# Discounting for CBAs involving private investment, but public benefit

25 July 2012

Statement

# Contents

| Section | | Page |
|---|---|---|

**Section 1**

# Introduction and summary

## Purpose

1.1    This technical paper sets out the approach to discounting that is a shared view of the membership of the Joint Regulators' Group (JRG). The Joint Regulators Group (JRG) is an association of the UK's economic and competition regulators. The JRG exists to support its members in delivering their own statutory remits, and to add value by visibly supporting the coherence of the UK system of economic regulation.

1.2    The issue of discounting in cost-benefit analysis (CBA) is one which many sector regulators face; regulators have discussed it within the JRG so to benefit from sharing and promoting good regulatory practice. The focus of this paper is on discounting in the particular case of a CBA where a firm finances the investment, but benefits mainly accrue to consumers and/or the wider public.[1] This paper does not seek to determine whether or not a regulator should be intervening, but rather if the regulator is considering intervening and using a CBA, what the appropriate technical framework for CBA might be. For example:

- Regulators may need to consider whether to intervene in markets and require firms to do something for which there is no profit incentive but where the intervention proposed would involve investment by the firms in question.

- Regulators may need to consider the costs and benefits of investment plans proposed by regulated firms.

1.3    We consulted on the approach to discounting for CBAs on the 4th October 2011.[2] Following a three month consultation period we received four responses that were in support of our proposed approach. This paper set out the conclusion of that consultation.

1.4    It should be noted that, although this is a view shared by the membership, each regulator will need to consider the appropriateness of the approaches set out in this paper to the specific issues and circumstances it is assessing, and with regard to its specific remit (which differs across regulators).

## Summary of the consultation

1.5    Regulators use discount rates across their work, including in CBAs and in calculating charges for regulated products. So far, some regulators may have based CBAs on the HMT generic approach involving a discount rate of 3.5% (the Social Time Preference Rate, or STPR).

1.6    The HMT approach is not generally concerned with firms' financing costs. Instead, the latter is a relevant consideration in areas of regulatory work where regulators need to estimate the total (including social) costs and benefits of an investment undertaken by a private company. In this case, a key question is which discount rate

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[1] In some cases, a firm may be able to pass costs through to consumers. In other cases, it may not be able to pass through full costs, or may be able to pass through only a proportion.
[2] This has been published on several JRG regulators' websites. For reference see:
http://stakeholders.ofcom.org.uk/binaries/consultations/cba/summary/JRG-condoc.pdf

should be used for CBAs where private companies undertake and finance the investment but benefits accrue mainly to consumers.

1.7 The issue of how a regulator should discount costs and benefits when assessing a CBA where a firm finances the investment but benefits mainly accrue to consumers is not an area where there is firm consensus among academic economists. However, there does appear to be some common ground and principles which experts from most backgrounds would agree on.

1.8 In principle, it is generally agreed that different cash flows may have different systematic risks, and that this should be reflected in the CBA. One way of doing this is to adjust the discount rate. The key area of disagreement appears to be how this should be applied in practice.

1.9 One view is that, in many cases, the actual underlying systematic risk of some cash flows is likely to be negligible, and that it is generally reasonable to use the social time preference rate (STPR) of 3.5%, as recommended by the HM Treasury Green Book, as the discount rate.[3] In practice, it is likely to be very difficult to assess the systematic risk of any given cash flow within a CBA, and make specific adjustments or assign different discount rates to different cash flows.

1.10 An alternative view is that systematic risk is likely to be significant in some cases, and that using the STPR, which ignores systematic risk, is unlikely to be appropriate in the absence of any other adjustments; instead the relevant weighted average cost of capital (WACC), which does reflect some systematic risk may be the correct discount rate to use.[4]

1.11 For this reason, the two practical candidates to use as the discount rates are likely to be the STPR and the relevant WACC, since the former is effectively given by the HM Treasury Green Book and the latter is often already estimated by regulators for the firm(s) in their regulated market(s).

1.12 Therefore, in our consultation we presented the following set of alternative practical approaches to inform CBAs where costs fall to firms to be financed but benefits accrue to consumers and/or society more widely:

a) Discount all costs (including financing costs as calculated based on a WACC) and benefits at the STPR. [The Spackman approach]

b) Discount some costs and/or benefits at a WACC, and some at the STPR, depending on their likely systematic risk

c) Discount all costs and benefits at the relevant WACC

d) Discount all costs and benefits at the STPR (excluding financing costs)

1.13 In the consultation, the JRG proposed that in general, the Spackman approach would be the most appropriate for the specific question that we are considering. The Spackman approach takes explicit account of firms' financing costs. This is done by converting the firm's investment cost into annual payments (an annuity akin to a

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[3] See HM Treasury Green Book, Chapter 5, http://www.hm-treasury.gov.uk/d/green_book_complete.pdf

[4] The company WACC would reflect the systematic risk of the company as a whole. In some cases, project-specific WACCs may be available, which would reflect the systematic risk of the specific project.

corporate bond) using the firm's WACC; the resulting flows of costs and benefits should then be discounted at the STPR.

1.14    However, we recognise that in some cases further adjustments for systematic risk and/or other factors may be necessary, if there is evidence on which to base these adjustments, and if it is proportionate to make such adjustments. Therefore, we note that it is important to retain flexibility in the approach taken to CBAs, and the specific application may be different depending on context and specific circumstances.

## Consultation responses and conclusions

1.15    As noted we received a limited number of consultation responses. All responses expressed clear support for the proposals. We note that all the organisations which responded belong to the water industry. These stakeholders are familiar with the approach discussed in the consultation and this statement, since the water industry already implemented this approach at the previous price control.

1.16    The JRG concludes that, on the basis of the review of the literature, the expert academic advice obtained, the consultation feedback, as well as the discussions between JRG members, the Spackman approach is the most appropriate method for CBAs in cases where a firm finances the investment, but benefits mainly accrue to consumers and/or the wider public.

1.17    At the same time, we recognise that the appropriate design of CBAs involves a wider set of considerations and that the Spackman approach may not be relevant to those. For instance, in some circumstances, the systematic risk of some cash flows is likely to be significant, or the company cost of capital is not a good measure of financing costs for a specific project. Both of these issues could be a source of bias. In these cases, while holding to the principles underpinning the Spackman approach, appropriate adjustments may be needed to reduce the risk or impact of these other potential biases to CBAs. This implies that the practical implementation of CBAs could vary depending on the type of exercise being undertaken.

**Section 2**

# Responses to the consultation

2.1 We have received responses from the following organisations: Northumbrian Water, Severn Trent Water, South West Water. We also received a response from Mr Simon Carne.[5]

2.2 All the four stakeholders who responded to the consultation concurred with its approach. Two water utilities agreed with the consultation, without substantial comments. Besides that, Severn Trent Water added that it did not consider it necessary for all utility industries to be subject to the same approach as to CBA discounting. The company argued that, given the variety across industries in the investment projects (and the types of benefits associated with them), some variations in the approach to CBA may be allowed, insofar as this can be justified by differences between sectors in the nature of the investments subject to CBA.

2.3 Furthermore, Severn Trent Water elaborated that the Spackman approach, as adopted within the water industry, is appropriate for both theoretical and practical considerations. First, Severn Trent Water considers posited that there is no significant systematic risk in the benefits derived from investment in the water industry, given the diverse nature of the projects undertaken. At the same time, the form of the Spackman approach adopted in the water industry has been incorporated within the asset management and planning templates used by these utilities. This implies that any change from the Spackman approach would require the modification of these templates and bestow significant costs to the periodic review process.

2.4 A further non-corporate response was received from Simon Carne, an independent management consultant. His position is in support of the approach proposed in the consultation and his response provides a reappraisal of the rationale for adopting the Spackman approach vs. the alternative options presented in the consultation.

[5] The responses are available at: http://stakeholders.ofcom.org.uk/consultations/discounting-for-cbas/?showResponses=true#Content

**Section 3**

# Shared view of the membership: the Spackman approach

## The approach proposed in the consultation

3.1     In the consultation we argued that in general, the "Spackman" approach would be the most appropriate for the question that we are considering and we therefore proposed to adopt it across the JRG, which we now confirm in this statement.

3.2     Michael Spackman, a public sector appraisal and evaluation expert and former DfT Chief Economist, argues that financing costs should be factored into the CBA undertaken by the regulator or public body and recommends the following 2-step process[6]:

i)     First, convert capital costs into annual costs using the company's cost of capital.[7] This gives a stream of financing costs, which should be included as part of the cost side of the cost benefit analysis.

A related question is the assessment of the appropriate time profile of annualised costs. One straightforward approach is to assume a flat annuity, as applied in the example below. Nonetheless, there may be specific reasons for deviating from this assumption, and an alternative time profile may be deemed appropriate. In that case other approaches to annuitisation, such as for instance a tilted annuity, might be used.

There may be specific circumstances in which private financing costs are effectively funded upfront by the public sector and so may not need to be added.

ii)     Second, use the social time preference rate (STPR) of 3.5% in discounting all costs and benefits, as recommended by the HM Treasury Green Book.

## An illustrative example of the Spackman approach

3.3     A simple example of how the Spackman method works is outlined below (using simplified parameters, and ignoring tax and inflation effects for illustration only).

3.4     The example below captures a typical scenario where the proposed regulatory intervention imposes costs to be incurred immediately by firms, leading to future consumer benefits. Because the Spackman approach accounts for the ongoing financing costs that a firm incurs to bear a capital outlay, higher costs are factored into the CBA.

3.5     As a result, in the example below the NPV of the proposed intervention is lower under the Spackman approach than under STPR discounting (albeit still positive

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[6] See, for example, Spackman (2008), "Time preference, the cost of capital and PPPs", http://jdi-legacy.econ.queensu.ca/Files/Conferences/PPPpapers/Spackman-081002-final.pdf

[7] In some cases the company's average cost of capital may not reflect the cost of financing a particular project.

here). The wider the gap between the STPR and the firm's cost of capital, the larger this effect will be. In general, the cost structure associated with the specific context will affect the impact of the proposed Spackman approach.

Scenario: a regulator is conducting a CBA to understand whether it would be beneficial to society for a company to invest in software that would lower switching costs for consumers. All costs are passed on to the consumer in the form of higher prices, which impacts demand.

The regulator ascertains the following parameters:

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|---|---|
| Capital outlay born by the firm (all in year 1) | £1,000 |
| The firm's cost of capital (WACC) | 7% |
| STPR | 3.5% |
| Net benefit to consumers per year | £300 |
| Relevant period of time (years) | 5 |

STPR DISCOUNTING – The table below displays results using the approach which disregards the firm's cost of financing.

| Cash flow | Year 1 | Yr 2 | Yr 3 | Yr 4 | Yr 5 |
|---|---|---|---|---|---|
| Capital outlay by the firm | -£1,000 | | | | |
| Consumer benefit | £300 | £300 | £300 | £300 | £300 |
| Net social benefit | -£700 | £300 | £300 | £300 | £300 |
| Net social benefit (at year 0) discounted at the STPR | -£676 | £280 | £271 | £261 | £253 |
| **Net present value at year 0** (sum of the above) | **£389** | | | | |

SPACKMAN APPROACH – The table below shows how results change when applying the method proposed in the consultation. The shaded area highlights the new first step, where the firm's capital outlay is converted into an annual financing cost using the WACC.

| Cash flow | Year 1 | Yr 2 | Yr 3 | Yr 4 | Yr 5 |
|---|---|---|---|---|---|
| Capital outlay by the firm | -£1,000 | | | | |
| Firm's cost of financing the above capital outlay, shaped as an annuity (e.g. corporate bond) based on 7% interest | -£244 | -£244 | -£244 | -£244 | -£244 |
| Consumer benefit | £300 | £300 | £300 | £300 | £300 |
| Net social benefit | £56 | £56 | £56 | £56 | £56 |
| Net social benefit (at year 0) discounted at the STPR | £54 | £52 | £51 | £49 | £47 |
| **Net present value at year 0** (sum of the above) | **£253** | | | | |