Automatic Annual Adjustment of the Cost of Capital

A Discussion Paper

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1. Introduction

During the last quarter of 2006 the CAA, Ofgem, Ofwat and ORR all announced that they would be carrying out work to investigate the feasibility and desirability of making annual adjustments to their cost of capital allowances. In all four cases the regulators involved have indicated that certain parameters in the standard cost of capital calculation – namely the risk-free rate and/or the cost of debt – might be thought of as being observable. They have then started to ask whether it is appropriate that they continue making five-year forecasts of these parameters at each periodic review, or whether regulators should simply allow price limits to move up and down in line with the observed, out-turn values.

This discussion paper highlights the issues which these sorts of proposals raise. Its main purpose is to help companies and regulators think about the pros and cons of what would be a major reform of the regulatory framework. The report is structured into five parts:

- section 2 provides a brief summary of the approaches that regulators have taken in recent reviews when choosing values for the risk-free rate and cost of debt;
- section 3 describes what an automatic adjustment mechanism might look like;
- section 4 then considers the impact that such a mechanism might have on companies and customers; and
- section 5 concludes.

2. Background

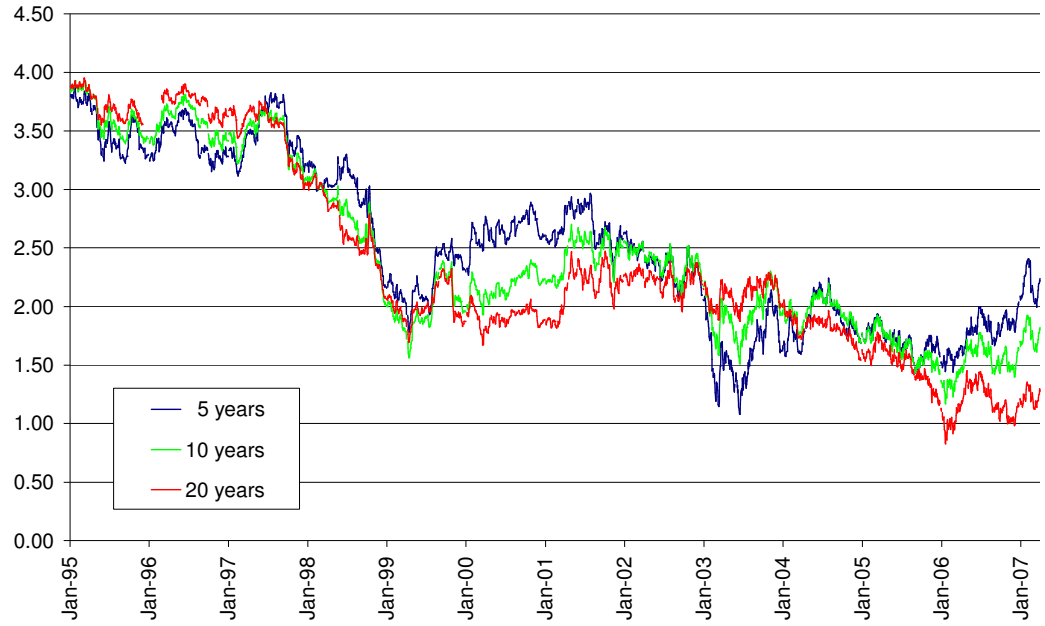
2.1 Recent market evidence

A key part of the background to this issue is summarised in the following two graphs. Figure 1 tracks the yield on government-issued gilts over the last 12 years. It depicts a steady reduction in real interest rates, particularly since 1997, to yields that now stand at around half the level that observers became used to in the 1980s and early 1990s. The government can today issue new index-linked debt which pays its bearer less than 2% per annum in interest, and is able to offer yields of 1.5% or less for very long-dated debt.

Figure 2 presents a similar picture for corporate borrowers. The average yield on A rated corporate bonds has today fallen to roughly half the level that companies would have paid ten years ago. In nominal terms, it ought to be possible for new borrowers with A ratings to achieve a cost of debt of around 5%, or a premium to the risk-free rate of around 50-100 basis points (assuming expected RPI-measured inflation of 2.5-2.75% per annum).

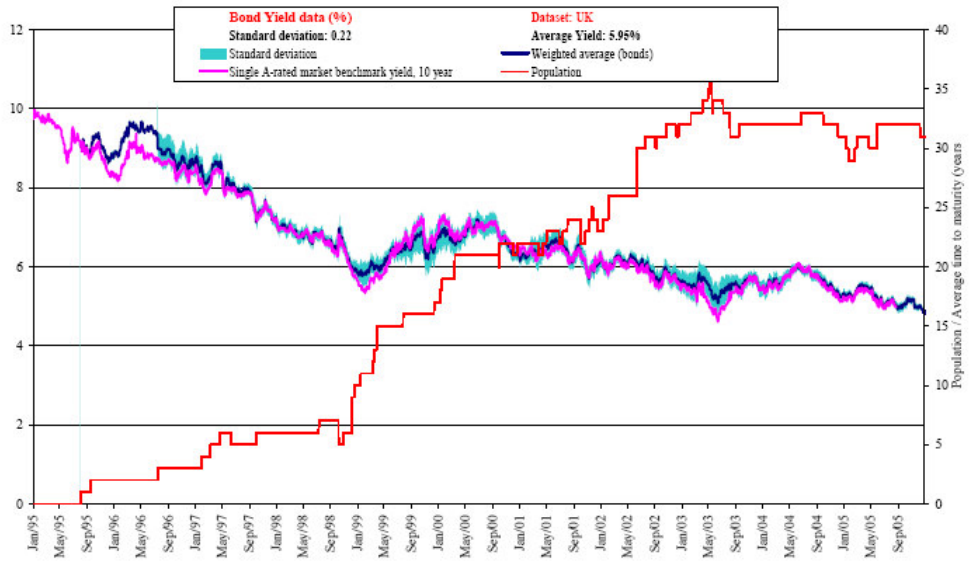
In both markets prices are at historic highs and yields at historic lows. Although there has been a degree of volatility in the market for short-term debt over the last year, conditions for raising long-term debt are more attractive now than at any time in living memory.

Figure 1: Real yields on UK government-issued gilts



Source: Bank of England website.

Figure 2: Yields paid by A-rated UK companies



Source: taken from Ofgem's initial transmission price control proposals, June 2006.

2.2 Recent regulatory determinations

When setting price controls, regulators make forecasts of the cost of capital for a period stretching five years into the future. The current, observed value of each of the market parameters inform the forecasts that regulators make, but they cannot reveal how markets will move once the five-year period has begun.

In theory, regulators could argue that today's rates – or more accurately, the forward curve derived from these rates – are the best predictor of future rates and set the value of the risk-free rate and cost of debt at prevailing market levels. This is an argument that some regulators, particularly Australian regulators, have used in the past. The logic to this view is that markets price in future expectations – a consensus that the risk-free rate would move to a higher level two years from now would be priced in immediately and reflected in current yields.

UK regulators have been reluctant to take such a view. Instead, most appear in recent periodic reviews to have been 'second guessing' the market and allowing for the possibility that both the risk-free rate and the cost of debt might currently be at unsustainably low levels. This has produced a series of determinations in which the risk-free rate and cost of debt have been set above prevailing market rates. The transmission price control review conclusions published by Ofgem at the end of last year[1] provides a particularly good example of this regulatory caution, as the following quote illustrates:

> One of the main objectives in setting the cost of capital for this review is to facilitate the necessary capital formation (debt and/or equity) to enable the expected investment in the networks to take place.
>
> The Smithers report concluded that the best long term estimate of the risk-free rate is 2.5 per cent, which is broadly consistent with the range of previous decisions taken by ourselves, other regulators, and the Competition Commission …
>
> The observable premium on utility debt is at historically low levels (within the range 98 to 130 basis points for A and BBB rated debt respectively). It is not clear whether these levels may be expected to persist over the entire period of the price controls or revert to the long term average. In setting the cost of capital modeling assumption, we therefore used a cost of debt figure above that implied by current market levels. Our analysis of long term average spreads supports a debt premium within the range 1.0 to 1.5 per cent.
>
> In the light of these considerations, we conclude that an appropriate range for the pre-tax real cost of debt in these Final Proposals is 3.5 to 4.0 per cent.

Ofgem ultimately used the mid-point of its quoted range, 3.75%, to calculate a single point estimate of the transmission businesses' weighted average cost of capital. As Figure 2 demonstrates, when converted into a nominal equivalent this figure stands a good 100 basis points or more above the cost of debt that an A or BBB rated transmission company would expect to be able to secure in today's market. If Ofgem's explanation is to be taken at face value, the regulator is effectively saying that it is so concerned about the potential for rising interest rates that it is prepared to provide a very sizeable buffer in price limits in order to ensure that companies can continue to access the capital markets.

This stance is broadly consistent with Ofwat's approach during PR04:[2]

> We have used a range of 2.5% to 3.0% [for the risk-free rate], based on a period average level of yields on medium-term index-linked gilts rather than recent yields which appear historically low. (Real yields on medium maturity index-linked gilts have averaged at just under 2% in the last six months.) However, since our draft determinations, real yields have declined

[1] Ofgem (2006), 'Transmission price control review: final proposals', 4 December.
[2] Ofwat (2004), 'Future water and sewerage charges 2005-10: Final determinations'.

> further, albeit very marginally. We do not think this is sufficient to warrant a change to our approach and to simply take account of the current market spot rate would not lead to a sustainable WACC over the medium term…
>
> The debt spreads on publicly traded debt issued by the water companies are lower than has been typical over recent years … We have used a range of 80 to 140 basis points. Our view, supported by our advisers, is that the bottom of the range would represent very low borrowing costs. The current very low debt spreads are unlikely to be sustained throughout the next five-year period and there is a much greater risk that spreads will rise over the period than that they will remain unchanged or fall.

Table 1 gives an indication of the scale of the buffers built into other recent determinations. It shows that regulators, with the possible exception of the Water Industry Commission for Scotland, have been aiming off from current market rates on a deliberate and systematic basis. Although the size of the buffer varies from one review to the next, a rough rule of thumb would be that companies can expect to see regulators use a risk-free rate worth at least 50 basis points and perhaps as much as 125 basis points above prevailing market levels when setting allowed returns.

Table 1: Review of recent determinations

Regulator	Determination	Risk-free rate	Approximate gap to prevailing market rates
Competition Commission	2002 airports review	2.625%	0.5%
Ofgem	2004 electricity distribution review	2.25% to 3.0%	0.5% to 1.25%
Ofwat	PR04	2.5% to 3.0%	0.75% to 1.25%
Ofcom	2005 review of BT	2.0%	0.5%
CAA	2005 review of NATS	2.5%	0.75%
WIC	SR05	1.8%	0.25%
Postcomm	2006 review of Royal Mail	2.5%	1.0%
Ofgem	2006 transmission review	2.5%	1.0%
CAA	2006 airports price control proposals	2.0%	0.5%

Note: gap calculated by comparing each regulator's estimate to the yield on ten-year index-linked gilts on the date of the determination.

2.3 Regulators' views on indexation mechanisms

The CAA's recent airport price control proposals[3] is one of the entries in table 1. Although at the bottom end of the spectrum, the logic the CAA has adopted is broadly the same as that deployed by Ofgem and Ofwat:

> The CAA is mindful that the risk-free rate has now remained at or around its current level since the late 1990s, and considers that it would be appropriate to reflect this evidence in its estimates of the cost of capital going forward [by choosing a value of 2.0%]. It notes, therefore, that the approach adopted here reflects some of that downward movement in yields that occurred at the end of the 1990s, but still stops short of fully reflecting the very low current

[3] CAA (2006), 'Airport price control review – initial proposals for Heathrow, Gatwick and Stansted'.

> market rates ... The CAA considers this to be an appropriate position given that the price control will be fixed for a five-year period.

Importantly, though, the CAA has placed considerable emphasis on the relevance of this final point:

> However, the CAA notes an alternative approach proposed by British Airways which would involve setting the risk-free rate at a level that fully reflects the current market rates, whilst insulating BAA against significant changes in the market rates through an indexing mechanism within the price control. The CAA considers that this approach could potentially provide scope to reduce charges to users (compared to where such charges would otherwise be) without materially increasing the risk faced by airports. The CAA, therefore, intends to raise this particular issue with the Competition Commission as part of its own wider considerations of the risk-free rate.

This neatly articulates the rationale for looking at indexing mechanisms in greater detail. If there is a sense in which regulators are knowingly setting the cost of capital too high because they are forced to fix price caps for five years, there is a logic in examining whether the framework can and should be changed.

Had the 'insurance premia' that table 1 depicts not been built into recent determination, we doubt very much whether this issue would now be receiving widespread attention from regulators. A slightly different perspective has, however, been put forward by Dieter Helm.[4] In his view, it is not so much the systematic bias in recent determinations that presents a cause for concern, but the sub-optimality in exposing companies to a risk they cannot control:

> It is very odd to fix the cost of capital once every five years. That is not what happens in competitive markets. Utilities are left exposed to the interest rate cycle and to the performance of the economy more generally…
>
> The answer is obvious: the cost of capital should be indexed to market information, adjusting as and when exogenous changes in financial markets are substantial. The utilities have no more control over the interest rate than they do over inflation, but the RPI is indexed in their prices but not the interest rate. This is a relatively simple change which could be easily implemented.

So far, none of the other regulators have come out and supported (or rejected) this view, nor have they given any indication as to whether they consider automatic adjustment mechanisms to be a good idea. In addition to the CAA's position, as set out above, Ofgem has said it 'can see both advantages and disadvantages' in the proposition and has said it will 'consult further on the issue in due course'.[5] ORR has said that 'there are a number of practical issues to be addressed if such an approach is to be adopted' but will be conducting 'a full analysis in the coming months'.[6] Ofwat, for its part, set out its current views at the 30 October 2006 City Briefing. Philip Fletcher said then that 'we think that this an idea worth further exploration and the results will inform our methodology for PR09'.[7]

[4] Dieter Helm (2005), 'Financial muddles and regulation', 8 November.
[5] Letter from Martin Crouch to 'interested parties' on Ofgem's website dated 27 October 2006.
[6] ORR (2007), 'Advice to Ministers', 28 February.
[7] Notes of Philip Fletcher's speech on Ofwat's website.

Perhaps the two key points to note at this stage, other than the regulators' genuine open-mindedness, are: first, that there is as yet no real clarity as to what it is that the regulators are considering (take, for example, the CAA's focus on the risk-free rate versus the Ofwat/Ofgem/ORR references to the cost of debt); and second, that the Competition Commission is due to reach conclusions on the CAA's reference by no later than 30 September 2007. Since no other regulator is compelled to reach their own view before the Commission announces it position, this may well turn out to be the next installment of regulatory thinking on this specific issue.

3. Feasibility

As the various bodies continue their work, the first challenge they face is to determine exactly what it means to adjust the cost of capital as market conditions change. There are a number of questions:

- what exactly is to be indexed – the risk-free rate or the cost of debt;
- is it just the allowed return component in allowed revenues that is to be subject to the adjustment mechanism or all parts of the financial model that the risk-free rate/cost of debt affect;
- what observable benchmark(s) will the adjustment mechanism attach price limits to; and
- how quickly will changes in the benchmark(s) feed through into prices.

The rest of this section goes through these questions in reverse order. We warn the reader upfront that in most cases we identify further questions that regulators must ask themselves rather than definitive answers. As will become apparent, there is typically no 'right' way to design the mechanisms that are being considered.

3.1 Response time

How regulators approach the question about the speed of adjustment goes to the very heart of the objectives that they have in introducing automatic adjustment mechanisms: a relatively short response time would introduce a much closer match between allowed returns and prevailing market rates; a longer response time would arguably constitute little in the way of change from the status quo and regulators' reliance on historic data to fix a company's cost of capital.

The key point for regulators to consider here concerns the manner in which companies finance themselves. To the best of our knowledge, very few UK companies would find that their borrowing costs move from day to day exactly in line with spot rates. Instead, most companies tend to build up their borrowing over time and will possess a portfolio of debt issued over a number of years. If some of this debt has been issued on a fixed-rate basis or has been hedged, a company's overall borrowing costs could be quite insensitive to changes in prevailing market rates. The company's cost of debt could even resemble quite closely the five- or ten-year trailing average used currently by regulators.

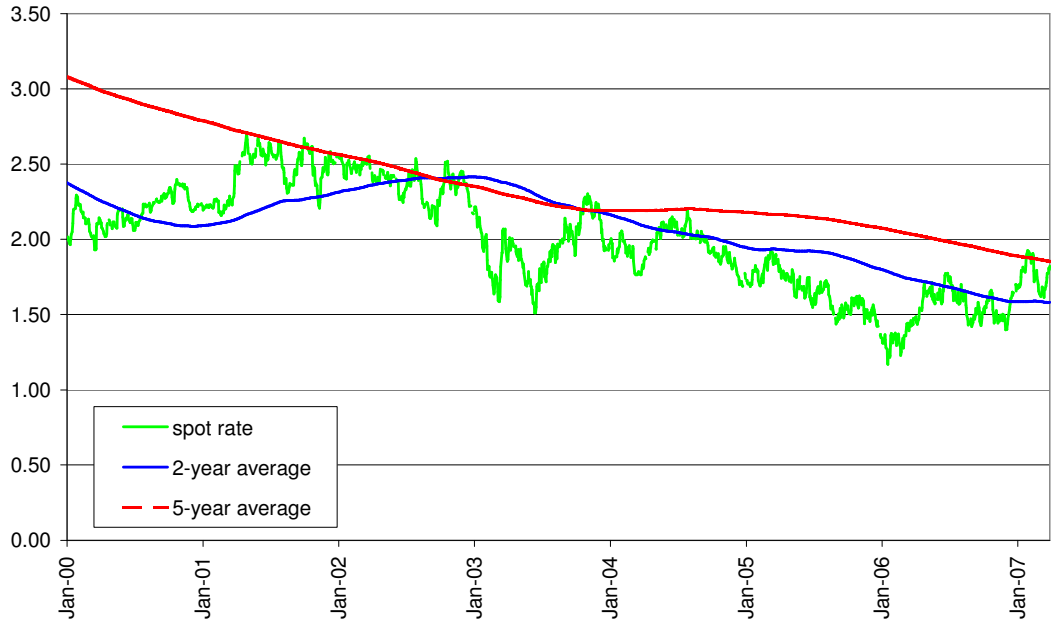
Such considerations, in effect, force regulators to answer two fairly fundamental questions if they wish to take forward automatic adjustment mechanisms:

- what is the efficient term structure (i.e. mix of maturities) for a company's debt; and
- when a company borrows, should it generally borrow on a fixed- or floating-rate basis?

It is the answers to these two questions that determine whether indexation mechanisms produce a short or long lag between changes in market rates and changes in companies' revenue entitlements. If, for example, a regulator believes it is efficient for companies to issue debt with relatively short maturities on a floating-rate basis, an adjustment mechanism which pegs revenue entitlements in line with prevailing rates would be appropriate. If, however, a regulator takes the view that it is acceptable for companies to issue long-dated debt on a fixed-rate basis, such a rapid response would be inappropriate. Revenue entitlements should instead track trailing averages calculated over periods of five years, ten years or more.

Figure 3 illustrates the impact that these alternative approaches can have by plotting movements in the yield on the government-issued, ten-year index-linked gilt against its two- and five-year trailing averages. During periods when there is a sudden change in the risk-free rate, a clear gap opens up between the spot rate and the moving averages – gaps which potentially translate into higher or lower profits for companies depending on how a regulator designs its indexation mechanism.

Figure 3: The risk-free rate



Source: Bank of England website and First Economics' calculations.

Our view is that it would be very difficult for a regulator to justify a mechanism which took into account only the spot rate. We think regulators should be willing to accept that companies ought to issue at least some fixed-rate debt and that some sort of trailing average should be built into indexation mechanisms. The only question in our mind is: how long that trailing average should be? In other words, exactly what mix of fixed- and floating-rate debt would an efficient company hold, and what would be the term structure of an efficient portfolio of fixed-rate debt? Questions such as these take a regulator further into a debate about efficient financing than they have ever gone before and may prove quite problematic (a theme which we return to in section 4).

3.2 Observable benchmarks

After taking a stance on response times, the other main job the regulators face is arguably even more problematic: defining 'the risk-free rate' and 'the cost of debt'. The reason this presents a challenge is that both are first and foremost theoretical concepts that are used by economists when they attempt to explain how a firm's cost of capital is determined. It is not possible, for example, to look up the values of the risk-free rate or the cost of debt in the Financial Times or any other published data source.

In practical terms, the risk-free rate can best be defined as the rate of interest that a government must pay to holders of gilts (what one might describe loosely as a 'riskless' asset). However, a government will typically issue a range of different gilts with different maturities, each of which will pay a slightly different yield at any given point in time. In measuring 'the risk-free rate', a regulator will therefore need to decide:

- which of two types of government bond to focus attention on – conventional gilts or index-linked gilts; and
- how to combine the different points of the yield curve into a representative weighted average (of different maturities) of some kind.

These are tasks that regulators encounter already during the periodic review process. However, they are under no obligation to take an explicit, public position because their conclusions can be presented as a broad, overall judgment. The introduction of an automatic adjustment mechanism would require a regulator to be much more specific about its methodology. It goes beyond the scope of this paper to discuss the pros and cons of each approach that a regulator might take; however, we can envisage at least half a dozen different ways that a regulator might credibly combine data about gilt yields into a calculation of the risk-free rate. Table 2 provides some examples:

Table 2: Methodologies for calculating the risk-free rate

Chosen benchmark…	**…with selected bond**
Yields on index-linked gilts Yields on conventional gilts adjusted for expected inflation	Gilt with 5 years to maturity (to match five-year regulatory period) Gilt with 30 years or more to maturity (to match life of assets) Weighted average based on a term structure matching a typical regulated company's debt portfolio

At first sight, these may seem like relatively arcane distinctions. However, the line that a regulator takes can easily cause its calculation of the risk-free rate to vary by +/- 50 basis points (see, for example, the difference at certain points in time between the 5-, 10- and 20-year benchmarks in Figure 1). It therefore becomes extremely important that a regulator gives careful attention to the design of its chosen formula.

Similar considerations would also apply to the construction of 'the cost of debt'. The estimates that appear in regulators' cost of capital calculations are supposed to match the cost that an efficiently financed company would incur when borrowing the amounts appearing in that company's notional balance sheet. In practice, companies borrow in all manner of different ways

from all manner of different sources. In order to identify appropriate benchmarks from publicly available market data, a regulator will need to take account of:

- the different types of debt instruments that companies use;
- term structure;
- credit quality; and
- the fees that a company would expect to incur in arranging its borrowing.

Even more so than with the risk-free rate, there are numerous different ways in which a regulator could credibly construct a calculation of the cost of debt. For example, it could focus on conventional corporate bonds with a ten-year maturity that have been awarded an A-/BBB+ rating by rating agencies. Alternatively, it could assume that companies issue a mix of conventional and index-linked debt with maturities averaging 20 years. Or it could assume that an efficient company uses structured financing techniques to issue both conventional and index-linked debt with different maturities at different credit ratings. None of these alternative, nor any other construction for that matter, is obviously 'right'; however, it is impossible for a regulator to establish a benchmark unless it confronts these sorts of choices.

The fact that a regulator would have to write down a formula for indexing the cost of debt also presents certain difficulties. Whereas the risk-free rate can be defined with reference to a relatively small basket of government gilts, the definition of the cost of debt will most likely make reference to yields on a larger number of corporate bonds. A regulator would need to take account of the possibility that not all of these bonds will remain relevant to the calculation of cost of debt throughout a five-year period. For example, a company could refinance or retire its debt and thereby eliminate a comparator. Alternatively, the rating agencies may downgrade a previously comparable bond issue to the point where its low credit rating makes it an inappropriate benchmark.

This makes the task of defining the cost of debt in simple and objective terms an inherently difficult task. There may therefore be real attractions in using one of the indices produced by third parties (such as the Bloomberg index depicted in Figure 2) as the benchmark which the regulator's cost of debt tracks. This may be seen in some quarters as transferring a regulator's responsibility for setting the cost of debt to a third party. However, in practice, a regulator would only be out-sourcing only the complicated task of constructing a suitable debt market benchmark. Provided that benchmark is felt by companies and their shareholders to be robust and transparent, such an approach provides, in our view, the most logical solution to what might otherwise become an unmanageable task.

3.3 Scope

Regulators' statements about the possible merits of automatic adjustment mechanism have so far mentioned only that it would be the risk-free rate and/or the cost of debt that might adjust within a five-year period. This is only part of the story: both parameters are themselves only inputs into other price control building blocks, which in turn are used to fix a company's price limits. Regulators will need to consider which of these building blocks is subject to indexation.

Perhaps the best illustration of this point arises if a regulator focuses its attention on the risk-free rate. Within the calculation of the weighted average cost of capital, the value of the risk-free affects both the cost of debt and the cost of equity. One obvious option, therefore, is for both the allowed cost of debt and the allowed cost of equity to move over time. In this scenario, a 10 basis

points increase in the risk-free rate would increase allowed returns (on a vanilla basis) by 10 basis points.

Some may feel that this takes the idea of indexation too far. While it seems sensible to argue that a change in the risk-free rate would change a company's borrowing costs (subject to the points we made in section 3.1 about response times), it is less clear that there is the same direct impact on the returns required shareholders. This may be a particular issue for companies that are privately owned, where our experience has been that investors tend to have a specific hurdle rate which is relatively insensitive to small movements in other market rates. This suggests that an option in which only the cost of debt varies with changes in the risk-free rate is at least a valid alternative. With this design, a 10-basis points reduction in the risk-free rate would increase allowed returns by only around 6-basis points (or an amount equal to 10-basis points multiplied by the regulator's gearing assumption).

There are also a number of other areas in which indexation might or might not apply. The financial model that regulators use to set price limits draws on the value of the risk-free rate/cost of debt in a number of different places. For example:

- the amount of tax that a company pays depends on the interest tax shields that are available to it which, in turn, depend on the assumed cost of debt;
- under Ofgem's new approach to financeability, the regulator's allowance for the cost of equity issuance is set equal to a given percentage of the assumed cost of equity;
- regulators that set a constant X for each price control period will smooth a company's revenue profile using a discount rate equal to the cost of capital; and
- the cost of capital will also be used to determine the net present value (NPV) of any investment carried over from the previous control period and the value of any NPV-neutral re-profiling of revenues.

The tax calculation is arguably the place in which there is the clearest link between the risk-free rate/cost of debt and price limits, and therefore the strongest arguments for automatic adjustment. However, it is conceivable that a regulator could choose to re-run its financial model in full each year and in doing so shift price limits to the level they would originally have been set at had the regulator correctly anticipated market movements. This undoubtedly makes the adjustment mechanism more complicated; the question is whether this complexity is justified.

3.4 Risk-free rate or cost of debt?

The preceding discussion does not provide any overwhelming arguments as to why automatic adjustment mechanisms should apply to the risk-free rate rather than the cost of debt (or vice versa). It did identify that defining 'the cost of debt' is likely to be more difficult than defining 'the risk-free rate', both in conceptual and in practical terms. However, these difficulties may not be insurmountable.

In choosing between the two approaches, it therefore becomes necessary for regulators to think back to exactly what it is that they are trying to achieve. The key issue that we identified in section 2 is that the current values of certain cost of capital parameters may not always predict accurately future values. Because regulators have been building quite large buffers into their cost of capital calculations in an attempt to allow for unforeseen upward movements, it has been suggested that regulators might look at whether an alternative approach of automatically adjusting allowed returns within period offers a better deal for customers.

In our view, the fact that it is the aggregate cost of debt calculation where these large buffers have been most apparent would tend to suggest that it is the cost of debt that should be indexed rather than the risk-free rate. The uncertainty that regulators face lies in both the risk-free rate and debt premium components of the cost of debt calculation. This can be seen clearly in Figures 1 and 2, where there is evidence of significant movements over time in both the government's cost of borrowing and the additional spreads paid by companies. It would seem strange to us if regulators dealt with the inherent unpredictability in the first of these areas by introducing automatic adjustment mechanisms but continued to forecast the debt premium for five years at a time (presumably aiming off from current market rates while doing so).

This implies that the decision as to whether to focus on the risk-free rate or the cost of debt comes down to a choice between a simpler but less complete solution and a fuller but complex alternative.

3.5 Summary

In each step of the preceding discussion, we have identified choices that the regulators will need to make as they consider in more detail what an automatic adjustment mechanism might look like. Table 4 provides a summary of the different dimensions involved.

Table 4: The practical choices facing regulators

Focus	Speed of response	Definition	Benchmark	Impact
Risk-free rate	Spot rates Two-year trailing average Five-year trailing average Ten-year trailing average etc.	Yield on index-linked gilts Implied real return on conventional gilts	5-year debt 10-year debt 30-year debt Weighted average reflecting efficient term structure for utility company debt etc.	Cost of debt Allowed returns Allowed returns plus tax calculation Full re-run of financial model
Cost of debt		Yield on A rated corporate bonds Yield on BBB rated corporate bonds All-in cost of debt constructed from a range of alternative debt instruments etc.		

The key messages to take from the discussion are as follows:

- after a succession of periodic reviews in which regulators have been quite vague about the way in which they have arrived at estimates of the risk-free rate and cost of debt, one of the consequences of introducing automatic adjustment mechanisms is to force regulators to become very specific about their calculation methodologies;
- there is no obviously right way to choose between many of the options that table 4 depicts – a number of different combinations would appear to be admissible;
- some of the options are much more straight-forward to implement than others, suggesting that complexity will be a key concern for the regulators; and

- for companies, different options introduce more or less volatility into revenue entitlements, potentially changing quite significantly companies' risk profiles.

The obvious next step to take, for regulators and companies alike, is to narrow down the options in table 4 to a handful of candidate rules. To our mind the most important issue of all can be found in the second column of table 4 – i.e. the question of how rapidly a change in the risk-free rate/cost of debt translates into a change in companies' revenue entitlements. Most of the other four columns in the table do not change the proposition as fundamentally as the answer to this question.

4. Desirability

The discussion in section 3 at no point considers whether automatic adjustment mechanisms are a good idea. Even if they are feasible to introduce, this does not mean to say that they should be taken forward by regulators for implementation at future periodic reviews. An assessment of the pros and cons would need to consider the following issues:

- would answering the questions in section 3 force regulators to intrude too far into companies' financing arrangements;
- would the new adjustment mechanism result in a more or less optimal allocation of risk between companies and customers;
- does the indexation of price limits in line with the retail prices index already provide a link between prices and changes in the cost of borrowing; and
- are there others impacts on customers which ought to be taken into account?

4.1 Regulatory intrusion

All of the UK's economic regulators have stated repeatedly that the manner in which a company finances itself is properly a matter for shareholders, not a regulator. However, the work involved in constructing an automatic adjustment mechanism would appear to require answers to a number of very detailed questions about companies' financing strategies, in particular:

- how quickly would a regulated company's borrowing costs respond to changes in observed market rates;
- are the relevant market rates the cost of short-term or long-term debt or some mix of different points on the yield curve; and
- should the regulator be looking at only conventional corporate bonds or pay attention also to one or more of the instruments that companies use when borrowing?

It is not clear to us how a regulator could avoid giving explicit answers to these questions. Even if it did not state that a company's borrowing should have a specific mix of fixed- and floating-rate debt or a particular term structure, the way that it designs its chosen benchmark would inevitably reward some companies and penalise others (depending on how they have borrowed in the past).

Although this by no means forces companies to borrow in future in exactly the way that a regulator assumes, it does start to imply that the regulator has views about what constitutes an efficient financing strategy and that companies which depart from that strategy take on greater risk than those that do not. This potentially interferes with companies' financing decisions. Take the treatment of embedded debt, as one example. In previous reviews regulators have been reasonably willing to accommodate the cost of embedded debt in its calculation of the cost of

capital. In future reviews is it may be that companies only receive acknowledgment of embedded debt problems if they have borrowed in a manner which is consistent with the construction of the cost of debt index.

To our mind, it is an open question whether this would be a positive development. Regulators already define the efficient frontier for opex and capital maintenance and there is no fundamental reason why it should not go through a similar exercise with companies' financing costs, especially if regulatory scrutiny produces benefits for customers in the form of lower prices. What can be said is that regulators as a group have been very reluctant to involve themselves in the detail of the way that companies finance themselves. At a practical level, it may be argued that the specificity that an adjustment mechanism requires is one step too far for most regulators at the current time.

4.2 Optimality in risk allocation

The broader question that the preceding discussion raises is: who is best placed to decide how companies should borrow? If a fundamental principle in regulation is that risk should be allocated to the party that is best able to manage it, are customers or companies best placed to manage interest rate risk?

General changes in financial markets undeniably lie outside of companies' control. It is impossible to argue, for example, that changes in the risk-free rate or aggregate spreads on corporate bonds can be influenced by regulated companies' actions. However, it is also very difficult to argue that companies cannot respond to such changes or that they cannot anticipate and protect against volatility in financial markets through the manner in which they borrow. Companies have large teams of in-house experts and professional advisers whose job it is to access financial markets as efficiently as possible. These people continuously make decisions about when to issue new capital, which parts of the market are most attractive, how to package new issuances, when to hedge, and so on.

This would seem to suggest that companies, rather than customers, are in the best position to manage interest rate risk. Even if asking companies to bear that risk leads shareholders to demand some form of compensation, customers should benefit in the long term from the treasury management activities that firms engage in as lower borrowing costs are factored into price limits. The theoretical case for asking companies to take the risk of changes in the risk-free rate and/or cost of debt for periods of five years at a time is therefore quite a strong one – in the terminology set used above, companies appear to be the party best able to manage this risk because they are in the position to reduce its size, and hence its cost.

As we noted earlier, the opposite view has been put forward by Dieter Helm. His argument appears to us, however, to be based upon a basic misunderstanding of the principles on which the allocation of risk should be decided. Take, for example, the text that we quoted in section 2:

> It is very odd to fix the cost of capital once every five years. That is not what happens in competitive markets. Utilities are left exposed to the interest rate cycle and to the performance of the economy more generally…
>
> The answer is obvious: the cost of capital should be indexed to market information, adjusting as and when exogenous changes in financial markets are substantial. The utilities have no more control over the interest rate than they do over inflation, but the RPI is indexed in their prices but not the interest rate. This is a relatively simple change which could be easily implemented. (*emphasis added*)

The observation that some determinants of the cost of borrowing lie outside companies' control is undoubtedly true. However, this is not the point – it is the ability of companies to manage risk, even in circumstances where they do not fully control all the underlying variables, that matters. In this specific example, the manner in which companies manage interest rate risk can have a very significant effect on the cost of borrowing. By confusing outright control with the management of risk, there is a danger of undermining much of the rationale for five-year price caps, as well as many other public-private partnerships.

4.3 RPI indexation

A quite separate issue that regulators will undoubtedly give consideration to is the question of how far the link between prices and RPI already provides a mechanism for passing through changes in the risk-free rate and/or cost of debt to customers. This is a point of principle that will be familiar to water companies from PR04 and Ofwat's analysis of rising pension and energy costs. Since adjusting prices in line with out-turn inflation automatically protects companies against economy-wide changes in the costs of producing goods and services, it follows that an economy-wide change in the cost of borrowing will eventually feed through in some form into price limits (via increases in the costs, and hence prices, of other firms' output).

The degree of protection this gives to water and sewerage companies depends on two factors:

- the relative sensitivity of other firms to changes in borrowing costs; and
- the extent to which changes in the mortgage interest payments component of the retail prices index tracks corporate interest bills.

In relation to the first of these factors, regulated companies tend to be more capital intensive businesses than the average supplier of goods and services to UK households. This means that the return on capital constitutes a greater proportion of costs than in an average firm. Although higher borrowing costs will feed into higher prices generally, particularly if higher borrowing costs are seen internationally (where many suppliers of goods to UK households are now based), it is unlikely that the corresponding change in RPI-measured inflation will be sufficient to cover higher borrowing costs at regulated companies in full. Estimating the exact size of the likely gap would, however, require much more work.

The second factor is also quite complicated to analyse. For a start, mortgage interest payments constitute just 5% of household expenditure and hence have a weight of only 5% in the calculation of RPI – a smaller contribution than borrowing costs make to a regulated company's revenue requirement. Because the Bank of England moves interest rates in discrete quarter-point jumps, households' mortgage interest payments cannot in the short term be said to move line with corporate borrowing costs (which move less sharply). Mortgage interest payments also move closely in line with the Bank of England's decisions, whereas bond yields are determined more by interest rate expectations. In the medium to long term, though, one might expect base rates and the risk-free rate (i.e. the yields on government gilts) to move in broadly the same direction. A sustained rise in companies' cost of borrowing would almost certainly also be matched to some degree by a rise on households' cost of borrowing. Again, much more work would be required in order to say exactly how much of an automatic link this produces between the economy-wide cost of debt and price limits.

What we can conclude is that there is a definite risk of double counting if regulators introduce automatic adjustment mechanisms while continuing to index price limits in line with RPI. Based

on past experience, we would expect this risk to be a highly relevant consideration for regulators as they consider the pros and cons of within-period adjustment.

4.4 Other impacts on customers

Although in theory regulators try to design theoretically optimal regulatory rules, the practical reality is that there are factors that will constrain the extent to which risk can be transferred among the parties. One of these factors is affordability.

Affordability is relevant to this discussion because automatic adjustment mechanisms introduces volatility to price profiles. Customers would begin each five-year period not knowing with any certainty how much their bills will be at the end of those five years (or, for that matter, in any single year). Unpredictability is by itself sometimes viewed by regulators as undesirable; in this case, the scale of the uncertainty is so large as to also bring in separate issues of absolute affordability.

To see this, imagine that a regulator introduces a mechanism which adjusts its risk-free rate according to the prevailing spot rate. Figure 1 shows that annual changes in the risk-free rate of around 50 basis points are normal (as an extreme case, in 1998/99 the risk-free rate dropped by well over 100 basis points over 12 months). When translated into allowed returns and then customers bills, such changes would lead to price increases/reductions of +/- 2.5% in a 'normal' year and more in an 'abnormal' year.

This feature of automatic adjustment is likely to be problematic for many regulators, especially in industries where prices have been rising over time. However, it should be noted that there is an offsetting benefit if indexation permits regulators to eliminate the 'insurance premia' that we highlighted in table 1 and so pass through a P_0 reduction to customers. The difficulty would be that the upfront price reduction will be just part of a wider price control package, with its inevitable ups and downs, whereas the subsequent volatility in bills will be traced directly back to regulators' new adjustment mechanisms.

5. Conclusions

The discussion in this paper generally constitutes a skeptical critique of proposals to introduce an automatic, within-period link between price limits and the prevailing risk-free rate and/or cost of debt. Our concerns fall into three categories: a general worry that the changes that have been suggested are not in the best of interests of customers; fears that regulators will encounter significant problems when they come to define 'the risk-free rate' and 'the cost of debt'; and an overall sense that this is not the direction in companies should want regulation to go.

In the first of these categories, we identified two main objections to automatic adjustment mechanisms:

- the apparent contradiction of the principle that risk should be allocated to the party that is best able to manage it; and
- the scope for double counting that arises from the existing link between prices and RPI.

These are the two issues that we would expect to weigh most heavily on a regulator's mind. From a public-policy perspective, we would argue that a switch towards automatic, within-period adjustment of the cost of capital would be ill-judged.

Against this backdrop, the definitional problems that we identified in section 3 are non-trivial. Although a regulator might easily cut through the various points of detail by simply asserting a

particular methodology for calculating 'the risk-free rate' or 'the cost of debt', the scope for this benchmark to differ from the costs that are actually being incurred by companies serves to further undermine the usefulness of the adjustment mechanism. Past behaviour suggests that regulators like to keep judgments about the cost of capital at a high level; it seems to us unlikely that they will relish the prospect of debate and challenge from companies in this area.

None of the concerns mean that companies themselves should also oppose the proposals that are being considered. On the one hand, there is a clear benefit to shareholders if companies are able to raise prices in response to an increase in the cost of borrowing. Against this companies must weigh:

- the sense that regulators would be intruding to some degree into decisions about financing;
- the scope for regulators to look elsewhere for costs that companies do not control and introduce further adjustment mechanisms; and
- the likely downward reduction in cost of capital estimates at future reviews.

The second of these points is something that we alluded to at the end of section 4.2. If the principle used to determine the allocation of risk between companies and customers becomes whether or not companies control risk, there would appear to be a number of other risks that should be handed back to customers. Take, for example, wage inflation – companies do not control the growth in average UK earnings, so presumably advocates of cost of capital indexation would also argue for an automatic adjustment mechanism for opex. The general point here is that companies should want to take on manageable risks – and the opportunities for out-performance that this brings. Customers then ultimately benefit from this type of risk transfer when regulators pass efficiencies on at each successive periodic review.

Companies should however recognise that the work described in this paper is motivated by a genuine concern about the degree to which regulators have aimed off current market data in recent determinations. The real issue here is not about some theoretically desirable reallocation of risk between company and customer, but rather a sense that regulators could do better when setting the allowed rate of return, and for this reason alone it is unreasonable for companies to expect the outcome of the different exercises the regulators are engaged into to be one of zero change.

There is, though, a fairly simple solution to this problem. If future estimates of the risk-free rate and cost of debt are neither so high as to make customers feel that they are over-paying nor so low as to make companies feel that they are over-exposed to unexpected market movements, we would feel that the case for automatic adjustment of the cost of capital falls away. The next six months ought to reveal if this is how others will also come to see the issue.