Discount rates and appraisal periods for the cost–benefit analysis of financial services regulation

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Prepared for the Financial Conduct Authority

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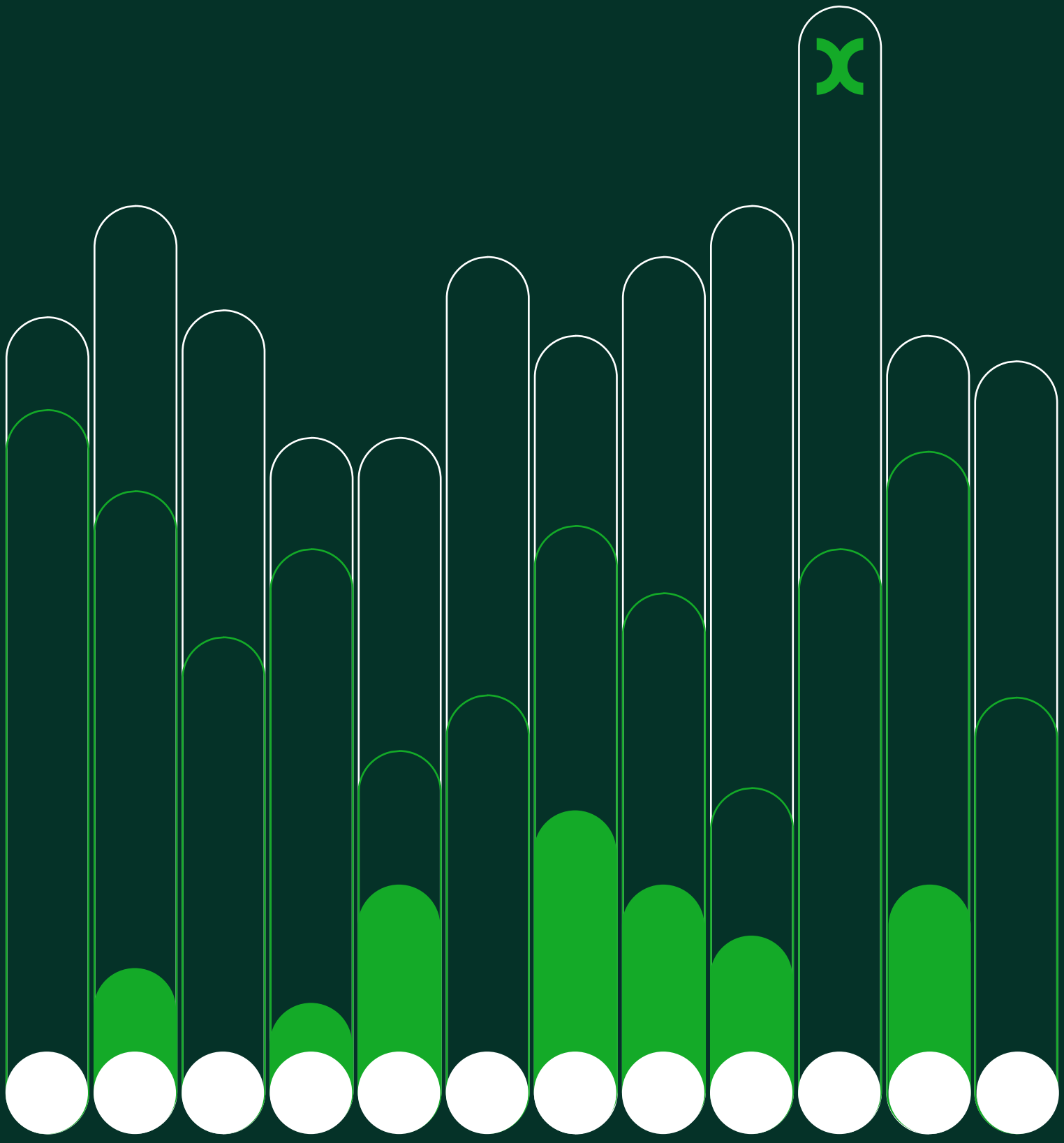

Contents

Figures and Tables

Foreword from FCA Chief Economist

Cost benefit analysis is at the heart of the FCA's policy-making. Our decisions shape financial markets today and for years to come. How we account for future costs and benefits—through discounting—affects the balance we strike between short-term and long-term impacts. This means our approach to discounting is an important part of good policymaking.

As set out in our Statement of Policy on Cost Benefit Analyses (July 2024), we follow the HM Treasury Green Book guidance. This means using a standard discount rate and a typical 10-year period for assessing impacts, consistent with other UK regulators and government departments.

It is important that we keep this approach under review. Following feedback we received when developing our Statement of Policy—including from our independent Cost Benefit Analysis Panel—we decided to explore alternatives such as using different discount rates for consumers and firms, and whether the 10-year period remains appropriate, particularly for products such as pensions.

To examine these questions, we commissioned Oxera to produce this discussion paper on the topic. The literature and existing practice from other authorities does not support us changing our approach at this time. However, it highlights cases where adjusting cost and benefit estimates before applying the standard discount rate can improve the quality of our estimates. For example, where costs or benefits are materially correlated with macroeconomic growth, or where there are material financing costs associated with investments needed to comply with new regulatory requirements.

We will continue to review our approach to cost benefit analysis and we welcome views on our approach and the techniques we use.

Kate Collyer

FCA Chief Economist

Executive summary

The Financial Conduct Authority (FCA) asked Oxera to assess the case for using separate discount rates for consumers and firms to better reflect their distinct time preferences in FCA Cost–Benefit Analyses (CBAs).

Our assessment was based on a review of the literature and practice by other authorities.

We found that the literature and current practice generally do not support this approach. Instead, CBAs that aggregate impacts across multiple affected groups—such as those conducted by the FCA—should be performed from a societal perspective, using a common unit of account.

To convert all costs and benefits into a common unit of account, the literature and current practice supports adjusting cost and benefit estimates directly as required (e.g. using a shadow price) and then discounting at a social discount rate such as the Green Book's 3.5% Social Time Preference Rate (STPR)—as currently used by the FCA—rather than using multiple discount rates.

Based on the literature and current practice reviewed, we considered the following four adjustments in the context of CBAs for financial services regulation.

- **Relative price effects:** these are changes in the value of quantified impacts relative to each other. Beyond health impacts, the FCA could assess whether any costs or benefits from its interventions experience material relative price changes that warrant adjustment.
- **Systematic risk:** the significance of systematic risk depends on whether costs (e.g. compliance expenses or lost revenues) or benefits (e.g. increased liquidity) correlate with macroeconomic growth. When spread throughout society, such risks may be negligible. However, if found to be material on a case-by-case basis, accounting for systematic risk directly in the streams of costs and benefits may be preferred to using risk-adjusted social discount rates.
- **Financing costs:** the FCA could consider whether firms' financing costs associated with investments needed to comply with FCA rules are material and not already reflected in cost estimates. If

an adjustment is needed, these costs should be incorporated into the cost and benefit streams and then discounted at the standard 3.5% STPR.

- **Regulation displacing or altering the use of capital:** while further research would be required to reach a firm conclusion, our assessment based on the research in scope of this report is that FCA interventions are generally unlikely to materially displace or alter the use of capital in a way that would warrant the implementation of an adjustment.

To practically account for private sector financing costs in CBAs, as introduced above, the FCA could consider two approaches:

- surveying firms directly to estimate financing costs for specific investments;
- approximating financing costs by forming an estimate for the cost of capital.

Finally, we have considered the case for the FCA maintaining or deviating from its standard ten-year appraisal period for CBAs. Given the complexity of determining optimal appraisal periods on a case-by-case basis across diverse financial services sub-sectors, there may be a stronger case for maintaining a predefined appraisal period, as it promotes consistency and simplifies comparisons across FCA CBAs.

There is also a case for the FCA continuing to use ten years as the predefined period to maintain alignment with the standard approach used by UK government departments and regulators. Nonetheless, the FCA could consider reviewing past interventions to assess whether a different predefined appraisal period would be more appropriate for the specific context of financial services regulation.

1 Scope

Oxera was commissioned by the FCA to prepare a discussion paper on the case for using separate discount rates for consumers and firms and for maintaining or deviating from the current ten-year appraisal period in FCA CBAs.[1]

The assessment of whether to use separate discount rates is based on a targeted literature and use case review to determine whether there is support for such an approach or whether alternative approaches are more appropriate. In particular, we were asked to consider whether the findings of the literature and practice of other authorities would apply to the FCA as a regulator in the financial services sector, whose regulatory interventions typically affect consumers and providers of financial services.

Based on this research, we make recommendations on what changes the FCA could consider in order to improve its CBA methodology. We also discuss some of the practical considerations for the implementation of potential changes. Developing detailed guidance on potential changes to the FCA's CBA methodology is outside the scope of this project.

The FCA has also asked us to take the social discount rate in the HM Treasury Green Book as given. We therefore do not comment on whether there is any case to update or amend the Green Book value.

To assess maintaining or deviating from a standard ten-year appraisal period we follow a similar approach as above by conducting a targeted review of the literature and use cases to make recommendations on the FCA's approach.

Our recommendations provide a basis on which the FCA can engage with stakeholders to determine whether to make any changes to its CBA methodology.

[1] The research was conducted and the report prepared in the first half of 2025. It should be noted that, subsequent to this work, HM Treasury has commissioned a review of discounting in the Green Book. See HM Treasury (2025), 'Review of discounting in the Green Book: Terms of Reference', 16 December.

2 Assessment of the case for using alternative assumptions for the discount rate

This section first outlines the FCA's current approach to discounting in CBAs and explores the rationale for considering the use of separate discount rates for consumers and firms. Next, we summarise the literature and use cases reviewed. We then interpret these findings in the context of FCA CBAs in the financial services sector and evaluate potential options. Finally, we discuss the practical considerations for implementing one of the options considered.

2.1 Establishing the baseline—the FCA's current approach to discounting

The FCA's interventions generate costs and benefits that often occur in future years.[2] To account for this the FCA uses discounting to calculate their present value. The FCA's current approach is summarised in its July 2024 'Statement of Policy on Cost Benefit Analyses'.[3] This document maintained the FCA's previous approach of using the discount rate recommended in HM Treasury's Green Book, which is currently 3.5%.[4] The rationale for this was consistency with the approach used by UK government departments and regulators.

The 3.5% discount rate recommended in the Green Book is a STPR, which represents 'the value society attaches to present, as opposed to future, consumption. It is based on comparisons of utility across different points in time or different generations'.[5]

Table 2.1 below summarises the parameters of the STPR and their current values. We set this out for context, but an assessment of whether the Green Book STPR should be updated or whether an alternative rate should be used for the social discount rate is not in scope of this work.

[2] We use the term 'intervention' to broadly refer to the rules and other measures that the FCA implements that may require a CBA to be conducted.
[3] Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July.
[4] A declining STPR applies after 30 years due to uncertainty about future values of its components. See HM Treasury (2024), 'The Green Book (2022)', 16 May; and Lowe, J. (2008), 'Intergenerational wealth transfers and social discounting: Supplementary Green Book guidance', July.
[5] HM Treasury (2024), 'The Green Book (2022)', 16 May.

Table 2.1 Parameters of the Green Book STPR

Element	Description	Current value
Rate of pure time preference	Represents the extent to which the current population's welfare is prioritised or deprioritised relative to the future population's welfare.	0.5%
Risk parameter	A measurement of risk which, according to the Green Book, accounts for 'catastrophic risk' and includes a small premium for 'systemic risk'.	1%
Elasticity of marginal utility with respect to consumption	Defined (approximately) as the percentage change in marginal utility, divided by the percentage change in consumption.	1
Expected growth rate of future per-capita consumption	Represents the expected percentage change in real per-capita consumption.	2%

Source: HM Treasury (2024), 'The Green Book (2022)', 16 May; Freeman, M., Groom, B. and Spackman, M. (2018), 'A summary report from two workshops on recent advances in social discounting practice and theory', February; Oxera (2020), 'A formula for success: reviewing the social discount rate', 30 September.

Consistent with the Green Book, the FCA may also deviate from the 3.5% STPR in certain circumstances as follows.[6]

- **Health impacts:** a health discount rate of 1.5% is used when appraising changes in health (wellbeing) values that occur in future years. Health effects are expressed using welfare or utility values, such as Quality Adjusted Life Years (QALYs), as opposed to monetary values. The diminishing marginal utility associated with higher incomes does not apply, as the welfare or utility associated with additional years of life will not decline as real incomes rise.
- **Intergenerational impacts (including environmental):** sensitivity analysis is conducted using the standard 3.5% discount rate and a reduced discount rate (which excludes pure social time

[6] Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July, pp. 86–87; HM Treasury (2024), 'The Green Book (2022)', 16 May.

preference) when an intervention involves large or irreversible transfers of wealth between generations.

2.1.1 What is the motivation for exploring alternative assumptions for the discount rate?

The Green Book 3.5% STPR has been the standard rate in the appraisal of UK government spending and regulatory interventions since 2003, and in its guidance the FCA highlights consistency as the main reason for adopting this approach.[7] However, putting aside the consideration of consistency, it is useful to ask whether the 3.5% STPR is optimal in the specific context of the CBA of interventions made by the FCA in the financial services sector.

As the financial services regulator, the FCA is particularly concerned with the impacts on consumers of financial services and the firms that provide them. To the extent that the true discount rates for consumers of financial services and financial services firms differ from each other, and from society as a whole, the use of a single STPR could theoretically introduce some error into the discounting of costs and benefits.

Therefore, using a differentiated (i.e. separate) discount rate for each stakeholder group may warrant further evaluation if it would reduce the potential error that may exist when using a single discount rate. This is discussed in the box below.

[7] Freeman, M., Groom, B. and Spackman, M. (2018), 'A summary report from two workshops on recent advances in social discounting practice and theory', February, p. 5.

Box 2.1 Differentiated discount rates

By 'differentiated discount rates' we refer to an approach that departs from the use of a single STPR in a CBA and uses **multiple discount rates**. There can be differentiation of discount rates along many dimensions, for example as follows.

- **Types of impact:** this would involve using a different rate to discount certain impacts such as health and environmental impacts. This is already part of the FCA's approach (as described above).
- **Types of group:** this would involve using one rate to discount impacts that are incident on consumers, and a second rate to discount impacts that are incident on firms.

Discount rates could be further differentiated by time horizon, market, consumer/firm characteristics, etc.

Source: Oxera.

However, if identifying the true discount rates of different stakeholder groups is challenging (not to mention the fact that there will be heterogeneity within each group), and/or using differentiated discount rates in a CBA introduces some other inconsistencies, then new types of error may be introduced.

An alternative to using differentiated discount rates in CBA, as suggested in the literature that we reviewed, is to adjust cost and benefit estimates directly. This is often done using a 'shadow price'. These adjusted estimates can then be discounted using a single STPR. We introduce this approach in the box below for discussion later in the report.

Box 2.2 Adjusting estimates of costs and benefits using a shadow price

The **shadow price approach** involves converting all effects into streams of consumption equivalents (i.e. costs and benefits expressed in a common unit of account) using a shadow price.[1] These can then be discounted using a standard STPR.

A shadow price is an estimated monetary value assigned to an impact that does not have a market price. Shadow prices can also be used to better reflect the true value of an impact, commodity, or service when its market price is distorted (e.g. due to externalities).

Note: [1] Consumption being the common unit of account is common practice in the literature and use cases that we reviewed. This ensures consistency with the STPR, which captures consumption trade-offs.
Source: CFI (2024), 'Shadow Pricing', accessed 1 April 2025; Office for National Statistics (2018), 'Reviewing discount rates in ONS valuations', 11 July; HM Treasury (2024), 'The Green Book (2022)', 16 May.

2.2 Literature and use case review—evidence on the use of differentiated discount rates

The literature directly addressing the question of using differentiated discount rates for different groups in a CBA is limited. Instead, most of the literature focuses on the use of differentiated discount rates for different types of non-monetary impact (e.g. health and environmental impacts). Therefore, we have also reviewed the broader literature to understand the different approaches to discounting in the context of public appraisal and CBAs.

We have also reviewed the use of different discounting methodologies by governments and regulators across sectors and geographies. Most governments and regulators have adopted the use of a single discount rate in their appraisals and CBAs, with the main point of divergence being the level of that single discount rate. However, there are a limited number of use cases where governments or regulators have used multiple discount rates or made other adjustments in their CBAs, which we discuss further below.

2.2.1 Firm and consumer discount rates

When conducting an analysis solely from the perspective of a consumer or a firm, there is strong empirical evidence that these groups may discount at different rates.[8]

- **Consumers:** empirical research suggests that individuals show a bias for the present.[9] Estimates based on observed behaviour and experimental techniques vary considerably, but are generally much higher than estimates of the STPR and of firms' discount rates.[10]
- **Firms:** these typically evaluate projects using discount rates that are above their cost of capital to account for additional risks or other factors.[11]

However, CBAs are usually conducted from the perspective of society as a whole and are concerned with overall social welfare.[12] Therefore, even accepting that consumers and firms have different individual discount rates, it does not necessarily follow that these should be used in a societal CBA. This is because society as a whole is an aggregation

[8] Some of the literature and use cases discuss how the difference may be due to '[e]conomic distortions, including taxes on capital, [creating] a divergence between the rate of return that savers earn and the private rate of return to capital'. However, as noted above, from observed consumer and firm behaviour there may even be more factors involved. See, for example, Office of Management and Budget (2003), 'Circular A-4', 17 September, p. 33; Li, Q. and Pizer, W. (2021), 'Use of the consumption discount rate for public policy over the distant future', *Journal of Environmental Economics and Management,* **107**, pp. 2–4.

[9] This means that, when considering trade-offs between two future periods, present-biased individuals give stronger relative weight to the earlier period as it gets closer. This is also referred to as hyperbolic discounting. See O'Donoghue, T. and Rabin, M. (1999), 'Doing It Now or Later', *American Economic Review,* **89**:1, pp. 103–124; Oxera (2002), 'A social time preference rate for use in long-term discounting', 17 December, pp. 26–27.

[10] See, for example, Frederick, S., Loewenstein, G. and O'Donoghue, T. (2002), 'Time Discounting and Time Preference: A Critical Review', *Journal of Economic Literature*, June, **XL**, pp. 351–401; O'Donoghue, T. and Rabin, M. (1999), 'Doing It Now or Later', *American Economic Review,* **89**:1, pp. 103–124; Augenblick, N., Niederle, M. and Sprenger, C. (2015), 'Working over Time: Dynamic Inconsistency in Real Effort Tasks', *The Quarterly Journal of Economics*, **130**:3, pp. 1067–1115; Ahmadi, I., Skiera, B., Lambrecht, A. and Heubrandner, F. (2017), 'Time preferences and the pricing of complementary durables and consumables', *International Journal of Research in Marketing,* **34**:4, pp. 813–828.

[11] See, for example, Jagannathan, R., Matsa, D., Iwan, M. and Tarhan, V. (2016), 'Why do firms use high discount rates?', *Journal of Financial Economics*, **120**:3, pp. 445–463; Graham, J. (2022), 'Presidential Address: Corporate Finance and Reality', *The Journal of Finance',* **77**:4, pp. 1975–2049; Sharpe, S. and Suarez, G. (2014), 'Why isn't Investment More Sensitive to Interest Rates: Evidence from Surveys', Finance and Economics Discussion Series (Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board), August.

[12] See, for example, HM Treasury (2024), 'The Green Book (2022)', 16 May: 'The appraisal of social value, also known as public value, is based on the principles and ideas of welfare economics and concerns overall social welfare efficiency, not simply economic market efficiency. Social or public value therefore includes all significant costs and benefits that affect the welfare and wellbeing of the population, not just market effects.'

of a number of different stakeholders. This is why a social discount rate is typically used.[13]

We discuss what is the right perspective in the specific context of CBAs conducted by the FCA in section 2.3.1, including the specific case of Equivalent Annual Net Direct Cost to Business (EANDCB).

2.2.2 Theoretical foundation for discounting in CBAs

The academic literature on discounting in public appraisal and CBAs lacks a common theoretical foundation, as discussions on how the social discount rate should be derived have evolved along two distinct strands.[14]

- Social Time Preference (STP): based on the principles of how the current population should balance trade-offs with future generations.
- Social Opportunity Cost (SOC): based on the idea that the return on public investment should be at least as high as the return if the funds had remained in the private sector.

While this fragmentation in the literature does not preclude the consideration of differentiated discount rates in either the STP or SOC paradigm, we have found that the lack of a single unified approach makes an assessment of differentiated discount rates more complex. This is because the use of differentiated discount rates may need to be evaluated in the context of the STP and SOC approaches separately.

Given that the current Green Book 3.5% discount rate used by the FCA is a STP rate, examples of alternative approaches that build from a STP foundation may be more relevant to consider—but we have not excluded SOC-derived approaches from our review.

[13] For example, society might not wish to deplete natural resources at the rates that would be implied by high individual discount rates. See Oxera (2002), 'A social time preference rate for use in long-term discounting', 17 December, p. 5.

[14] See, for example, Creedy, J. and Passi, H. (2017), 'Public Sector Discount Rates: A Comparison of Alternative Approaches', New Zealand Treasury Working Paper 17/02, June; Spackman, M. (2018), 'Social discounting: social opportunity cost, social time preference and risk', Centre for Climate Change Economics and Policy Working Paper No. 207, Grantham Research Institute on Climate Change and the Environment Working Paper No. 182, April; Spackman, M. (2016), 'Appropriate time discounting in the public sector', Centre for Climate Change Economics and Policy Working Paper No. 207, Grantham Research Institute on Climate Change and the Environment Working Paper No. 182, March; Spackman, M. (2025), 'Social discounting and the cost of public funds: problems with current global practice', Grantham Research Institute on Climate Change and the Environment Working Paper No. 419, January.

2.2.3 Relative price effects

Relative price effects refer to changes in the value of quantified impacts relative to each other. This occurs where the change in the value of a quantified impact is expected to differ from the general rate of inflation that is assumed in the CBA. Relative price effects are often observed for non-monetary values quantified in CBAs, such as health and environmental impacts.[15]

Using a differentiated discount rate to account for the relative price effects of health impacts is already part of the FCA's approach and is not the focus of this report (see section 2.1). However, we briefly discuss this application of differentiated discount rates to consider whether there are useful findings that could be applied in the context of our research focus.

Health effects are often valued using QALYs. The rationale for using a different discount rate to discount measures such as QALYs is that the value of a QALY is not expected to diminish as incomes increase over time, and it may even be expected to grow.[16] This is in contrast to 'normal' consumption goods that might be expected to become less valuable as income increases. The wealth effect component of the STPR accounts for the diminishing marginal utility associated with higher incomes.[17] Therefore, when discounting health effects a discount rate that excludes the wealth effect can be used, which in the case of the Green Book is 1.5%.

In the context of health effects, several paradoxes and inconsistencies have historically been provided as reasons against using differentiated discount rates. For example, Keeler and Cretin (1983) argued that, if health benefits are discounted at a lower discount rate than costs, delaying a health programme will increase its benefits-to-cost ratio (known as the paralysing paradox).[18] Weinstein and Stason (1977)

[15] While often discussed in the context of non-monetary effects (e.g. in terms of health and the environment), the effect may also apply to monetary values. For example, the Green Book notes that a relative price effect is the movement over time of a specific price index (such as information technology or construction) relative to a general price index (such as the GDP deflator). Where there is historical evidence and an expectation this will continue in the future, different rates of inflation can be used to reflect the relative difference. See HM Treasury (2024), 'The Green Book (2022)', 16 May.

[16] Office for National Statistics (2018), 'Reviewing discount rates in ONS valuations', 11 July, p. 40; Attema, A., Brouwer, W. and Claxton, K. (2018), 'Discounting in Economic Evaluations', **36**, pp. 745–758; John, J., Koerber, F. and Schad, M. (2019), 'Differential discounting in the economic evaluation of healthcare programs', *Cost Effectiveness and Resource Allocation*, **17**, article number 29.

[17] In the Green Book, the wealth effect component is currently estimated at 2% and is calculated as the elasticity of marginal utility with respect to consumption multiplied by the expected growth rate of future per-capita consumption. See HM Treasury (2024), 'The Green Book (2022)', 16 May.

[18] Keeler, E. and Cretin, S. (1983), 'Discounting of Life-Saving and Other Nonmonetary Effects' *Management Science*, **29**:3, pp. 300–306.

argued that using different discount rates for costs and health effects would lead to undesirable inconsistencies over time.[19] However, more recent literature has dispelled these theories, for example by arguing that the value of health is expected to grow over time.[20] Nonetheless, this highlights the importance of considering whether the use of differentiated discount rates could cause inconsistencies in other contexts.

Freeman et al. (2017), in a report for the Office for National Statistics (ONS), argue that two effectively identical approaches can be used to account for the changing scarcity of environmental resources in CBAs.[21]

- The first approach is to use different discount rates for environmental impacts and consumption impacts. The different rates should reflect the changing relative scarcity of the environmental resource to consumption.
- The second approach is to reflect the changing scarcity of environmental resources in the 'shadow prices' for those resources, convert all cost and benefit streams into consumption gains and losses, and discount at the standard STPR.[22]

The two approaches should be equivalent if correctly calibrated. However, the authors argue that it is conceptually preferable to separate out issues of scarcity through pricing from the considerations of welfare over time that underlie the discounting debate. Moreover, if different environmental resources have different characteristics, the first approach would require a different discount rate to be calculated for each while the second approach allows different characteristics to be accounted for more easily.

For health, Freeman et al. (2017) also argue that the approach of converting the health benefits of a project into streams of consumption gains and losses that are discounted at a STPR may be preferable to the

[19] Weinstein, M. and Stason, W. (1977), 'Foundations of cost-effectiveness analysis for health and medical practices', *The New England journal of medicine*, **296**:13, pp. 716–721.
[20] Luttrell, M. (2011), 'The Case for Differential Discounting: How a Small Rate Change Could Help Agencies Save More Lives and Make More Sense', *William and Mary Policy Review*, **3**:80; Attema, A., Brouwer, W. and Claxton, K. (2018), 'Discounting in Economic Evaluations', **36**, pp. 745–758; John, J., Koerber, F. and Schad, M. (2019), 'Differential discounting in the economic evaluation of healthcare programs', *Cost Effectiveness and Resource Allocation*, **17**, article number 29.
[21] An environmental good that is becoming scarcer and is not easily substituted by other goods will face a sustained increase in its relative value to consumption in the future. See Office for National Statistics (2018), 'Reviewing discount rates in ONS valuations', 11 July.
[22] The first approach would hold the value of the environment relative to consumption constant and account for changing scarcity in the discount rate. The second approach would require the value of the environment relative to consumption to increase.

use of different discount rates.[23] As above, the separate consideration of relative price effects and welfare over time avoids using discount rate(s) to account for multiple factors.

2.2.4 Systematic risk

Differentiated discount rates and direct adjustments to the streams of costs and benefits have been used by some governments to account for systematic risk. Before discussing these applications, it is useful to set out the relevance of systematic risk in public appraisals and CBAs.

In general, the costs and benefits of an intervention are subject to different types of risk. These are most often discussed in the context of project appraisal (e.g. the appraisal of a publicly funded infrastructure investment), but risk and uncertainty also apply to the costs and benefits of regulatory interventions (see Box 2.3 below for a discussion of the differences).[24]

- **Project/intervention-specific risk:** this is risk that can be eliminated through diversification across projects/interventions—for example, the probability that a project will be managed well or badly, leading to over- or underperformance.[25]
- **Systematic risk:** this is risk that cannot be eliminated through diversification across projects/interventions. This occurs where the costs and/or benefits of a project/intervention are correlated with changes in the macroeconomic environment, such as economic growth. One example of an impact influenced by the macroeconomic environment is the scale of benefits from some consumer protection regulations in the mortgage market, as a strong economy often leads to housing market transactions and more mortgage borrowing.
- **Catastrophic risk:** this reflects the probability that society will fail to survive a given year. Catastrophic risks come from existential threats such as meteorites as well as significant political events such as large-scale anarchy or nuclear war.

[23] See Office for National Statistics (2018), 'Reviewing discount rates in ONS valuations', 11 July.
[24] For a further discussion see, for example, Oxera (2020), 'A formula for success: reviewing the social discount rate', *Agenda,* September.
[25] If required, it can be accounted for in the profile of benefits and costs, as is already suggested in the Green Book. See Spackman, M. (2005), 'Time Discounting and of the Cost of Capital in Government', *Fiscal Studies*, **25**:4, pp. 467–518; Oxera (2020), 'A formula for success: reviewing the social discount rate' *Agenda,* September; Moore, M., Boardman, A. and Vining, A. (2017), 'Risk in Public Sector Project Appraisal: It Mostly Does Not Matter!', Public Works Management & Policy, **22**:4, pp. 301–321.

Box 2.3 Differences between spending and regulatory CBAs

There are several key differences between the impacts of government spending decisions (e.g. on infrastructure, defence, or social programmes) and regulatory interventions.

- Government spending is funded through taxation and/or borrowing. In contrast, regulatory interventions typically do not involve direct public spending but instead result in direct costs to firms.
- Government spending is often constrained by budgetary limits. While in some cases there are controls on overall regulatory burdens, there is no inherent cap on the extent of regulation.[1]
- Government spending, such as infrastructure projects, often involves significant capital expenditure, whereas regulatory costs for firms are more likely to be operational expenses (we explore the implications of this in sections 2.3.4 and 2.3.5).

While the core principles of discounting apply to both government spending decisions and regulatory interventions, some methodological aspects may be less relevant due to the distinctions outlined above.

Note: [1] For example, in 2008 the UK government consulted on a regulatory buget. In 2011, a 'one-in, one-out approach' was introduced followed by a 'one-in, two-out approach', and then a 'one-in, three-out approach'. Between 2015 and 2023 the UK government set a target for the total regulatory burden on business of new regulation (the Business Impact Target). In March 2025, the government announced a commitment to reduce administrative costs for business by 25%. See, for example, HM Government (2008), 'Regulatory budgets: a consultation document', August; HM Government (2011), 'One-in, one-out (OIOO) methodology', July; HM Government (2013), 'One-in, two-out: statement of new regulation', 10 July; HM Government (2016), 'Government going further to cut red tape by £10 billion', 3 March; HM Government (2023), 'The increase in the cost of regulation on business and the end of the BIT', 15 September; HM Government (2025), 'New approach to ensure regulators and regulation support growth', 31 March. Source: Oxera.

A large strand of the literature deals with accounting for systematic risk in projects financed by public spending, and some governments use risk-adjusted discount rates in their appraisals of public projects.

The use of differentiated discount rates to account for systematic risk by the government of the Netherlands in its CBA of public investment projects and government policies is perhaps of most direct relevance.[26] Generally, the guidance recommends the use of a single risk-adjusted social discount rate for all types of costs and benefits.[27] This assumes that the systematic risk of all cost and benefit streams is the same. However, in practice, different streams may have a different level of systematic risk, based on their correlation with the state of the economy. Therefore, the guidance allows for a higher or lower risk-adjusted social discount rate to be used for the following specific cost and benefit streams in the CBA.

- Fixed (sunk) costs of a project that are largely independent of its utilisation. If this impact is expected to be less correlated with economic growth than other impacts, a lower discount rate can be applied.[28]
- Benefits of a project that are highly non-linear with its utilisation and where utilisation depends on the state of the economy. If this impact is expected to be more correlated with economic growth than other impacts, a higher discount rate can be applied.[29]

Guidance issued by the Office of Management and Budget of the United States (OMB) for regulatory CBA also discusses the use of risk-adjusted discount rates to account for systematic risks, but concludes that a preferred approach is to adjust the streams of costs and benefits

[26] Ministerie van Financiën (2020), 'Rapport Werkgroep discontovoet 2020', 9 October.
[27] The risk-adjusted discount rate is composed of a -1% risk-free rate and a 3.25% risk premium. This is based on a Beta (ß) parameter of 1 (the Beta measures the correlation of the cost and benefit flows with the state of the economy).
[28] Specifically, if costs are higher in absolute terms when economic growth is higher, and lower when economic growth is lower, and to a lesser extent than consumption, then they have a beta smaller than 1, resulting in a lower risk-adjusted discount rate. See Ministerie van Financiën (2020), 'Rapport Werkgroep discontovoet 2020', 9 October, pp. 62–63.
[29] Specifically, if benefits are higher with higher economic growth, and lower with lower economic growth, and to a greater extent than consumption, then these benefits have a beta higher than 1, resulting in a higher risk-adjusted discount rate. See Ministerie van Financiën (2020), 'Rapport Werkgroep discontovoet 2020', 9 October, pp. 62–63. The French government's guidance for the socioeconomic assessment of public investments also recommends using a risk-adjusted discount rate that is composed of a 2.5% risk-free rate and 2% risk premium that is multiplied by a sector-specific Beta (ß) parameter. See Commissariat général à la stratégie et à la prospective (2013), 'Cost benefit assessment of public investments', December.

directly.[30] This can be done by calculating certainty-equivalent values, which reflect the expected value of a benefit or cost plus or minus a premium that quantifies the systematic risk. This is a version of the shadow price approach discussed in Box 2.2, and is preferred because 'using discount rates to account for risk requires rigid assumptions about the form that risks take over time, and therefore creates the potential for increased inaccuracy'.[31]

Similarly, the European Commission's handbook for the economic appraisal of EU co-financed investments recommends that discount rates should not be adjusted for systematic risks, and rather systematic risks can be accounted for directly in the streams of costs and benefits and testing the robustness of the project's performance against changes in the main assumptions using sensitivity analysis.[32] This is similar to the FCA's approach of handling uncertainty in estimates of impacts in CBAs.[33]

While the above use cases assume that systematic risk is material and should be accounted for, other governments and academics consider systematic risk from the perspective of a societal CBA to be less material.[34] For example, in the UK's Green Book, while an allowance for catastrophic and systemic risk is included in the 3.5% STPR, this is only 1 percentage point, which is much lower than the figure that is used by other governments such as those of the Netherlands and France. Freeman et al. (2018) describe this as an implicit assumption that the correlation between public investments and the net benefits is sufficiently spread throughout the populous that such risks are irrelevant to the public sector.[35] Another example is Moore et al. (2017),

[30] Office of Management and Budget (2023), 'Circular No. A-4', 9 November. At the time of writing there is some uncertainty about the current status of the 2023 OMB guidance following the change of the Administration in the USA.
[31] For example, using a higher discount rate to account for systematic risk would be inappropriate when evaluating regulations that reduce systematic risk (meaning that they have higher net benefits when other societal outcomes are worse, and vice versa). Investments in pandemic preparedness are given as an example. See Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 81–82.
[32] European Commission (2021), 'Economic Appraisal Vademecum 2021-2027', 20 September, p. 21.
[33] Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July, pp. 25–28.
[34] There is also disagreement in the literature on the extent to which the public sector is better able to diversify risk than the private sector. See, for example, Greco, L. and Moszoro, M. (2023), 'Public versus Private Cost of Capital with State-Contingent Terminal Value', IMF Working Papers, **2023**:056; Armitage, S. (2015), 'Discount rates for long-term projects: the cost of capital and social discount rate compared', *The European Journal of Finance*, **23**:1, pp. 60–79.
[35] Freeman, M., Groom, B. and Spackman, M. (2018), 'Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury', February; Spackman, M. (2004), 'Time Discounting and the Cost of Capital in Government', *Fiscal Studies*, **25**:4, pp. 467–518.

which discusses how risk premia are material only for 'projects that affect a very large share of some individuals' consumption'.[36]

2.2.5 Private sector financing costs

Even taking the view of the UK Green Book, where from society's perspective underlying systematic risk is likely to be negligible, systematic risk (or other types of risk) may be material from the perspective of a firm financing a project or investment that is required to comply with a regulator's rules. In such situations, differentiated discount rates or adjustments to the streams of costs and benefits have been discussed.

Oxera has previously considered what discounting approach should be used when appraising public policies that are financed and delivered by the private sector.[37] The financing and delivery of such projects (or investments to comply with regulation) is costly to firms and, in particular, involves costly exposure to risks. These risks will be reflected in the financing costs of the firm as investors will require compensation for these risks, and this should be seen as part of the social cost of the project. The methodology proposes that the private sector capital costs reflecting embedded risks should be incorporated in the cost (and benefit) streams, which can then be discounted at the 3.5% STPR. This is a version of the shadow price approach discussed in Box 2.2.

The proposed basis for the valuation of financing costs is the firm- or sector-specific post-tax cost of capital. However, if the costs included in the appraisal already include a firm's financing costs (e.g. in the case of a Private Finance Initiative), they will also include the compensation that investors require for risk. In such cases, no additional adjustment for financing costs is required.

Similar adjustments for financing costs that are reflective of project risks have also been discussed by academics and regulators in the UK.

Spackman (2008) discusses CBA for regulations that would require substantial investment from private firms in cases where data is not directly available on the financing costs. To incorporate a private firm's financing costs, Spackman recommends calculating depreciation and

[36] Moore, M., Boardman, A. and Vining, A. (2017), 'Risk in Public Sector Project Appraisal: It Mostly Does Not Matter!', *Public Works Management & Policy*, **22**:4, pp. 301–321.
[37] This was in the context of the Water Framework Directive and addressed the appropriate treatment of public projects financed and executed by the private sector to deliver improvements to the water environment.

return on capital payments (based on a firm's cost of capital) over the project's lifetime and then discounting at the STPR.[38]

The Joint Regulators Group (JRG) considered the case of CBAs involving private investment, but public benefit.[39] Specifically, regulators may need to intervene in markets and require firms to make investments that need to be financed. The JRG discussed how different cost and benefit streams will have different systematic risk. The JRG considered the following four options.

1 Discount all costs and benefits at the STPR, including financing costs calculated using a Weighted Average Cost of Capital (WACC).[40]
2 Discount some costs and/or benefits at the relevant WACC, and some at the STPR, depending on their systematic risk.
3 Discount all costs and benefits at the relevant WACC.
4 Discount all costs and benefits at the STPR, excluding financing costs.

The JRG concluded that none of the regulators surveyed appeared to use differentiated discount rates (option 2), and that this may be because it is the least practical of the options given the complexities of assessing the systematic risk of individual impacts in a CBA. Instead, the JRG preferred option 1 as it may be more practical and ensures that the financing costs of investments are adequately incorporated.

The Office of Rail and Road (ORR) commissioned a report on the methodology for CBAs in support of safety-related investment decisions.[41] Consistent with the use cases discussed above, the report suggests that, when a privately financed project is appraised from a social perspective, the capital expenditure costs would normally exclude financing costs and this would lead to an understatement of the

[38] Spackman, M. (2008), 'Time Preference, The Cost Of Capital And PPPs', Conference on 'Discount Rates for the Evaluation of Public Private Partnerships', 3 October.
[39] The JRG was the predecessor to the UK Regulators' Network. See Joint Regulators Group (2011), 'Discounting for CBAs involving private investment, but public benefit', 4 October; Joint Regulators Group (2012), 'Discounting for CBAs involving private investment, but public benefit', Statement, 25 July.
[40] The JRG refers to this as the 'Spackman' approach based on the work done by Michael Spackman on this topic. The WACC measures the cost of capital of a firm. See section 2.4.2 for more details.
[41] Office of Rail Regulation (2016), 'Internal guidance on cost benefit analysis (CBA) in support of safety-related investment decisions', February; NERA Economic Consulting (2007), 'Discount Rates for Rail Safety Scheme Appraisals: Final Report for the Office of Rail Regulation', 9 August.

social costs (the risk premium in private financing costs is a social cost, as it would in due course fall on consumers and/or taxpayers).[42]

The report recommends replacing the initial capital expenditure with the subsequent stream of capital repayment and return on capital charges (e.g. based on a regulated firm's WACC) over time, and then discounting these cash flows at the STPR. The explicit inclusion of private financing costs applies only where financing costs are not included in the immediately available private sector cost data (i.e. in market prices).[43]

What the above use cases demonstrate is that, when a government or regulatory intervention requires firms to make investments that need to be financed by the firm, the costs of this financing (which are reflective of risk) may need to be incorporated in the CBA.

2.2.6 Regulation displacing or altering the use of capital in the private sector

Guidance issued by the OMB for regulatory CBA recognises that a regulation that displaces or alters the use of capital in the private sector can have different implications for total welfare compared with a regulation that directly affects consumption.[44] This arises because investment has a higher rate of return than the consumption discount rate due to economic distortions such as taxes.[45] This can be conceptualised as the opportunity cost of private capital.

[42] In the ORR's guidance based on the NERA report, the following example is provided: 'if a firm invests £100 in a piece of safety equipment, it is unlikely that the total cost of this investment for the private firm was £100 exactly. For example, if the firm has had to borrow this money from a bank, it will also have interest payments on that £100, and may incur arrangement fees.' See Office of Rail Regulation (2016), 'Internal guidance on cost benefit analysis (CBA) in support of safety-related investment decisions', February, p. 5.

[43] For comparison, the report provides the example of the National Institute for Clinical Excellence appraising the costs and benefits of pharmaceuticals. The costs in these appraisals are private sector output prices, in which financing costs are already included, so an additional adjustment for private financing costs is not required. See NERA Economic Consulting (2007), 'Discount Rates for Rail Safety Scheme Appraisals: Final Report for the Office of Rail Regulation', 9 August, p. 7.

[44] Such effects can be difficult to model. The OMB provides the following example: 'if a regulation directs electric utilities to reduce emissions of sulfur dioxide to reduce acid rain, depending on the specific circumstances and investment plans of utilities, the regulation may or may not result in productive capital being displaced by emission-reducing capital. The effect of such regulations on displacement of capital versus consumption depends on the utilities' ability to pass on the compliance costs to consumers, on the extent to which costs passed on to consumers affect investment decisions, on the extent to which reductions in acid rain reduce capital depreciation and thereby leads to increased capital investment, etc.' See Office of Management and Budget (2023), 'Preamble: Proposed OMB Circular No. A-4, "Regulatory Analysis"', April, pp. 24–25; Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 77–78.

[45] Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 77–78; Li, Q. and Pizer, W. (2021), 'Use of the consumption discount rate for public policy over the distant future', *Journal of Environmental Economics and Management,* **107**, pp. 2–4. This distortion exists independently from any consideration of systematic risk.

When regulation is 'incident' on capital, the OMB guidance states that the analytically preferred method to account for the effects is to use a shadow price of capital to adjust all the benefits and costs to reflect their value in equivalent units of consumption before discounting them at the STPR.[46]

The 2003 version of the OMB guidance (since replaced) considered this approach to be analytically too complex, and the guidance instead recommended that estimates of net benefits be calculated using:[47]

- a 7% discount rate representing the average before-tax rate of return to private capital in the US economy, to approximate the opportunity cost of capital;
- a 3% discount rate representing the real rate of return on long-term government debt, to approximate the social rate of time preference.

More recently, the 2023 edition of the OMB guidance developed an approach for applying the shadow price of capital, replacing the previous approach.[48] This is a version of the shadow price approach discussed in Box 2.2. The shadow price of capital is the welfare value lost from displaced capital investment—i.e. the present value of the stream of consumption losses associated with the immediate displacement of $1 of capital, discounted at the consumption discount rate.[49]

Importantly, in the case of an economy with perfect capital mobility, the shadow price (which is applied as a multiplier) is one and this adjustment makes no difference. Therefore, the guidance recommends a series of sensitivities using different assumptions on capital mobility.[50]

To summarise, a shadow price of capital can be used to quantify the welfare impact of regulation displacing or altering the use of capital in the private sector. To the extent that regulation has other distortions that have welfare implications, and that are not already incorporated in

[46] Office of Management and Budget (2023), 'Circular No. A-4', 9 November, p. 78.
[47] Office of Management and Budget (2003), 'Circular A-4', September 17, pp. 33–34.
[48] Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 77–79.
[49] Newell, R., Pizer, W. and Prest, B. (2023), 'The Shadow Price Of Capital: Accounting For Capital Displacement In Cost Benefit Analysis', NBER Working Paper Series, Working Paper 31526, August. See also Li, Q. and Pizer, W. (2021), 'Use of the consumption discount rate for public policy over the distant future', *Journal of Environmental Economics and Management*, **107**.
[50] Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 78–79. See also Lind, R. (1990), 'Reassessing the government's discount rate policy in light of new theory and data in a world economy with a high degree of capital mobility', *Journal of Environmental Economics and Management*, **18**:2, pp. S8–S28.

the stream of costs and benefits, a shadow price could be used to quantify them. However, the OMB use case highlights the importance of assessing whether any distortions are permanent and material.

2.2.7 Other examples of differentiated discount rates

In our use case review we have identified a limited number of additional applications of differentiated discount rates. However, these have tended to apply in very specific circumstances that may be less relevant to the context of CBAs carried out by the FCA, or have included little or no discussion to justify the approach.

OMB guidance—a case of internal government investments

The OMB guidance discusses the appraisal of government investments that provide internal benefits (i.e. increased government revenues or decreased government costs).[51] Some government activities result in both government cost savings and external social benefits. If the analysis is able to allocate the investment's costs between the provision of government cost savings and external social benefits, then government cost savings and their associated investment costs may be discounted using a Treasury borrowing rate (based on marketable securities of comparable maturity to the period of analysis), while the external social benefits and their associated investment costs may be discounted at the social discount rate.

This approach is very specific in its application, the rationale being that the government internally discounts at a different rate to society. If a policy affects both internal government efficiency and wider society, this implies the use of two different discount rates. However, the operative term of this guidance is 'allocate the investment's costs between provision of government cost savings and external social benefits'. In effect, this approach leads to two separate CBAs being conducted. Moreover, the narrow scope of this approach suggests that broader implications for FCA CBAs are limited.

The European Commission's Better Regulation Toolbox

The Commission's Better Regulation Toolbox provides guidance on the use of discount rates in CBAs for policies and regulation. When carrying out a CBA from the perspective of society, the guidance recommends

[51] Office of Management and Budget (2023), 'Circular No. A-94', 9 November.

using a social discount rate.[52] However, the guidance discusses how the discount factor for individual companies may be higher as they are unable to diversify risk as effectively as society as a whole.[53] Therefore, in some cases, such as an analysis of the behaviour of a company in respect of an investment decision or for projects that are only partially funded by the EU budget, a higher discount rate may be used.

The guidance also notes that, in a single analysis, different discount rates can be used. It states that '[t]he policy measure itself can from a social point of view use a lower social discount factor; private actors may face higher discount factors; and a distinction may be made for income groups'.[54]

While the assertion that the discount rate from the perspective of society may be different to the discount rate from the perspective of an individual private actor can be supported (see section 2.2.1), the guidance does not discuss how the use of multiple discount rates in a CBA should be operationalised or why it is justified. This is also not discussed as an option in the Commission's handbook for the economic appraisal of EU co-financed investments.[55]

Case of the California Public Utilities Commission (CPUC)

In analyses of the costs and benefits of risk reduction measures of a utility company, CPUC argued that it does not necessarily make sense to use the same discount rate for both the numerator and the denominator of a Benefit Cost Ratio (BCR), unless the two types of outcome in the numerator and the denominator have the same characteristics and the same built-in assumptions.[56]

[52] The guidance recommends a rate of 3% in real terms. See European Commission (2023), 'Better Regulation Toolbox', July, pp. 561–562.
[53] There is disagreement in the literature about the extent to which this is true. See, for example, Greco, L. and Moszoro, M. (2023), 'Public versus Private Cost of Capital with State-Contingent Terminal Value', IMF Working Papers, **2023**:056; Armitage, S. (2015), 'Discount rates for long-term projects: the cost of capital and social discount rate compared', *The European Journal of Finance*, **23**:1, pp. 60–79.
[54] European Commission (2023), 'Better Regulation Toolbox', July, p. 562. The guidance notes that, while conceptually different discount rates can be justified, it is not straightforward to determine by how much these discount factors can differ.
[55] The handbook also advises that the social discount rate used should not vary across sectors based on policy considerations. Sector-specific rates would imply that one project or sector has a higher opportunity cost than another, which is not consistent with the social rate of time preference-based approach. See European Commission (2021), 'Economic Appraisal Vademecum 2021-2027', 20 September.
[56] CPUC also argued that '[h]aving a lower discount rate for benefits would be one way of placing capital projects and maintenance activities on a more equal footing', as otherwise 'the benefit streams for asset replacements are much longer and are thus greatly reduced by discounting.' See

This approach was criticised by an external consultancy as 'not standard practice' and 'not based in sound economic theory'. It argued that using different discount rates between the numerator and denominator would have a large effect on the results of the analysis. For example, if the streams of costs and benefits are equal, whether the BCR is lesser or greater than one depends on whether the numerator or denominator uses a higher discount rate.[57]

This example highlights how using multiple discount rates instead of a single discount rate in a BCR or NPV, all else being equal, may bias the results.

2.3 Interpretation of the evidence on the use of differentiated discount rates—options for the FCA

This section assesses whether the reviewed literature and use cases support alternative discounting approaches for CBAs conducted by the FCA in the financial services sector.

2.3.1 What is the right perspective for FCA CBAs?

CBAs are usually conducted from the perspective of society as a whole and are concerned with overall social welfare. However, the FCA is particularly concerned with the impacts on consumers of financial services and the firms that provide them. So, the key question to consider is whether society is the right perspective for the FCA's analysis. To answer this, several factors must be considered.

First, the appropriate discount rate for consumers or for firms is unlikely to be the rate at which an *individual* consumer or firm discounts. This is because, for example, a regulatory intervention is typically not a one-off action. Rather, interventions often have long-term impacts affecting multiple generations of consumers or firms over time. Therefore, just because an individual firm or consumer discounts at a given rate, it does not follow that the same rate should apply to the group of individuals.[58]

Safety Policy Division of the California Public Utilities Commission (2022), 'Safety Policy Division Staff Evaluation Report on the Southern California Edison Company's 2022 Risk Assessment and Mitigation Phase (RAMP) Application (A.)22-05-013', 10 November, pp. 17–18.

[57] Synapse, on behalf of The Utility Reform Network (2023), 'Application of Discount Rates for Assessing Cost-effectiveness of Utility Risk Related Investments', 11 October, pp. 8–9. Following the reports put forward by CPUC and the consultancy, we note that the utility company decided to adopt the use of multiple discount rates consistent with the CPUC's position. See Southern California Edison (2023), 'RAMP Recommendation Responses', Exhibit No. SCE-01 Vol.02, p. 8.

[58] An example of where an individual's discount rate may be preferable is when modelling the behavioural response of individual consumers or firms to an intervention. For example, OMB guidance discusses that, when estimating the underlying private behavioural changes that inform estimates of the effects of regulation, appropriate private discount rates faced by the relevant populations should be used. Once necessary private behaviours are modelled, the social discount rate can be applied to ascertain the social welfare effects (benefits and costs) of a regulation. See Office of Management and Budget (2023), 'Circular No. A-4', 9 November, p. 76.

Indeed, social discount rates such as the Green Book's STPR capture these dynamics by measuring, for example, the extent to which the current population's welfare is prioritised or deprioritised relative to the future population's welfare.[59]

Second, while the scope of FCA interventions often affects specific and identifiable groups such as mortgage lenders or consumers of mortgages, if the FCA is to report the overall net impact of its intervention—e.g. the Net Present Social Value (NPSV)—it needs to aggregate impacts across different groups. This requires a common perspective. There is no support in the literature or use cases that the common perspective should be sector-specific.[60] Moreover, given that financial services are used by nearly the entire population and have spillover effects on the broader economy, society as a whole is likely to be the appropriate perspective. Box 2.4 below discusses whether a different approach is appropriate when calculating the EANDCB.

[59] This is the rate of pure time preference parameter—see Table 2.1.
[60] While governments have a wider remit than an individual regulator such as the FCA, the types of intervention that governments conduct range from very targeted to broad-based. In all these cases, whether impacts fall on a small or large part of the population, the analysis being done is one of social welfare. Moreover, purely from a practical perspective, adopting sector-specific discount rates would be complex, especially as interventions often affect multiple sectors and have spillovers.

Box 2.4 Is the case of EANDCB different?

The EANDCB is the annualised present value of the net direct costs to business. Unlike the NPSV, this metric captures only direct costs and benefits to firms. Therefore, the right perspective for this metric could be 'firms' rather than 'society', which could warrant a different discount rate.[1]

However, retaining the existing methodology may be preferable to ensure estimates can be compared with those of other regulatory authorities.

Note: [1] However, the rate at which a single firm discounts is unlikely to be appropriate for the reasons discussed above (regulation may affect many firms across generations).
Source: Oxera.

Conducting a CBA from the perspective of society requires a common unit of account into which all impacts can be converted. Therefore, the question is how to convert all costs and benefits to the same unit.

In some cases, the literature and use cases that we reviewed suggested using differentiated discount rates for different types of impact. This, in effect, involves adjusting the social discount rate. Examples are the Green Book adjustment to the 3.5% STPR to discount health impacts, and the use of multiple risk-adjusted social discount rates in the Netherlands to account for different systematic risks. What is worth noting with these examples is that the starting point is the social discount rate, and adjustments are considered after this. That is, the literature and use cases do not advocate for replacing the social discount rate with the discount rates of individuals or specific groups.

However, we found more support for the approach of converting all effects into streams of consumption equivalents using a shadow price, and then discounting everything using the STPR.

In reviewing the literature and use cases, we found the following four adjustments discussed in the context of shadow prices and differentiated discount rates: (1) relative price effects; (2) systematic risk; (3) private sector financing costs; and (4) displacement of capital. We discuss their relevance for FCA CBAs in the remainder of this section.

2.3.2 Accounting for relative price effects

Using a differentiated discount rate to account for the relative price effects of health impacts is already part of the FCA's approach, consistent with the Green Book. More broadly, when conducting a CBA there is a need to account for relative price effects. Therefore, there may be scope for the FCA to consider whether there are other types of cost or benefit associated with FCA interventions for which relative price effects are material, and then what adjustments may be needed.

As noted above, some of the literature and use cases express a preference for the use of the shadow price method over differentiated discount rates to account for relative price effects.[61] While an assessment of the two methods in the context of health impacts is not in scope of this report, given that there is an established approach in the Green Book it may be advisable to retain the current approach.

2.3.3 Accounting for systematic risk

In the context of FCA interventions in the financial services sector, it is relevant to consider how significant systematic risk is.

First, the FCA would need to consider whether direct or indirect costs (e.g. the wages of compliance personnel, the costs of a new IT system, the reduction in firms' revenues from an intervention) or benefits (e.g. increased access to a financial services product, increased liquidity in a market) are correlated with macroeconomic growth. If the systematic risk of costs/benefits to one group (e.g. firms) is consistently higher than to another group (e.g. consumers), this may warrant a cost/benefit stream-specific adjustment. This would require assessment on a case-by-case basis.

Second, the FCA would need to decide whether to take the view, implicit in the Green Book, that, even if the systematic risk of certain costs or benefits is material, when spread throughout society such risks are negligible and do not need an additional adjustment in a societal CBA.

If the decision were made to make an additional adjustment for systematic risk, the use of differentiated risk-adjusted social discount rates (as per the Netherlands guidance) could be considered. However, it is likely to be practically easier to make adjustments to the streams of costs and benefits directly as per the OMB and European Commission guidance. This would not require a change to the entire discounting

[61] For example, Office for National Statistics (2018), 'Reviewing discount rates in ONS valuations', 11 July.

approach and could be applied proportionately on a case-by-case basis.[62] Sensitivity analysis is also discussed in the context of accounting for systematic risk, by testing the impact of different macroeconomic growth assumptions on the estimates of costs and benefits.[63]

2.3.4 Accounting for private sector financing costs

Even if no adjustment is made for the systematic risk of costs and benefit streams in a societal CBA, systematic risk (or other types of risk) could be material from the perspective of a firm that needs to finance an investment as a result of an FCA intervention. These risks would be reflected in the financing costs of the firm as investors will require compensation for them. This could be considered an additional direct cost that needs to be incorporated into a CBA.

The key question to determine whether the FCA should consider this adjustment is whether financing costs are material for financial services firms in the context of FCA interventions.

The inclusion of financing costs in the literature and use cases that we have reviewed arose in the context of utilities and infrastructure regulators that may require firms to make large capital investments. Capital investments typically require large upfront expenditure, which firms may need to finance using external debt or equity financing. In such cases, financing costs are likely to be material.

We note that the FCA has already considered the case of firms needing to raise new capital to comply with capital requirements. In the CBA of the Investment Firms Prudential Regime (IFPR), the FCA assumed that, in the first instance, firms could use their retained earnings to build up their own funds to the required level over the transition period (incurring no direct financing costs). To remedy any shortfall, the FCA then assumed that firms would raise capital at a cost of capital of 5.5%.[64]

Beyond capital requirements, firms may need to make upfront investments to comply with other FCA rules. For example, a firm may

[62] See, for example, Office of Management and Budget (2023), 'Circular No. A-4', 9 November; European Commission (2021), 'Economic Appraisal Vademecum 2021-2027', 20 September. See also Moore, M., Boardman, A. and Vining, A. (2017), 'Risk in Public Sector Project Appraisal: It Mostly Does Not Matter!', *Public Works Management & Policy*, **22**:4, pp. 301–321.

[63] Further consideration of sensitivity analysis is outside the scope of this report. However, we note that when conducting sensitivity analysis, other adjustments for systematic risk should not be applied at the same time.

[64] The CBA does not provide any explanation for why 5.5% was chosen. See Financial Conduct Authority (2021), 'A new UK prudential regime for MiFID investment firms', CP21/26, August, p. 76; Financial Conduct Authority (2021), 'A new UK prudential regime for MiFID investment firms', CP21/7, April, p. 145.

need to invest in a new IT system to comply with new reporting requirements.[65] However, it is likely that even the largest capital investments that financial services firms may need to make as a result of an FCA intervention are much smaller than a project undertaken by a utilities or infrastructure firm. The impact on financial services firms is much more likely to be on operating expenditure (e.g. wages or software licensing costs) or reduced revenue. This would typically not involve a firm raising new debt or equity financing specifically to pay for these costs (which would involve a direct financing cost). Instead, the impact would be on a firm's profit/loss—and accounting for such costs is already part of the FCA's CBA approach.

Another key consideration is whether estimates of costs used in the CBAs already include the relevant financing costs. Using the example of the new IT system, if the FCA uses market estimates of the price of an IT system in its CBA, it could be the case that any financing costs are already included in the market price.

In summary, a financing cost adjustment would require the FCA to assess on a case-by-case basis whether financing costs for financial services firms are material in the context of the regulatory intervention and whether they are already incorporated in cost estimates. If the FCA determines that an adjustment is necessary, the preferred approach in the literature is to incorporate the financing costs in the cost (and benefit) streams and then discount at the standard STPR.

In section 2.4, we discuss how this could be operationalised by the FCA in its CBAs, highlighting the practical considerations.

2.3.5 Accounting for displacement of capital

The above adjustment focuses on the additional direct cost to *firms* when they need to raise financing. A different adjustment can be made to account for the impact of regulation displacing or altering the use of capital on the wider economy. As per the OMB guidance, this effect can be accounted for using the shadow price of capital, which is the welfare value lost from displaced capital investment.

Some FCA interventions may displace or alter the use of capital in the economy, so it is relevant to consider whether this is a material effect

[65] Even where a firm does not raise new finance as a direct result of an FCA intervention, there may still be indirect financing impacts. For example, a firm may fund the required investment from its wider capital pool which may increase the firms overall financing requirement. It may also divert capital from more productive investments resulting in an opportunity cost. We discuss one potential way of accounting for opportunity costs of capital in section 2.3.5.

that needs to be accounted for in a CBA. For example, if an FCA intervention increases reporting requirements on firms, this could result in productive investment being displaced by investment that is needed in order to comply with regulations.

First, as flagged in the OMB guidance, modelling the exact impact on productive capital can be complex. For example, it can depend on the firm's ability to pass on the compliance costs to consumers and on the extent to which costs passed on to consumers affect investment decisions.[66] Regulation can also induce rather than displace productive capital investment (for example, competition-enhancing regulation could lead more firms to invest to enter a financial services market).[67] If the potential effects on capital of FCA interventions are expected to generally be small in the wider context of the UK economy, making a shadow price of capital adjustment may be disproportionate.

Second, even if regulation has an effect on productive capital investment, capital may be sufficiently mobile worldwide to largely eliminate any crowding out. In an open economy with perfect capital mobility, the shadow price of capital (which is applied as a multiplier) would be expected to be one.[68] While an assessment of the openness of the UK economy is out of scope of this report, the fact that there are large foreign direct investment inflows into the UK economy suggests a degree of openness.[69]

While further research would be required to reach a conclusive finding, our assessment based on the research in scope of this report is that FCA interventions are generally unlikely to materially displace or alter the use of capital in a way that would warrant the implementation of a shadow price of capital adjustment in all CBAs.[70] Importantly, we note

[66] Office of Management and Budget (2023), 'Preamble: Proposed OMB Circular No. A-4, "Regulatory Analysis"', April, pp. 24–25.
[67] Office of Management and Budget (2023), 'OMB Circular No. A-4: Explanation and Response to Public Input', p. 81.
[68] Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 78–79; Office of Management and Budget (2023), 'Preamble: Proposed OMB Circular No. A-4, "Regulatory Analysis"', April, pp. 25–27.
[69] For example, in 2022 foreign direct investment inflows were £22.9bn and the stock was £2.1trn. See Ward, M. (2024), 'Foreign Direct Investment Statistics', Research Briefing, 9 December. In the case of the USA, OMB guidance recommends consideration of a low shadow price of capital value of 1.0, reflecting an economy with perfect capital mobility, and a high value of 1.2, reflecting a closed economy estimate with no foreign capital flows. See Office of Management and Budget (2023), 'Circular No. A-4', 9 November, pp. 78–79.
[70] On a case-by-case basis where an intervention is expected to have material impacts on the wider economy due to the use of capital being displaced or altered, the FCA could account for these effects in cost–benefit estimates before discounting at the STPR. For the FCA's approach to estimating wider economic impacts, see Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July, pp. 57–60.

that this does not preclude the incorporation of firms' financing costs in CBAs, as explained in section 2.3.4, as those are direct costs to firms.

2.3.6 Summary of the options

In summary, the literature and use cases that we have reviewed do not support the use of separate discount rates for consumers and firms in a CBA. Instead, CBAs that aggregate impacts across multiple affected groups—such as those conducted by the FCA—should be performed from a societal perspective, using a common unit of account.

To convert all costs and benefits into a common unit of account, there is more support in the literature and use cases for adjusting cost and benefit estimates directly as required (e.g. using a shadow price) and discounting at the STPR, than using differentiated discount rates. This reduces the risk of any inconsistencies caused by multiple discount rates and also ensures consistency in the discount rate used to calculate the NPSV and EANDCB with government departments and other regulators.

Based on the literature and use cases reviewed, we considered adjustments for (1) relative price effects; (2) systematic risk; (3) private sector financing costs; and (4) displacement of capital, in the context of FCA interventions in the financial services sector. These are as follows.

- The FCA could consider whether there are other types of cost or benefit associated with FCA interventions for which **relative price effects** are material.
- The FCA could consider whether the **systematic risk** of certain costs or benefits is material on a case-by-case basis. Even then, when spread throughout society, such risks may be negligible. However, if the decision were made to make an additional adjustment, accounting for systematic risk directly in the streams of costs and benefits may be preferred to using risk-adjusted social discount rates.
- The FCA could assess whether **financing costs** for financial services firms are material and whether they are already incorporated in cost estimates. If an adjustment is required, financing costs could be incorporated in the cost (and benefit) streams, and then discounted at the standard STPR (3.5%). We discuss how this adjustment could be operationalised in section 2.4.
- While further research would be required to reach a firm conclusion, our assessment based on the research in scope of this report is that FCA interventions are generally unlikely to

materially **displace or alter the use of capital** in a way that would warrant the implementation of a shadow price of capital adjustment.

We note that these *potential* adjustments are not specific to the context of the FCA; that is, we would not expect them to be necessarily more relevant in the context of financial services than in other sectors or areas of regulation.

2.4 Practical considerations for the private sector financing costs adjustment

This section discusses how the adjustment for private sector financing costs (see section 2.3.4) could be operationalised, and highlights the practical considerations for the FCA.

The preferred approach in the literature and use cases reviewed is to incorporate the financing costs in the cost (and benefit) streams, and then discount at the standard STPR (3.5%). There are two approaches that the FCA could adopt to estimate the financing costs.

The first approach is to estimate financing costs on a case-by-case basis for each CBA. This could be done by directly surveying firms for their estimates of financing costs associated with a given investment. For example, as part of bespoke compliance cost surveys, the FCA could include a question to gather data on:

- whether relevant financing costs are already included in the firm's other compliance cost estimates;
- if not, what would be the cost of the financing that the firm would expect to need to raise in order to make the required investments to comply with the regulation being proposed.

However, firms may struggle to provide accurate estimates. Our understanding is that compliance cost surveys are typically carried out prior to a given policy's Consultation Paper (CP) being published. At this stage, it is unlikely that firms would be able to accurately estimate (1) the scale of the investment that may be required; (2) how the investment would be financed; and (3) the expected costs of that financing.

The second approach is to approximate financing costs by forming a general estimate for the cost of capital that is applied across CBAs. This requires a consideration of (1) how to adjust cost estimates in a CBA using the cost of capital; and (2) what is the appropriate cost of capital to use. This is discussed in sections 2.4.1 and 2.4.2 respectively.

2.4.1 Adjusting cost estimates using the cost of capital

Financing costs can be incorporated in CBAs by adjusting cost estimates using a cost of capital. The approach recommended in the literature and use cases is to replace estimates of the initial capital expenditure in the CBA (which is on the basis of when the cash cost is incurred by firms) with estimates of how the capital expenditure is recovered over time—i.e. the depreciation of the investment. The financing costs in monetary terms are calculated for each year by applying the cost of capital (see section 2.4.2) to the stock of unrecovered capital in that year.

We note that the literature and use cases developed this approach in the context of regulated utilities making large capital investments. In such cases, the regulatory regime defines the exact profile according to which capital expenditure is recouped from customers and consequently realised as a social cost. This approach may be less suitable for the FCA as there is no predefined way in which a financial services firm recovers an initial capital expenditure.

Therefore, the FCA would need to consider whether some simplifying assumptions could be made. For example, the FCA could assume that an initial capital investment by a firm is depreciated in equal amounts per year over the standard ten-year appraisal period currently used by the FCA.

2.4.2 Deriving the cost of capital for financial services firms

A firm's cost of capital is an estimate of the rate of return that a firm must pay to compensate investors when raising capital to fund firm operations and/or investments such as projects or acquisitions. In other words, it reflects the return required by investors, as compensation for the risk borne, to invest in the firm's activities rather than elsewhere.[71]

The most common way of measuring or calculating the cost of capital of a firm is through the concept of the WACC. This is the weighted average of a firm's cost of debt and its cost of equity (see Box 2.5 below). The weights are determined by the proportion of debt or equity financing to a firm's total value of assets (or capital), usually based on

[71] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, p. 109.

the relative market values of the firm's debt and equity. The sum of the weights equals 100%.[72]

Box 2.5 Cost of debt and cost of equity

The **cost of debt** is the rate of return that a firm must pay to raise debt financing such as through loans, bonds, or convertibles notes. Payment to creditors by debtors can vary in profile by the type of debt instrument in question; however, debtors typically make interest payments and repay the principal (the amount borrowed) throughout the life of the agreement. The exact timing and allocation of such (re)payments are agreed between the creditor and the debtor. Terms for repayments on debt are contractually set in advance at the time when that debt is raised.

The **cost of equity** is the rate of return required by investors to provide equity financing, which is investment in a firm in exchange for an ownership stake (e.g. shares). A shareholder makes a return on their shareholding in the form of dividend payouts and/or via capital gain when selling an ownership stake at a future date. Common equity holders have a residual claim on the assets of a firm—that is, in the event of bankruptcy, equity holders will be paid any remaining value of a firm's assets, after other obligations (such as debt payments) have been satisfied. In forming a required rate of return, investors in a company's equity tend to demand a higher return than debtholders of the same firm, resulting in a higher cost of equity than cost of debt.

Source: Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, pp. 109–110; Brealey, R., Myers, S. and Allen, F. (2011), *Principles of Corporate Finance*, Tenth Edition, McGraw-Hill Irwin, p. 216.

[72] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, p. 110; Brealey, R., Myers, S. and Allen, F. (2011), *Principles of Corporate Finance*, Tenth Edition, McGraw-Hill Irwin, p. 216.

The first practical consideration for the FCA is whether to use WACC estimates calculated at the level of individual firms, sub-sectors, or the financial services sector as a whole.

The WACC is typically calculated for each firm, reflective of the risk of the firm's overall business. One possible approach would be for the FCA to calculate a WACC for each firm that is affected by an intervention and apply these in the CBA. However, this is likely to be disproportionate and it may be complex to identify the exact list of firms affected by an intervention. A broader perspective that looks past firm-specific characteristics (e.g. differences in capital structures and underlying risks) may also be advisable.

Therefore, a more proportionate approach could be to form a view on an indicative WACC for each sub-sector that the FCA regulates (e.g. banks, insurers, asset managers, investment platforms, stock exchanges, financial advisers, etc.). This would enable the FCA to observe any differentials in the cost of capital across sub-sectors.

However, it is worth noting that this approach may be practically complex to apply in a CBA, as the FCA would need to determine which sub-sector WACCs to apply. While some FCA interventions clearly affect a single sub-sector (e.g. operational resilience requirements for exchanges), many affect a wide range of firms in multiple sub-sectors (e.g. the Consumer Duty).

An alternative (or complementary) approach would be to form an estimate for a financial services-wide WACC that the FCA could use in all CBAs. A single estimate would inevitably be a simplification, as it would not capture the heterogeneity across different sub-sectors' financing costs, meaning that a range may be more appropriate. The FCA would need to compare data on WACCs in different sub-sectors to determine whether a justifiable range could be adopted.

The second practical consideration for the FCA is what methodology to use to calculate the relevant WACCs.

There are two broad approaches that the FCA could adopt to calculate WACCs for different financial services sub-sectors, as described below.

- Gather data on existing estimates of WACC from various sources for a representative sample of firms in a given sub-sector. For example, the FCA could collect WACC estimates from firm annual reports or investor presentations. The FCA

could also conduct a survey asking firms to report their WACC.[73] Estimates of WACC may also be found in academic research and equity analyst reports, and obtained from financial data providers.

- Conduct a bottom-up calculation of the WACC for a representative sample of firms in a given sub-sector using financial data. This approach is further explained in Appendix A1.

The FCA can determine which approaches to adopt based on data availability and the proportionality of developing bespoke models. Ideally, multiple approaches would be considered and the results cross-checked across them and with independent estimates for robustness. Box 2.6 below, which summarises past FCA calculations of the WACC, highlights the regulator's precedent for using a wide range of methodologies to calculate WACCs in different sub-sectors.

[73] Firms may report their 'hurdle rate' for investing in a new project, which may be higher than their cost of capital. The FCA would need to consider the implications of this if relying on estimates provided by firms.

Box 2.6 Previous examples of the FCA calculating the WACC

The FCA has on multiple occasions used the WACC in its analyses. This has typically been in the context of profitability analysis for market studies, as in the following examples.

- **Wholesale Data Market Study (MS23/1):** the FCA asked firms to provide their own WACC estimates, but only a few submitted these. The FCA therefore derived its own estimates for each of the three markets covered in the market study using publicly available data, providing a detailed methodology that we reference in Appendix A1.
- **IFPR CBA (CP21/26):** the FCA assumed that firms would raise capital at a cost of capital of 5.5%, without providing further explanation.
- **Credit Information Market Study (MS19/1):** the FCA relied on estimates of the WACC from annual accounts, cross-checked with estimates from equity research analyst reports.
- **Asset Management Market Study (MS15/2):** the FCA derived its own estimates of the WACC for a hypothetical UK asset manager. Market parameters (the risk-free rate and the equity risk premium) were based on the UK market, and beta estimates were taken from firms within the FCA's sample.

Note: Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, pp. 11–13; Financial Conduct Authority (2021), 'A new UK prudential regime for MiFID investment firms', CP21/26, August, p. 76; Financial Conduct Authority (2022), 'Credit Information Market Study Interim Report' (Annex 2: Credit reference agency competiiton)', November, pp. 48–49; Financial Conduct Authority (2016), 'Asset Management Market Study' (Interim Report: Annex 8 – Profitability Analysis', November, p. 14.
Source: Oxera.

3 Assessment of the case for using alternative assumptions for the appraisal period

This section first outlines the FCA's current approach to the appraisal period in CBAs and explores the rationale for considering alternative appraisal periods. Next, we summarise the literature and use cases reviewed. We then interpret these findings in the context of FCA CBAs in the financial services sector and evaluate potential options.

3.1 Establishing the baseline—the FCA's current approach to the appraisal period

The appraisal period defines the timeframe over which costs and benefits are estimated and metrics such as the NPSV are calculated.

As with the discount rate, the FCA's current approach is summarised in its July 2024 'Statement of Policy on Cost Benefit Analyses'.[74] The default approach is to use a ten-year appraisal period from the point at which the rule being analysed is introduced. This is consistent with conventional practice for Regulatory Impact Assessments (RIA) conducted by UK government departments and reviewed by the Regulatory Policy Committee.[75] Proposals involving administrative changes also use a ten-year appraisal period under the Green Book.[76]

The FCA's Statement of Policy also sets out instances when alternative appraisal periods may be considered, as follows.[77]

- A longer appraisal period may be appropriate when effects are expected to continue far beyond the default ten-year appraisal period. For example, where there is evidence that an intervention affects long-term UK emissions, an appraisal period of up to 60 years may be suitable, as per the Green Book.
- The appraisal period may also be reduced when appropriate. For example, in the CBA of 'the Framework for a UK

[74] Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July, pp. 21 and 33.
[75] HM Government (2020), 'RPC case histories: appraisal periods', September, p. 2.
[76] Proposals involving infrastructure such as roads, railways, or new buildings are appraised over a 60-year period. Refurbishment of existing buildings is considered over 30 years. See HM Treasury (2024), 'The Green Book (2022)', 16 May.
[77] Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July, p. 28.

Consolidated Tape', a five-year appraisal period was used representing the length of the initial tender contract.[78]

The FCA may also consider the effect of varying the appraisal period as part of sensitivity analysis.[79]

3.1.1 What is the motivation for exploring alternative assumptions for the appraisal period?

As noted above, the FCA's current guidance allows for appraisal periods longer or shorter than the default ten-years, but lacks a consistent basis for deciding when to deviate.

Therefore, it is useful to explore whether a consistent basis for using alternative appraisal periods can be established, considering the characteristics of the regulatory intervention being analysed. For example, regulatory rules may face greater uncertainty over time than the types of project that are appraised by other government departments (such as those in energy and transport infrastructure). In some financial markets the regulatory landscape may remain fairly stable over a long period of time. In other markets, particularly fast-moving markets with innovative technology, regulation may need to be updated on a shorter timescale.

3.2 Literature and use case review—evidence on the use of different appraisal periods

There is a limited amount of literature discussing the choice of appraisal period for the CBA of regulatory interventions. Instead, appraisal periods are generally discussed in the context of physical infrastructure and health impacts appraisal. We summarise the literature and use cases below, commenting on their relevance to regulatory interventions.

3.2.1 RPC case histories on appraisal periods

The UK government's RPC is responsible for assessing the quality of evidence and analysis used to inform government regulatory proposals. In 2020, the RPC provided case study examples and practical guidance on the use of different appraisal periods.

In its case histories review, the RPC states that, for proposals that are not time-limited and where costs and benefits follow a broadly even profile over time, the default ten-year appraisal period is appropriate. In

[78] The FCA noted that costs and benefits would continue to accrue after that period, but it was not possible to produce realistic estimates of these. See Financial Conduct Authority (2023), 'The Framework for a UK Consolidated Tape', CP23/15, July, p. 81.
[79] Financial Conduct Authority (2024), 'Statement of Policy on Cost Benefit Analyses', July, p. 33.

such cases, even where costs and benefits extend beyond ten-years, the choice of appraisal period is unlikely be a critical factor because: (1) the ranking of options in Net Present Value (NPV) terms is unlikely to be affected; and (2) using a shorter or longer appraisal period will have little effect on the EANDCB figure. Moreover, a ten-year period allows one-off costs to be spread over a reasonable number of years while reducing the need to forecast far into the future.[80]

However, the RPC outlines specific cases in which an alternative appraisal period may be considered, as follows.

- **A longer appraisal period** may be considered where costs and benefits have a highly variable pattern over time such that the choice of the appraisal period can have a significant and distortive impact on the NPV and EANDCB metrics (either in itself or relative to other options). This could happen where it takes many years for the benefits of an intervention to materialise, such as can be the case with health, energy, and environment interventions.[81]
- **A shorter appraisal period** may be considered for time-limited measures when calculating the EANDCB, if direct impacts on business fall only within the time period when the measure is in force. However, for the overall CBA, a longer appraisal period (by default ten-years) can still be used if the wider benefits of a time-limited measure materialise after the measure has expired.[82]

Where a measure is not time-limited but has a sunset clause, conventional practice is to assume that the measure will be renewed, so by default the ten-year appraisal period can be used.[83]

3.2.2 OMB guidance for regulatory CBA

Guidance issued by the OMB for regulatory CBAs does not specify any default appraisal period that should be used. Instead, the appraisal period should be long enough to encompass all the important benefits and costs that are likely to result from the regulation.

[80] HM Government (2020), 'RPC case histories: appraisal periods', September, pp. 2–3.
[81] The RPC stresses that there is no suggestion that departments would seek to use a longer appraisal period by default. Rather, this option is provided so as to protect against distortions to the results of the appraisal, and a full explanation must be provided. See HM Government (2020), 'RPC case histories: appraisal periods', September, pp. 3–7.
[82] See HM Government (2020), 'RPC case histories: appraisal periods', September, pp. 7–8.
[83] HM Government (2020), 'RPC case histories: appraisal periods', September, p. 8.

The appraisal period should not end at a point before benefits or costs are likely to change in a way that could change the sign of the estimated net benefits or change the relative ranking of regulatory alternatives. The guidance also states that, where benefits or costs become more uncertain or difficult to quantify, the appraisal period should not be artificially shortened to exclude them.[84]

We note that the guidance lacks detail on how practitioners can consistently determine the timeframe over which benefits and costs are expected to materialise in practice.

3.2.3 Appraisal periods for infrastructure

Longer appraisal periods are typically used for the appraisal of infrastructure projects, to reflect an asset's life.

For instance, the Green Book guidance is that proposals involving infrastructure such as roads, railways, or new buildings are appraised over a 60-year period. Refurbishment of existing buildings is considered over 30 years. An asset's residual value or liability at the end of the appraisal period should also be included. An appraisal period longer than 60 years may be considered where an intervention is likely to have significant social costs or benefits beyond 60 years (e.g. the safe treatment and storage of nuclear waste).[85]

The European Commission's handbook for the economic appraisal of EU co-financed investments recommends that the appraisal period should correspond to the project's economic life to allow its likely long-term impacts to unfold. The project's economic life is defined as the expected time during which the project remains useful, and may be different to its physical life. However, the appraisal period should generally be restricted to when net future economic cash flows can be reasonably forecast—usually no longer than 50 years—and a residual value may be included.[86]

Australian Transport Assessment and Planning Guidelines recommend that the appraisal period should be set at the expected life of the asset in its intended use, plus the construction period.[87]

[84] Office of Management and Budget (2023), 'Circular No. A-4', 9 November, p. 10.
[85] This needs to be agreed with HM Treasury in advance. See HM Treasury (2024), 'The Green Book (2022)', 16 May.
[86] European Commission (2021), 'Economic Appraisal Vademecum 2021-2027', 20 September, pp. 20 and 23.
[87] Transport and Infrastructure Council (2018), 'T2 Cost Benefit Analysis', May, p. 16.

US Department of Transportation guidance recommends that the appraisal period should typically be tied to the expected useful service life of the infrastructure. However, there is a limit to the utility of modelling project benefits over very long timescales due to uncertainty. Additionally, each subsequent year is less and less likely to impact the overall findings of the analysis, so the period should be limited to 30 years and a residual value can be included.[88]

3.2.4 Appraisal periods for health impacts

Longer appraisal periods have also been used for the appraisal of interventions that have health impacts.

The RPC's case histories on appraisal periods discussed examples of the Department for Health and Social Care using 25-year appraisal periods for obesity-related interventions. The justification given was that ill health related to being overweight or obese tends to develop later in life, so a longer appraisal period was used to ensure that the benefits of obesity reduction are captured.[89] The Green Book discusses that an appraisal period longer than 60 years may be considered where an intervention is likely to have significant social costs or benefits beyond 60 years (e.g. a vaccination programme).[90]

Other countries have adopted similar guidance. For example, the French Health Authority recommends an appraisal period that is long enough to include all expected impacts on costs and health. A lifetime horizon is applied if there is an impact over the patient's lifetime, either in terms of costs, length of life, health-related quality of life, or after-effects. In some cases, such as vaccination programmes, a multigenerational time horizon is necessary.[91]

3.3 Interpretation of the evidence on the use of different appraisal periods—options for the FCA

Based on the literature and use cases that we reviewed, there are two broad approaches to setting the appraisal period for a CBA. The first is to use a predefined appraisal period that is the same across all interventions being appraised. This has the benefit of making

[88] U.S. Department of Transportation (2023), 'Benefit-Cost Analysis Guidance for Discretionary Grant Programs', December, pp. 13–14.
[89] However, the RPC commented that the Department could have explained more clearly why specifically 25-years would capture all of the effects of the policy. HM Government (2020), 'RPC case histories: appraisal periods', pp. 4–7.
[90] This needs to be agreed with HM Treasury in advance. See HM Treasury (2024), 'The Green Book (2022)', 16 May.
[91] Department of Economics and Public Health Assessment (2012), 'Choices in Methods for Economic Evaluation', October, p. 21.

comparison across CBAs easier as metrics such as the NPV are calculated over the same length of time. The second is to use a custom appraisal period for each intervention being appraised, chosen to encompass all the important costs and benefits that are expected to result from the intervention.

To effectively operationalise the custom appraisal period approach, there should be some methodology for determining the time period over which costs and benefits are expected to incur, in order to maintain consistency. In the example of infrastructure, there is a large amount of existing research on the useful life of assets such as bridges, roads, and railways. This can be used as a basis for tailoring appraisal periods to different types of infrastructure.[92] Similarly, clinical research on the impacts of health interventions can provide an evidence base for tailoring the appraisal period.

However, estimating the timeframe over which the costs and benefits of an FCA intervention in the financial services sector will unfold is likely to be more complex for several reasons.

- **Lack of a defined lifespan:** unlike infrastructure, regulation does not have a fundamental physical longevity or an exogenous lifecycle that can serve as a natural starting point for determining an appraisal period.
- **Challenges in modelling:** infrastructure can often be broken down into tangible components (e.g. concrete, steel), making it easier to model. While health outcomes are complex to model, health interventions are typically supported by extensive clinical research that can be used as an evidence base. Evidence on the period over which impacts of interventions in financial services occur is likely to be more limited.
- **Rapid market evolution:** financial services markets likely evolve more quickly than sectors such as infrastructure, making it harder to estimate how long a regulation will remain relevant. For example, while physical assets may become obsolete due to innovation, financial markets are far more susceptible to changes driven by innovation or firm behaviour.
- **Sectoral heterogeneity:** financial services sub-sectors vary significantly (e.g. banks, insurers, asset managers, investment platforms, stock exchanges, financial advisers, etc.), meaning

[92] However, we note that there is a difference between useful life and physical life, as an asset can become obsolete before it physically needs to be replaced, which is additional complexity that needs to be considered.

that the same intervention may have impacts over very different time horizons in different sub-sectors.

For these reasons, it would be complex to derive a general set of rules for determining the optimal appraisal period for different types of FCA intervention or for different financial services sub-sectors. The FCA could consider reviewing past interventions to analyse the average timeframe over which costs and benefits unfolded, to use as a guide. However, for most CBAs a case-by-case assessment would be required. Without a consistent economic basis on which to make this assessment, it could become arbitrary—i.e. it could be possible to make an argument why a given appraisal period should be shorter or longer by one year, given that there is limited precedent and significant uncertainty.

Therefore, for CBAs conducted by the FCA, there may be a stronger case for a predefined appraisal period with deviations considered only in very specific and well-defined cases. For example, based on the RPC case histories, these could include cases where:

- costs and benefits have a highly variable pattern over time, such that the choice of the appraisal period can have a significant and distortive impact on the NPV and EANDCB metrics (either in itself or relative to other options);
- an intervention is time-limited and direct impacts on business fall only within the time period when the measure is in force.

Using a consistent appraisal period simplifies comparisons across FCA CBAs. There is also a case for the FCA continuing to use ten years as the predefined period to maintain alignment with the standard approach used by UK government departments and regulators.

Nonetheless, the FCA could consider reviewing past interventions to assess the typical timeframe over which costs and benefits materialise, to determine whether a different predefined appraisal period would be more appropriate for the specific context of FCA interventions in the financial services sector.[93]

[93] The FCA has an existing process for carrying out ex-post impact evaluations of interventions. However, the FCA notes that these normally take place 3 to 5 years after a rule is implemented. This may be too short a timeframe for all the material costs and benefits to have unfolded. Therefore, this may require a new type of evaluation approach. See Financial Conduct Authority (2023), 'Our rule review framework', accessed 9 April 2025.

A1 Calculating the WACC

For a bottom-up calculation of the WACC, the FCA will need to have estimates for its different parameters. We note that, in a CBA, taxes can be considered transfers within society and are not social costs. Therefore, the post-tax WACC could be used. Since interest on debt is a tax-deductible expense for firms, the formula for the post-tax WACC is given by:

$$WACC\ (post\ tax) = W_d\ \times R_d \times (1 - t) + \ W_e \times R_e$$

Where:

$W_d = weight\ of\ debt\ financing$
$W_e = weight\ of\ equity\ financing$
$R_d = cost\ of\ debt$
$R_e = post\ tax\ cost\ of\ equity$
$t = marginal\ corporate\ tax\ rate$

We outline below at a high level how the calculation of each component could be approached.

To calculate the **weights of equity and debt** financing, the FCA could use data on firms' market value of debt and market value of equity.[94] Alternatively, the FCA may be able to collect data on firms' gearing ratios directly.[95] In MS23/1, the FCA gathered yearly leverage information on a range of select comparable companies.[96]

The **cost of debt** can be calculated as the risk-free rate plus a debt premium, where the latter is the additional return demanded by debt investors to hold a firm's debt over an investment in the risk-free asset (e.g. government bonds). The debt premium can be measured by comparing the redemption yields on firms' bonds relative to the applicable risk-free rate.[97] Alternatively, data on firms' annual interest

[94] In practice, given data unavailability, the book value of debt is used. Observing the market value of equity is dependent on a firm being publicly listed and market capitalisation being estimated. In the absence of this, an estimation of a current value of equity may be undertaken.
[95] The gearing ratio is debt divided by the sum of debt and equity. See Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, pp. 110 and 112; Brealey, R., Myers, S. and Allen, F. (2011), *Principles of Corporate Finance*, Tenth Edition, McGraw-Hill Irwin, p. 216.
[96] Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, p. 11.
[97] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, pp. 110–112.

payments can be divided by their year-end debt balances. This was the approach taken in MS23/1 and was cross-checked by looking at the yield on companies' traded debt instruments.[98] It is important to note that these approaches provide the pre-tax cost of debt. As debt payments are typically tax deductible, practitioners tend to adjust the estimate of the pre-tax cost of debt by a firm's **marginal tax rate** in order to account for the tax benefit of debt financing to a firm.[99]

The most common way of calculating the **cost of equity** is to use the Capital Asset Pricing Model (CAPM), which measures a firm's riskiness relative to the market. The formula for the CAPM is:

$$R_e = R_f + \beta \times ERP$$

Where:

$R_e = post\ tax\ cost\ of\ equity$
$R_f = risk\ free\ rate$
$\beta = equity\ beta$
$ERP = equity\ risk\ premium$

The formula can be broken down into the following three components.

- The **risk-free rate** is the theoretical rate of return required by an investor on an investment with zero risk. The risk-free rate is not directly observable, so is typically proxied by high-quality government debt with minimal default risk, such as the yield on UK government index-linked bonds or other instruments with very low credit risk.[100] In MS23/1, the FCA used daily data on UK Treasury gilts across a range of maturities.[101]
- The **equity risk premium** (ERP) is the additional return required by investors for holding a theoretical market portfolio (e.g. comprising all assets within the investible universe) over the risk-free asset. Since the market portfolio is not directly observable, practitioners typically consider the all-share index of a country. The ERP would be estimated by subtracting the

[98] Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, p. 12.
[99] Brealey, R., Myers, S. and Allen, F. (2011), *Principles of Corporate Finance*, Tenth Edition, McGraw-Hill Irwin, p. 216. See also Oxera (2015), 'Which WACC when? A cost of capital puzzle (revisited)', *Agenda*, April.
[100] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, p. 111.
[101] Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, p. 12.

risk-free rate from the return on the market portfolio typically over a long time horizon. Inferences can also be drawn about its level and fluctuations over time by consulting historical averages, survey evidence, and market valuation models.[102] In MS 23/1, the FCA adopted two approaches: (1) using data on returns across a range of equity indices; and (2) using annual ERP data from Professor Aswath Damodaran's publicly available database.[103]

- The **equity beta** coefficient measures the degree to which the returns of the firm's equity move in line with the returns of the market as a whole.[104] If the beta takes a value of one, this indicates that, statistically and on average, the firm's stock returns move in line with the market return. If the beta is greater than one, the firm's stock returns generally amplify (i.e. exceed in magnitude) positive and negative returns on the market. If the beta is greater than zero but less than one, the firm's stock returns generally move less than in line with the market return. While different methods can be adopted to calculate equity betas, estimates can usually be retrieved from financial data providers. In a bottom-up calculation, practitioners typically estimate the equity beta by regressing the total returns of a stock (or a portfolio) on the total returns of an all-share index over a long time horizon.[105] In MS23/1, the FCA sourced publicly available equity betas.[106]

The CAPM is not the only model that can be used to estimate the cost of equity. For example, the Fama–French three-factor model extends the CAPM to control for the size of the stock and its book-to-market valuation.[107] In MS23/1 the FCA discussed this model as an option but decided that introducing additional parameters was not necessary for

[102] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, p. 111.
[103] Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, p. 12.
[104] Mathematically, the beta of a stock (or portfolio) is given as the covariance between returns of a stock (or portfolio) and returns of the market index, divided by the variance of the returns of the market index. For instance, see Brealey, R., Myers, S. and Allen, F. (2011), *Principles of Corporate Finance*, Tenth Edition, McGraw-Hill Irwin, pp. 174–176.
[105] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, pp. 111–112.
[106] As firms' betas also reflect their financing decisions or chosen capital structures, in MS23/1 the FCA calculated an unlevered beta and re-levered it using the FCA's own estimates of gearing. See Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, p. 12.
[107] Oxera (2003), 'Assessing profitability in competition policy analysis', Economic Discussion Paper 6, prepared for the Office of Fair Trading, July, p. 115.

the purpose of estimating a representative cost of capital range for the three markets in scope of the market study.[108]

[108] Financial Conduct Authority (2024), 'Wholesale Data Market Study (Annex 1: Financial Analysis)', 29 February, p. 12.

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