account first and foremost of likely commodity price movements. Here the story for the foreseeable future remains one of continued strong demand from China and other developing countries putting pressure on supply and driving prices up. Insofar as the outlook for global economic growth is one of reasonably good growth in 2013 and 2014 followed by

strong and stable expansion (as shown in the OBR forecasts in table 3.2 above), the likeliest or central scenario has to be one in which prices move in line with the average rates of growth that have been observed in our selected indices since around 2003.

This points to an average increase in prices of around 5% per annum. We allow a glidepath to this trend during 2013/14.

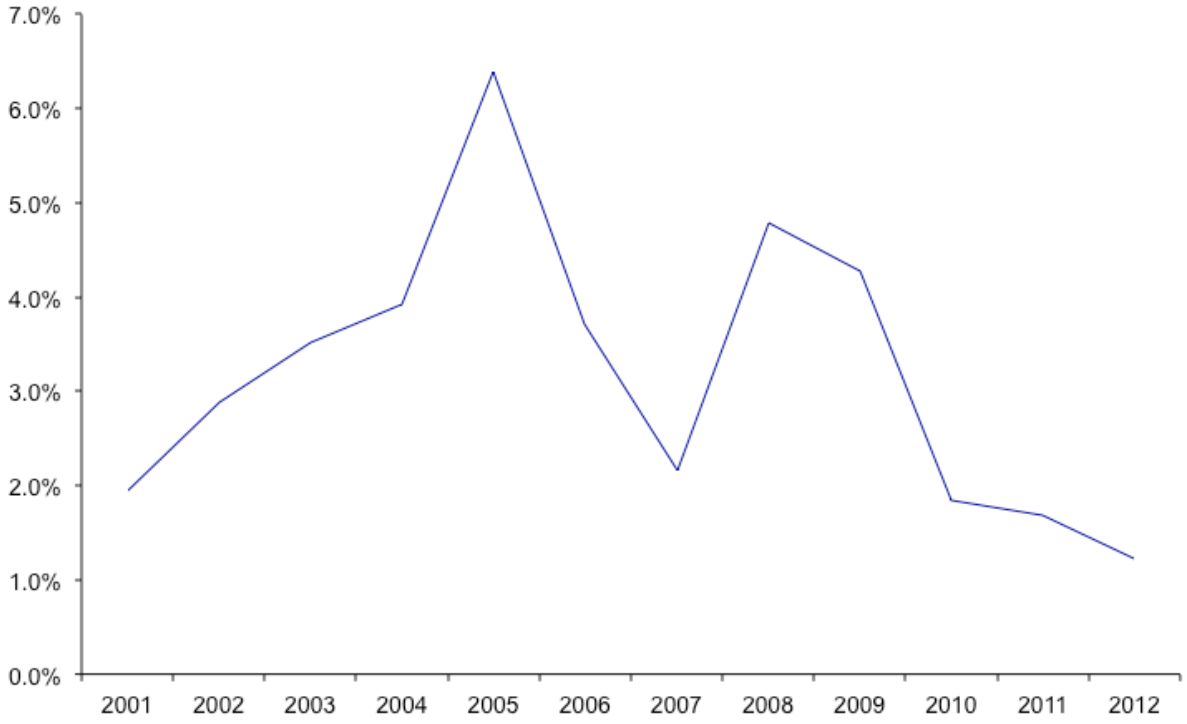
Table 3.16: Forecasts of chemicals inflation

	Chemicals cost increases
2013/14	3%
2014/15 and thereafter	5%

3.3.7 Plant and equipment

The best indicator of the cost pressures impacting on the plant and equipment that water companies use to repair and extend their networks is the BCIS plant and road vehicles index. Figure 3.17 plots the annual change in this index over the period 2000 to 2012.

Figure 3.17: Plant and equipment cost increases



Source: BCIS.

The chart shows a discernible slowing of price pressures in 2010, 2011 and 2012. This probably reflects redundancy in the construction sector generally, which has been of benefit to all purchasers/leasers of plant and equipment that is used for the purposes of transporting and installing materials.

On the basis of pre-2008 experience, we have suggested in previous reports that it is prudent to allow for comparable price increases of 4% per annum in the medium term. The most recent evidence does nothing to alter our views on this matter. As elsewhere, we provide for a glidepath to this run rate.

Table 3.18: Plant and equipment cost inflation

	Plant and equipment cost increases
2013/14	3%
2014/15 and thereafter	4%

3.3.8 Business rates

The total amount that local councils collect in rates is indexed in accordance with RPI-measured inflation in the preceding September. Although it is possible that five-year revaluations will rebase the contributions paid by water companies upwards or downwards, it is reasonable for us to provide for RPI-linked increases in this study.

The figures below come from the OBR's March 2013 economic forecasts for September-to-September RPI inflation.

Table 3.19: Business rates increases

	Annual change
2013/14	2.6%
2014/15	3.3%
2015/16	2.8%
2016/17	3.2%
2017/18	3.6%
2018/19	3.9%
2019/20	3.4%

3.3.9 EA charges

We have no specific insight into the rate at which EA charges will increase in the period to 2019/20. Ofwat and the Competition Commission have previously assumed that charges will move in line with RPI. We use the same assumption.

Our figures come from the OBR's March 2013 economic forecast for RPI inflation by financial year.

Table 3.20: EA charges increases

	Annual change
2013/14	3.1%
2014/15	2.9%
2015/16	3.3%
2016/17	3.7%
2017/18	4.0%
2018/19	3.4%
2019/20	3.4%

3.3.10 Doubtful debt

The industry has seen bad debts increase substantially during recent years as a result of recession and the government's ban on disconnection. The trend going forward will be influenced by:

- future increases in bills;
- the manner in which customers respond to price increases;
- the wider macroeconomic environment; and
- the success of new initiatives to deter non-payment.

For the purposes of this high-level study we make the simple assumption that bad debts remain a constant percentage of companies' annual billing. The trend in revenues depends on the K values which Ofwat announces at the end of PR14 and it is obviously beyond the scope of this study to predict what price increases will be allowed. We therefore use a notional K of zero and allow for increases in bad debts in line with RPI.

As in the case of business rates, our figures come from the OBR's March 2013 economic forecast for RPI inflation by financial year.

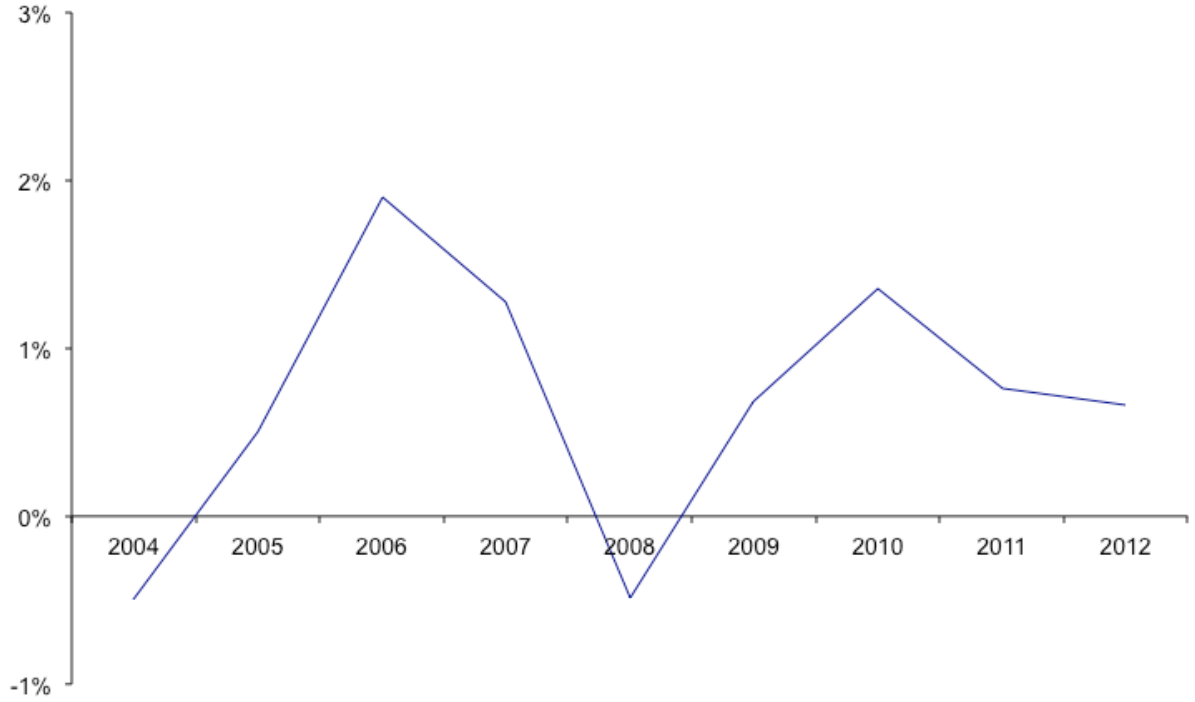
Table 3.21: Bad debt increases

	Annual change
2013/14	3.1%
2014/15	2.9%
2015/16	3.3%
2016/17	3.7%
2017/18	4.0%
2018/19	3.4%
2019/20	3.4%

3.3.11 Business IT

The prices of IT products and services are notoriously difficult to track on a consistent, like-for-like basis. After suspending the publication of its corporate IT price indices in 1999, the ONS launched a new data series in 2005 as part of its experimental service producer price index. Figure 3.22 plots the data.

Figure 3.22: Business IT cost increases



Source: ONS.

Our reading of this chart is that business IT costs are not as unpredictable as wage costs. Historical readings of the annual rate of change in the index have been within a fairly narrow -0.5% to +2% range.

Going forward, it would seem prudent to provide for a flat annual price inflation allowance at the mid-point of this range. We therefore provide for price increases of 0.75% per annum.

Table 3.23: Business IT cost inflation

	IT cost increases
2013/14 and thereafter	0.75%

3.3.12 Bulk supplies

South East Water takes bulk supplies from other water companies. We understand that the costs of these supplies during AMP6 has not yet been determined. We assume that price increases match the average annual rate of increase in the rest of the input basket.

3.4 Summary

Table 3.24 summarises the estimates that have been given in the preceding analysis.

Table 3.24: Summary of input price inflation forecasts (%)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Labour – general	1.8	2.9	3.8	4.0	4.0	4.25	4.25
Labour –specialist	3.05	4.15	5.05	5.05	5.05	5.5	5.5
Materials – machinery	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Materials – civils	3.5	4.5	4.5	4.5	4.5	4.5	4.5
Power	17.3	13.5	9.4	9.7	3.4	4.9	4.2
Chemicals	3.0	5.0	5.0	5.0	5.0	5.0	5.0
Plant and equipment	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Business rates	2.6	3.3	2.8	3.2	3.6	3.9	3.4
Bad debt	3.1	2.9	3.3	3.7	4.0	3.4	3.4
EA charges	3.1	2.9	3.3	3.7	4.0	3.4	3.4
Business IT	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Bulk supplies	4.3	4.5	4.3	4.6	3.8	4.1	4.0

4. Productivity Growth

4.1 Benchmarking

The extent to which productivity growth can be expected to offset the input price pressures identified in section 3 depends on a number of factors, including:

- the pace of technical progress affecting the sector;
- the availability of opportunities to reduce overheads; and
- companies' ability to bring better working practices to bear on their operational activities.

Evidence of historical rates of productivity growth in the water industry (and elsewhere in the utility sector) gives some sense of the industry's potential in these areas, but is distorted by a step change in productivity after privatisation and by the impact of a large ongoing quality programme. A better source of information is the historical total factor productivity (TFP) improvements achieved by competitive sectors of the UK economy which are in some way similar to the water industry. The most up-to-date source for this type of data is the EU KLEMS project which looked at economic growth, productivity and technological change for all European Union member states during the period 1970 to 2007. A database released to the public in 2008 and updated in 2011 allows researchers to analyse TFP growth on an industry-by-industry basis and to compare/benchmark the historical performance of UK companies against firms from elsewhere.

For the purposes of analysing the potential to improve productivity in the water industry, data for four generic types of sector are especially interesting:

- sectors in which a product is being processed or produced;
- sectors where firms are repairing/maintaining existing assets or operating some sort of established asset/network;
- sectors where the core activity is the provision of a business service; and
- sectors in which physical buildings or infrastructure is being constructed.

In each case, the competitive industries in this list can be said to be carrying out activities which bear similarities to the activities contained within a water company's costs. Knowing what productivity trends in these industries have been may therefore help to reveal the underlying potential for the water industry to deliver productivity improvements of its own.

Table 4.1 shows average annual TFP growth rates in a selection of comparator industries for the 1970 to 2007 period as a whole and for the more recent 1990 to 2007 period. The definition of TFP growth that we have used is value-added TFP growth.

Table 4.1: Annual total factor productivity growth (%) by sector

	UK Sector	1970 to 2007	1990 to 2007
A	Manufacturing	1.8	1.9
B	Electricity, gas and water supply	2.2	0.9
C	Sale, maintenance and repair of motor vehicles; retail sale of fuel	2.0	2.6
D	Transport and storage	2.1	1.7
E	Finance, insurance, real estate and business services	(0.9)	0.3
F	Construction	0.7	0.6

Source: EU KLEMS.

It is apparent from table 4.1 that perceptions of the water industry's productivity improvement potential depend on which of the periods is seen as providing the best guide to future performance and on which of the industries are considered to be the best comparators. On the first of these points, we have a strong preference for using up-to-date information. It is not at all clear to us how data on productivity growth from the 1970s and, to some extent, the 1980s can act as a reliable indicator of what might be expected of companies in the period to 2020. Although there are difficulties with any approach that seeks to extrapolate from the past to predict the future, we are much more confident in using data from the most recent business cycle (i.e. 1990 to 2007) in such an exercise.

On the second point, previous studies in this field have sought to weight the different components of table 4.1 in line with the 'nature of work' involved in running a water and sewerage network. Although by no means completely precise, an overall comparator constructed in this way ought to show how the different rates of productivity growth affecting different parts of a company's business come together at the overall company level.

Our nature of work comparator is shown in table 4.2.

Table 4.2: Nature of work comparator

Activity	% of costs	Comparators	Annual productivity growth (1990 to 2005 benchmark)
Wholesale opex			
Water resources and treatment	25%	A	1.9%
Water distribution	25%	BCD	1.7%
Indirect costs	35%	E	0.3%
EA charges, business rates, other	15%	-	-
Weighted average			1.0%
Wholesale capex			
All	100%	F	0.6%
Retail costs			
All	100%	E	0.3%

The weights in the wholesale opex calculations are taken from our analysis of companies' June returns. For a typical company, we identify 25% of wholesale costs in 'production' activities, 25% of costs in running and maintaining networks, 35% of costs in business support services and a further 15% of costs in business rates, EA charges and other.

The productivity trends shown in the final column are the simple averages from the relevant rows of table 4.1.

When the two columns of table 4.2 are combined, the average annual rate of productivity improvement affecting a typical water company is 1% per annum in wholesale opex, 0.6% per annum in wholesale capex and 0.3% per annum in retail costs.

To put these figures in to some sort of perspective, the rate of value-added productivity improvement for the UK as a whole between 1990 and 2007 was around 0.7% per annum.

4.2 Adjustments

In other studies of this type, including previous First Economics reports, adjustments have sometimes been made to the figures in table 4.2 to account for:

- the possibility that some of the reported productivity growth in comparator industries is 'catch-up' to the efficiency frontier rather than frontier shift; and
- the effects of large investment programmes and capital substitution on opex and capex productivity improvement.

We do not consider it appropriate to make any adjustments in this study for reasons that are set out in more detail in annex 2. In looking at the literature that has built up during recent periodic reviews across the regulated sectors, it is apparent that there is no consensus on the scale of such adjustments or, indeed, the need for adjustments at all. It is also apparent that the adjustments act in different directions, making it very difficult to judge whether the net effect is up or down.

Rather than make spuriously accurate adjustments to the table 4.2 figures, we prefer instead to leave the benchmarks as they are. We take comfort from the fact that the sense checks we provide in section 5 suggest that the numbers are in broadly the right place.

5. Overall Cost Escalation Calculations and Cross Checks

5.1 Expected cost escalation

South East Water has told us that the component parts of its expenditure combine with the following weights.

Table 5.1: Input mix

Input	% of expenditure
Wholesale opex	
Labour – general	50
Materials – parts/equipment	7
Power	13
Chemicals	2
Business rates	13
EA charges	5
Bulk supplies	5
Other	5
Wholesale capex	
Labour – general	30
Labour – specialist	15
Materials – parts/equipment	10
Materials – civils	15
Plant and equipment	25
Other	5
Household retail costs	
Labour – general	45
Business IT	10
Doubtful debt	35
Other	10
Non-household retail costs	
Labour – general	55
Business IT	10
Doubtful debt	25
Other	10

Table 5.2 gives estimates of aggregate input price inflation, productivity growth and overall cost escalation by cost type.

The only extra assumptions that we need beyond those set out in sections 3 and 4 is the annual rate of change in other costs. We have provided for increases in wholesale opex and wholesale capex in line with RPI. In the case of retail costs, we obtained better visibility of smaller cost items – postage costs, rents, motoring costs – in an April 2013 study and concluded that other costs are likely to increase by 2% per annum. We use the same assumption here.

Table 5.2: Calculations (%)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Wholesale opex							
Input price inflation	4.3	4.5	4.3	4.6	3.8	4.1	3.0
Productivity growth	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)
Cost escalation	3.3	3.5	3.3	3.6	2.8	3.1	2.0
Wholesale capex							
Input price inflation	2.7	3.6	4.0	4.1	4.2	4.2	4.2
Productivity growth	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)
Cost escalation	2.1	3.0	3.4	3.5	3.6	3.6	3.6
Household retail costs							
Input price inflation	2.2	2.6	3.1	3.4	3.5	3.4	3.4
Productivity growth	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Cost escalation	1.9	2.3	2.8	3.1	3.2	3.1	3.1
Non-household retail costs							
Input price inflation	2.0	2.6	3.2	3.4	3.5	3.5	3.5
Productivity growth	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Cost escalation	1.7	2.3	2.9	3.1	3.2	3.2	3.2

The calculations show that:

- wholesale opex can be expected to increase by between 2.8% and 3.6% per annum;
- wholesale capex costs are likely to increase by 2.1% at the start of the forecast period rising to 3.6% per annum at the end of the period; and
- the expected increase in retail costs is below 2% in 2013/14 but rises to around 3% for the whole of the AMP7 control period.

5.2 Cross-check 1: recent industry cost data

One obvious sense check to apply to the estimates in table 5.2 is a comparison to the actual rate of cost escalation in England & Wales in recent years.

5.2.1 Wholesale opex

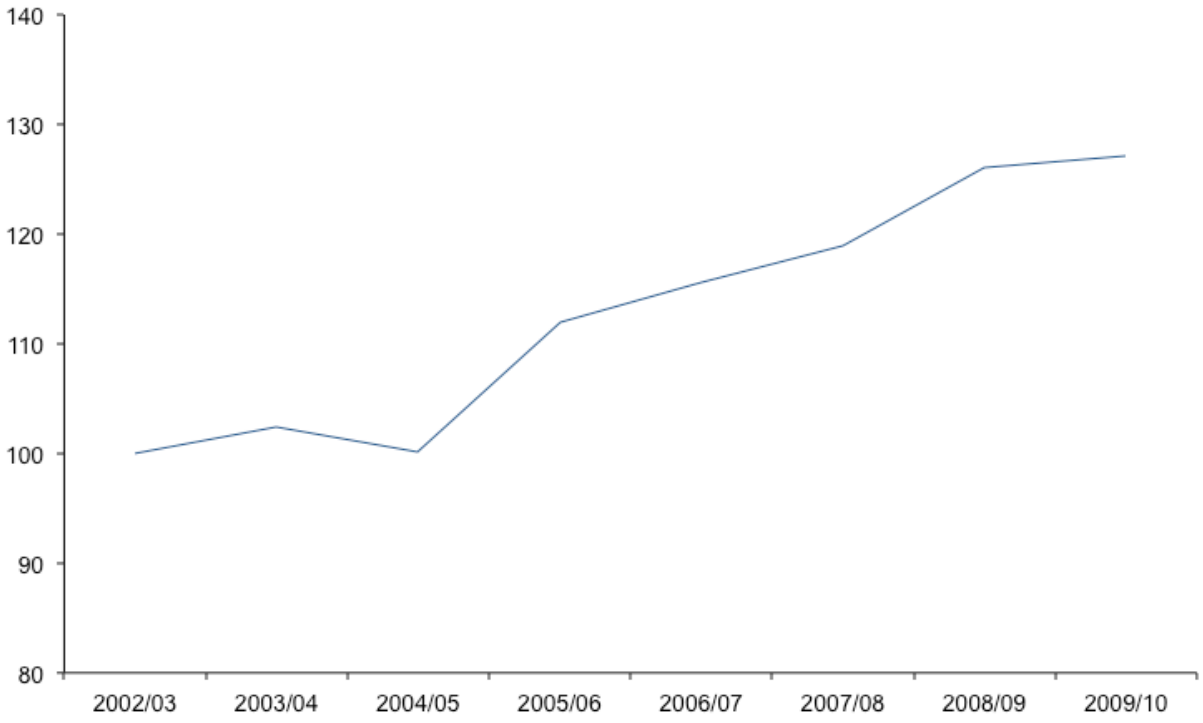
Table 5.3 and figure 5.4 attempt to calculate the rate of wholesale opex frontier shift using base opex data for the frontier water company in 2009/10 – Yorkshire Water. The experience of this business is a relevant benchmark because the company has been at the top of Ofwat's efficiency rankings for a number of years. As a consequence, the recent trend in the business's base opex provides the best available insights into what has been going on at the industry's efficiency frontier, excluding any catch-up effects.

Table 5.3: Base opex (excluding exceptionals), nominal £m

	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Yorkshire, water	108.3	110.9	108.5	121.3	125.2	128.9	136.5	137.6

Note: to construct consistent data series we have re-based AMP4 opex in line with the methodology outlined in Ofwat's 7 March 2006 instructions to companies. We have also corrected for changes in customer supply pipe repair accounting policies.

Figure 5.4: Base opex (excluding exceptionals) in nominal terms, 2002/03 = 100



The data shows an upward drift in costs at an average rate of just over 3% per annum. This is broadly comparable to the rate of cost increase that we have in our forecasts.

We take this to mean that the estimates that we have in table 5.2 are in the right ballpark.

5.2.2 Wholesale capex

We do not have access to data for the annual rate of change in water companies' capital unit costs. Published data refers to total capital expenditure only.

5.2.3 Retail costs

The most useful points of reference for retail costs are contained within:

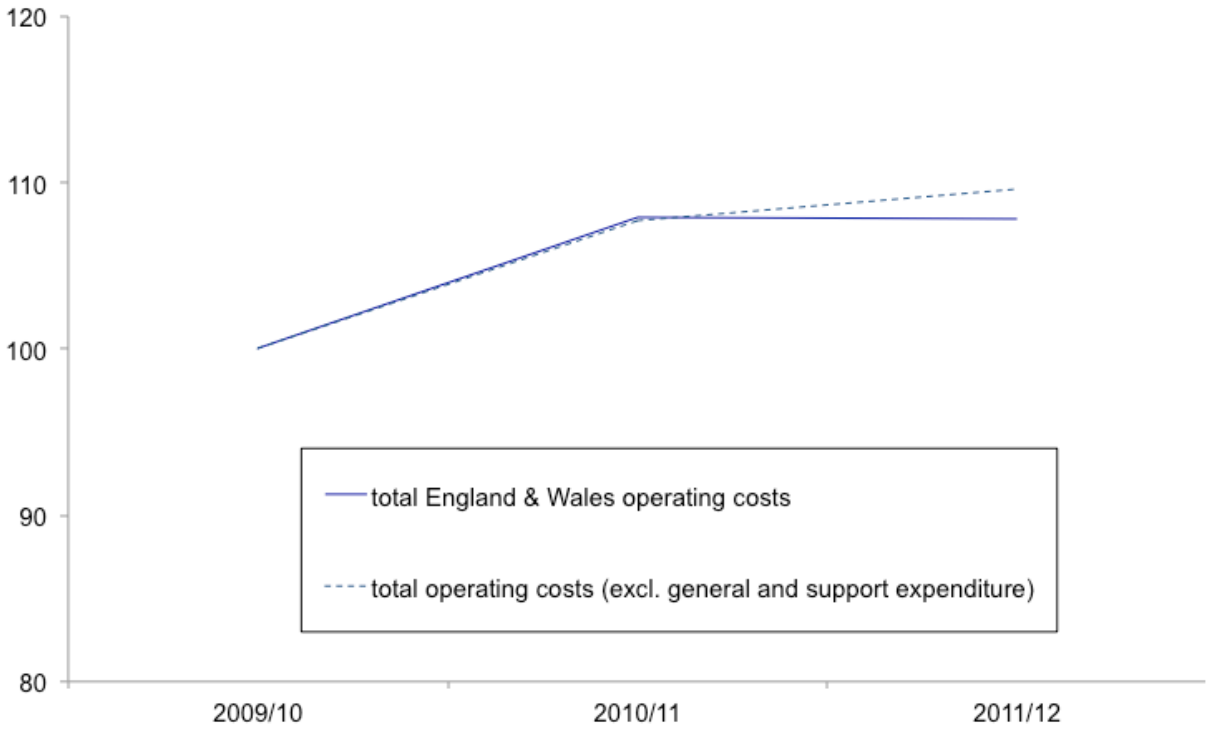
- the June Return table 21b figures for total retail costs; and
- the June Return table 21 figures for customer services costs.

The table 21b figures correspond most closely to the retail costs that Ofwat will be allowing for in 2015-20 price controls, but it is a relatively short series of data covering 2009/10, 2010/11 and 2011/12 only. The table 21 figures, by contrast, give an incomplete picture of

retail costs, but do pick up the largest retail cost category and, most importantly, comprise a 20-year series of data.

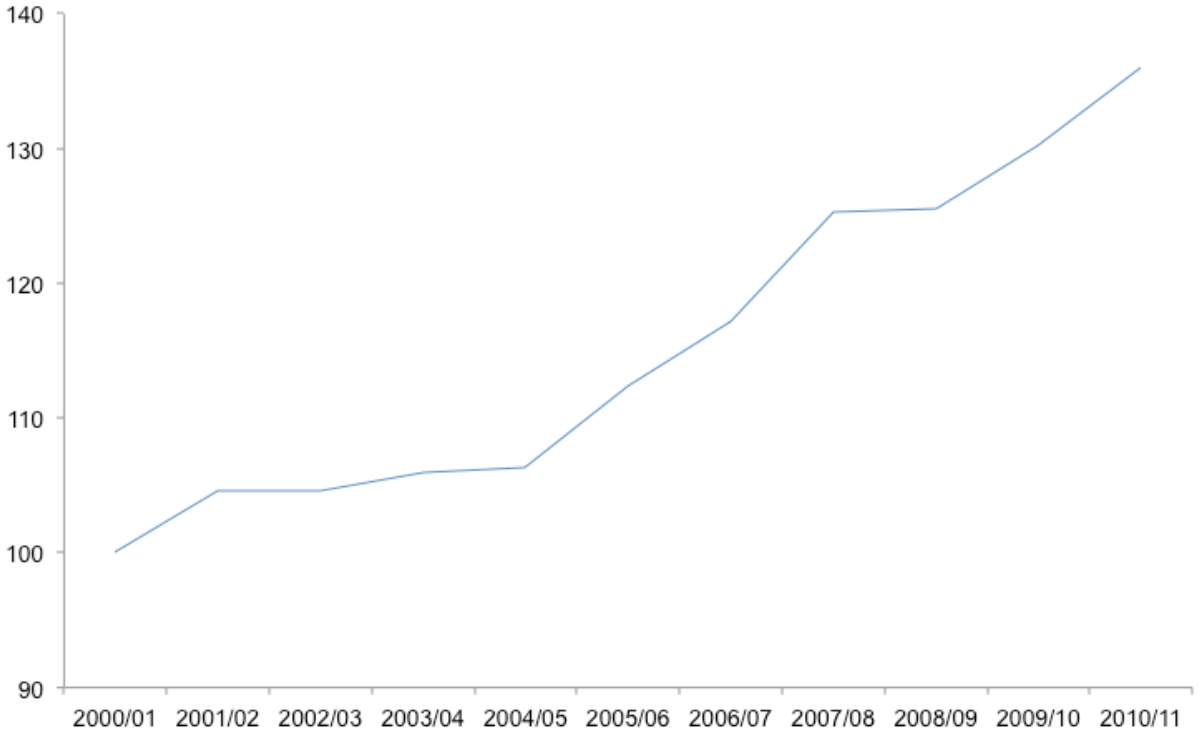
Figures 5.5 and 5.6 summarises the trends in total industry costs over time.

Figure 5.5: Table 21b retail costs



Source: June Returns.

Figure 5.6: Table 21 customer services costs



Source: June Returns.

The key points that we take from these charts are as follows:

- the table 21b data shows that total industry retail operating costs were 7% higher in 2011/12 compared to two years earlier in 2009/10. It is possible, however, that this figure is distorted by what looks to have been a reclassification of certain general and support costs by some companies during 2011/12. If we exclude such costs, the rate of increase in industry costs over the two years was 9%; and

- the longer series of table 21 data shows that customer service costs have increased steadily over time. Total industry costs in 2010/11 were 36% higher in 2010/11 than in 2000/01.

Both of these data sets therefore suggest that a projected annual increase of up to 3% per annum is in line with historical experience.

5.3 Cross-check 2: regulatory precedent

The water industry is not the only sector that has had to think about the long-term underlying trend in companies' costs. Table 5.7 summarises estimates of frontier shift in other recent periodic reviews.

Table 5.7: Summary of recent opex[7] frontier shift estimates (annual)

	Decisions issued between 2008 and 2010	Decisions issued in 2012
Network opex		
Ofgem – electricity transmission	–	RPI – 0.5%
Ofgem – gas transmission	–	RPI – 0.4%
Ofgem – gas distribution	RPI + 0.4%	RPI – 0.6%
Ofgem – electricity distribution		–
Ofwat – water Ofwat – sewerage	RPI – 0.25%	–
Competition Commission – water	RPI – 0.25%	–
ORR – Network Rail, opex	RPI + 0.75%	–
ORR – Network Rail, maintenance	RPI + 0%	–
PPP Arbiter – underground infracos, central costs	RPI + 0.8%	–
PPP Arbiter – underground infracos, opex	RPI + 0.3%	–
Network capex		
Ofgem – electricity transmission	–	RPI + 0.1%
Ofgem – gas transmission	–	RPI – 0.3%
Ofgem – gas distribution	–	RPI – 0.2%
Ofgem – electricity distribution	RPI + 0.1%	–
ORR – Network Rail, renewals capex	RPI + 0%	–
PPP Arbiter – underground infracos, capex	RPI + 0%	–

[7] The costs covered by the figures in table 5.8 vary slightly from industry to industry. Of particular note, Ofgem, Ofwat and ORR all make separate allowance – i.e. over and above the stated figures – for changes in business rates. In addition, Ofwat in PR09 made separate allowance for increases in some (but not necessarily frontier) companies' power costs. All four regulators also deal with changes in pension contributions separately. If these uplifts are factored into the calculations they would tend to increase the figures quoted in the table.

The table shows that regulatory determinations made between 2008 and 2010 typically estimated the rate of frontier shift to be at or just above RPI-measured inflation. The exception to this rule was Ofwat's PR09 frontier shift calculation, which the Competition Commission confirmed in its 2010 Bristol Water decision. More recently, Ofgem in its RIIO-T1 and RIIO-GD1 has allowed for below-RPI increases in costs.

At first sight, a cross-check between table 5.2 and table 5.7 suggests that we have got our estimates of frontier shift about right. A more detailed reading of these decisions adds further corroboration to this view.

First, we note that our estimate of frontier productivity growth sits squarely in line with regulatory precedent. Table 5.8 isolates the assumptions appearing in the above determinations. Our 1% and 0.6% figures slot quite naturally into this table.

Table 5.8: Regulators' calculations of productivity growth at the industry frontier

	% reduction in opex per annum
Network opex	
NIAUR – gas distribution	(1.0%)
Ofgem – electricity distribution	(1.0%)
Ofgem – electricity/gas transmission	(1.0%)
Competition Commission – water	(0.9%)
ORR – Network Rail, opex	(0.7%)
ORR – Network Rail, maintenance	(1.4%)
PPP Arbiter – underground infracos, central costs	(0.7%)
PPP Arbiter – underground infracos, opex	(0.9%)
Network capex	
Ofgem – electricity transmission	(0.7%)
Ofgem – gas transmission	(0.7%)
Ofgem – gas distribution	(0.7%)
Ofgem – electricity distribution	(1.0%)
ORR – Network Rail, renewals capex	(1.2%)
PPP Arbiter – underground infracos, capex	(0.7%)

Second, it is important when making comparisons between regulatory decisions made at different points in time to allow for differences in the macroeconomic conditions that the regulators were dealing with. In particular, section 3 and table 5.2 shows very clearly that input price inflation and RPI-measured inflation are not constants and there is no reason a priori to think that an input price inflation forecast made in 2009 will be the same as an estimate of frontier shift made in 2012.

This is evident from the Ofgem entries in table 5.7. Its 2012 RIIO-GD1 estimate of cost escalation for the period 2012/13 to 2022/23 is 1 percentage point per annum lower than its 2009 DPCR5 estimate of frontier shift between 2009/10 and 2014/15. Ofgem has made no major change in its methodology between these two reviews, but it has recognised the effects of recession and the shift up in expected RPI-measured inflation that we identified in section 3. This means that it has arrived quite logically at a below-RPI estimate of frontier shift in its 2012 proposals as opposed to an above-RPI estimate in 2009.

If we control for the time-varying nature of input price inflation and RPI-measured inflation, we can show that our estimates of water and sewerage opex frontier shift are broadly consistent with the Competition Commission's 2010 estimates in the Bristol Water inquiry. Table 5.9 compares our input price forecasts for 2019/20 with the Competition Commission's frontier shift calculation 2014/15. In both cases we are looking at what is/was considered to be a sort of 'exit rate' or medium- to long-term equilibrium trend which the industry reverts to after riding out short term volatility in prices.

Table 5.9: Estimates of frontier shift in the medium to long term

	First Economics	Competition Commission
Input price inflation	4.25	4.3
Labour	3.0	1.5
Materials – machinery/parts	5.0	1.8
Chemicals	n/a	n/a
Power	RPI	RPI
Rates	RPI	RPI
Bad debt	RPI	RPI
EA charges	RPI	RPI
Other		
Productivity growth	(1.0)	(0.9)

The table contains broadly comparable estimates of nominal input price inflation and productivity growth. The only meaningful difference is in the forecasts of materials and chemicals costs, which have weights of only 0.075 and 0.025 in the overall calculations. For these inputs, we found in section 3 that actual cost increases have been above the CC's 'equilibrium' estimates for the past 6-7 years, which we think adequately justifies an upward revision to the CC's numbers.

5.4 Recommendations

Having performed the cross-checks set out in sections 5.2 and 5.3 we are content that our estimates of input price inflation and productivity growth combine to give a reasonable and robust estimate of the cost escalation that South East Water is likely to have to deal with during the next seven years. We therefore recommend that the figures in table 5.10 should be included in South East Water's forthcoming business plan.

Table 5.10: Expected cost escalation (%)

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Wholesale opex							
Input price inflation	4.3	4.5	4.3	4.6	3.8	4.1	3.0
Productivity growth	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)
Cost escalation	3.3	3.5	3.3	3.6	2.8	3.1	2.0
Wholesale capex							
Input price inflation	2.7	3.6	4.0	4.1	4.2	4.2	4.2
Productivity growth	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)	(0.6)
Cost escalation	2.1	3.0	3.4	3.5	3.6	3.6	3.6

<u>Household retail costs</u>							
Input price inflation	2.2	2.6	3.1	3.4	3.5	3.4	3.4
Productivity growth	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Cost escalation	1.9	2.3	2.8	3.1	3.2	3.1	3.1
<u>Non-household retail costs</u>							
Input price inflation	2.0	2.6	3.2	3.4	3.5	3.5	3.5
Productivity growth	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)
Cost escalation	1.7	2.3	2.9	3.1	3.2	3.2	3.2

Annex 1: Using This Report

A1.1 Wholesale opex

The opex cost escalation forecasts in this report are very closely related to what in previous reviews was labelled 'continuing efficiency'. That is:

continuing efficiency	=	input price inflation	*less*
		frontier productivity growth	*less*
		expected RPI inflation	
	=	cost escalation	*less*
		expected RPI inflation	

South East Water might therefore wish to strip our nominal cost escalation estimates of its business plan estimate of RPI inflation and then use our numbers in the same way that it has used a continuing efficiency assumption in previous periodic reviews. We do not prescribe here what the RPI inflation estimates should be, recognising that companies will want to use consistent RPI inflation forecasts through all aspects of their business plans.

A1.2 Wholesale capex

The capex cost escalation forecasts can be used in a similar way to the construction output price inflation (COPI) forecasts that South East Water will have used in previous periodic reviews. The two measures are not exactly the same:

- COPI measures unit cost increases in the wider construction sector and has for some time been known to misstate the cost pressures impacting on the water industry;
- COPI has a more lagged structure, in that COPI readings in a given quarter are determined by contracts costed and signed up to three years earlier; and
- in addition to input price inflation and productivity growth, COPI is affected by changes in contractor margins.

We leave it to South East Water to consider how best to allow for these factors, if at all. Our advice is that some adjustment to our estimates maybe required, particularly for the third of the above factors, in substituting our numbers for a pure COPI forecast.

A1.3 Retail costs

Ofwat indicated in its July 2013 PR14 methodology document that it required compelling evidence from companies to convince it that retail costs would move over time from their current level. We think that the analysis in this paper can contribute to this evidence base. We leave it to South East Water to decide whether the cost escalation that we have identified should be allowed for in the cost line or the margin line of the retail price cap calculation.

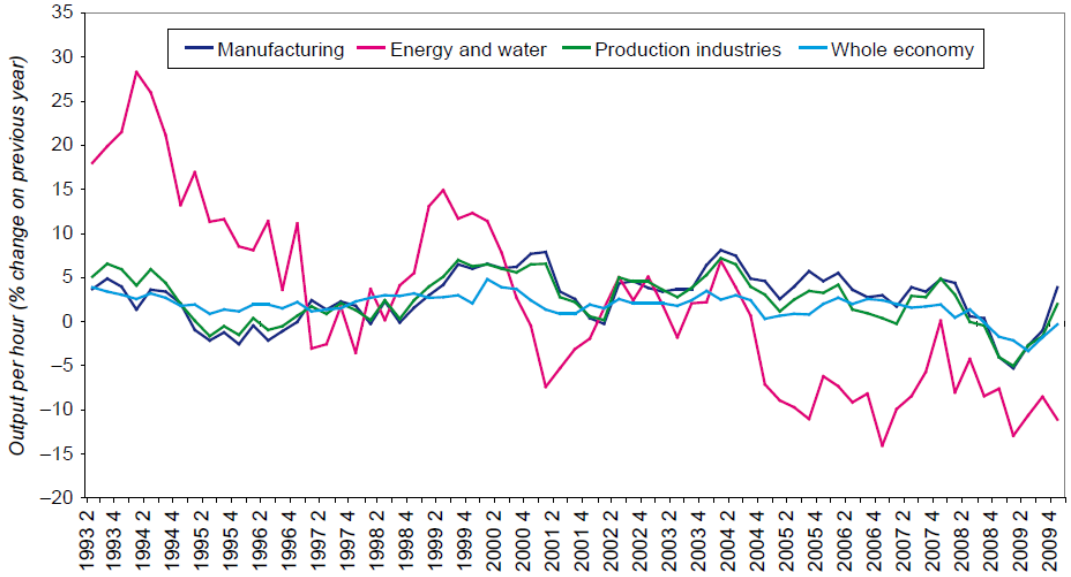
Annex 2: Productivity Benchmarking – Methodological Issues

EU KLEMS data vs ONS data

The EU KLEMS project was a Europe-wide collaborative project that created a database of economic growth, productivity, employment and capital formation statistics for 32 OECD and EU countries. The productivity statistics have informed the vast majority of the price control reviews that have been carried out in the UK since 2007, including reviews by the CAA, Competition Commission, Ofgem, Ofwat and ORR.

The Competition Commission in its 2010 Bristol Water inquiry also made reference to ONS data. The relevant series are set out in figure A1 below.

Figure A1: Productivity growth by sector



Source: CC calculations, based on ONS data.

The Commission in its report noted that the ONS data shows a decline in energy and water sector productivity growth, probably due to higher levels of capex and improvements in quality over time. It concluded that the data recorded above provided no additional information over and above the EU KLEMS data set – a conclusion which we agree with.

Gross output versus value-added productivity estimates

Work by other regulators in this field has looked at two different calculations of productivity growth: gross output productivity growth and value-added productivity growth. In this study we make use of only the latter estimates for a very pragmatic reason: the latest releases of EU KLEMS data includes only value-added productivity growth data.

In principle, one could ignore the latest release and go back to the older data set which included both types of data. We are uncomfortable about doing this because the latest releases include significant revisions to the previous numbers and therefore seem to us to say that the earlier figures are no longer valid.

We also note that concerns have been expressed about basic error in the gross output data – as evidenced by the scale of the revisions to the data set after previous releases – and about the consistency of a gross output productivity growth series over periods in which industries undergo vertical separation and/or vertical integration. We think that these issues

carry sufficient weight that water companies should not make use of gross output productivity measures even if up-to-date EU KLEMS data becomes available during the timescales of PR14.

Frontier shift vs catch-up

The Competition Commission in its 2010 Bristol Water inquiry made an adjustment to the EU KLEMS comparator data to allow for the possibility that some of an industry's reported productivity growth has been the result of firms in the selected industry catching up to the frontier rather than frontier shift per se. Its adjustment was worth slightly less than 0.5% per annum.

We have previously expressed some puzzlement about this adjustment; specifically, it seems to us that the Commission overstated the extent to which productivity growth over relatively long horizons (i.e. 37 years and 17 years in table 4.1 in the main body of the report) in competitive industries can be the result of some sort of never-ending catch-up effect rather than frontier shift. We note that Ofgem has expressed the same concerns and last year decided that such an adjustment was not justified in its RIIO-GD1 and RIIO-T1 proposals.[8]

We do not therefore include an explicit adjustment in section 4 of the report. Instead, we note that it is possible that the EU KLEMS productivity statistics slightly overstate the potential for an efficient water company to improve its productivity.

Capital substitution

In previous studies of this type it has been recognised that labour productivity typically increases more quickly than TFP as companies over time replace people with capital. In applying our analysis of TFP trends to wholesale opex we ought to make an adjustment for future capital substitution otherwise we will be understating the reductions in opex that water companies can make.

The scale that this adjustment should take is not something that can be easily measured. The EU KLEMS data shows that labour productivity growth has tended to outstrip TFP growth. A very rough ballpark estimate of the magnitude of the capital substitution effect might be around 0.33% to 0.5% per annum. The lower number is the figure that appeared in Ofgem's 2012 RIIO-GD1 review and the higher number was used by ORR in its 2008 periodic review decision for Network Rail.

However, estimation of the capital substitution effect in the water industry really ought to become a matter for expert judgment – i.e. something for companies and regulator to take a view on together having observed what sorts of people costs companies can save via their proposed investment programmes. Recognising that we are not well placed to make the required judgments, and knowing that any adjustment we make acts in the opposite direction to any overstatement of true frontier shift (as set out above), we again prefer not to include an explicit adjustment in section 4 of the report.

[8] See Ofgem (2012), RIIO-T1/GD1: Real price effects and ongoing efficiency appendix (final decision), p.18.

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