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Response to the UK Government review of discounting in the Green Book

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About this submission

This paper represents a response submitted to a review launched by His Majesty's Treasury on 16 December 2025 into discounting in the Green Book (the UK government's handbook on policy appraisal). The response was submitted on 26 February 2026. This version has been lightly edited prior to publication on the CETEx website.

About the author

Stefania Cerruti is a policy analyst at CETEx.

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Summary

Context

- Discount rates play a fundamental role in several economic applications, such as in the appraisal of proposed policy interventions. Discount rates are applied to the estimated costs and benefits of a proposed intervention to allow policymakers to compare investments occurring across different timeframes.

- Discount rate considerations are particularly important in the context of transformational projects, such as climate–related interventions. The further into the future we expect costs and benefits to materialise, the greater the impact the choice of discount rate has in cost–benefit analysis calculations.

- The UK Government recently undertook a review of its policy appraisal handbook, the Green Book, which highlighted the need to reevaluate discount rates to ensure transformational projects are appraised fairly.

- Following that review, the UK Government commissioned a further review of discount rates, and as part of that the academic community were consulted on their views on the subject. This submission has been made in response.

Recommendations

- **Type of discount rate:** We recommend continuing to use a Social Time Preference Rate (STPR) approach instead of a Social Opportunity Cost (SOC) approach to discount costs and benefits in government appraisal, to ensure a broader range of societal considerations can be taken into account.

- **Parameters in the Ramsey rule:** We would endorse setting the rate of pure time preference to zero to avoid discounting future generations, and recommend reconsidering whether the current growth metric (GDP per capita) and value (2%) are still valid in the context of environmental degradation and slower growth rates.

- **Risk:** We advise ensuring that non–systemic risks are accounted for appropriately in the appraisal of policy interventions.

- **Environmental impacts:** If discount rates do not explicitly incorporate environmental impacts, we would recommend verifying the extent to which they are appraised systematically in other parts of cost–benefit analysis across the wider portfolio of government projects.

- **Adjusting discount rates specifically for transformational projects:** We advise against making such an adjustment and instead endorse a single, lower, discount rate to be applied to the entire portfolio of government projects

Introduction and context

In 2025, the UK Government published a review of HM Treasury's 'Green Book', the policy appraisal handbook used by UK public organisations in appraising, evaluating and making decisions about spending proposals to ensure value-for-money (HM Treasury, 2025a). That review highlighted several issues that required further investigation and to be addressed in the new version of the Green Book. One of these was the use of the discount rate, which needed to be reconsidered "...to make sure that the government is taking a fair view of the long-term benefits that arise from transformational investments" (ibid.).

The Treasury appointed Professors Mark Freeman and Ben Groom to carry out a further review and present recommendations to the Government on the use of discount rates (HM Treasury, 2025b). Part of this review involved surveying the academic community on their views on different aspects of discount rates. CETEx submitted a response on 26 February 2026, which is presented below.

Discount rates play a key role in Green Book appraisal, as well as in several economic applications. Discount rates are applied to the estimated costs and benefits of a proposed intervention to allow policymakers to compare investments occurring across different timeframes.

Discount rate considerations are particularly important in the context of transformational projects such as climate-related interventions. The further into the future we expect costs and benefits to materialise, the stronger the impact of the discount rate in cost–benefit analysis calculations.

The Green Book uses a social time preference rate (STPR) for discounting purposes. Using Green Book notation, STPR (r below) is calculated through the Ramsey rule with the following formula:

$$r = \rho + \mu g$$

Where:

• ρ is time preference, given by $\delta+L$, the sum of pure time preference (δ, equal to 0.5%) and catastrophic risk (L, equal to 1%).

• μg is the wealth effect, calculated by multiplying the elasticity of marginal utility of consumption (μ, equal to 1) by the expected growth rate of future real per-capita consumption (g, equal to 2%).

The Green Book discount rate has a diminishing profile, equal to 3.5% in years 0-30, 3% in years 31-75, 2.5% in years 76-125 and so on, reflecting greater uncertainty around the value of costs and benefits into the future.

Responses

The survey included 13 questions. We have responded to questions 1, 3, 9, 11 and 12.

Q1. Do you think that the UK government should retain its current STPR approach, or should it instead change to a Social Opportunity Cost (SOC) approach based on the rates of return available to capital?

We would like to endorse the use of STPR instead of SOC to discount costs and benefits of proposed policy interventions in a Green Book setting.

A SOC-based approach to discounting would be acceptable if we believed that individuals' decision-making process on present and future investment decisions could be extended to society as a whole. We argue that government investment decisions should be made from a social planner perspective, which requires several considerations that are broader than market returns. To this end, STPR allows a government to take ethical considerations into account, such as the trade-offs between present and

future generations, levels of inequality aversion, and growth considerations that might not be accounted for in the market.

Furthermore, for a SOC-based approach to hold we need to assume that actors in the market operate under perfect competition. The literature has shown and argued extensively that, when considering a world affected by climate change and nature degradation, market failures are widespread. Therefore, failing to take this into account would lead to biased interest rates.

In conclusion, we believe a SOC-based approach would undervalue the benefits of investing in climate action relative to STPR in multiple ways, hence we strongly favour the use of STPR in the Green Book.

Q3. If you were advising HM Treasury, what single values would you recommend for the following components of the Ramsey Rule? Where appropriate, please give your answers in average real (inflation-adjusted), per-capita, annualised percentages specifically for the UK (e.g. "x" = "x% real per year").

Rate of pure time preference: 0. We would endorse setting the rate of pure time preference to 0 or very close to 0. While we acknowledge that the current rate in the Green Book is relatively low, it still favours present generations over future generations. When considering this issue from a moral perspective, we find it difficult to justify why present generations should be valued any higher than future ones.

Growth rate: The growth rate used to calculate the discount rate should be reviewed for several reasons. Firstly, it is likely to be endogenous, as growth rates are correlated with: (i) the policy under consideration; (ii) the wider portfolio of policies the government decides to invest in; (iii) the other parameters in the Ramsey rule.

Secondly, as has been extensively discussed in the literature, GDP is a metric that does not account for nature, the environment or resource availability. Investment decisions inevitably affect nature and the environment, and we believe this should be accounted for appropriately in the discount rate. There are different ways to do this. One could be to choose a growth rate that accounts for resource usage, nature and the environment, such as the Office for National Statistics' Gross Inclusive Income or Net Inclusive Income (ONS, 2022). However, this could be also done in other ways – please see our response to Question 11.

Finally, even if real GDP per capita growth were retained as our preferred growth metric, we would question whether 2% is the most appropriate rate. In the latest forecasts from the Office for Budget Responsibility (OBR, 2025; 2026), real GDP per capita growth is consistently below 2%, and at no point higher than 1.8% in the forecast period. If real GDP per capita growth is kept in the equation, we would recommend aligning with the OBR's forecasts.

Q9. What are the main conceptual issues and considerations when using social discounting in appraisals involving private finance models, such as public-private partnerships?

Below we provide a response related to one aspect of this question.

How can we ensure risks are accounted for correctly?

Parameters in the standard Ramsey rule do not allow systematic and project-specific risks to be accounted for in the discounting calculations. The only kind of risk included in the standard Ramsey rule is systemic risk. Systematic risks are usually assumed to be negligible, and project-specific risks are to be considered in the main cost–benefit analysis. This is usually done by calculating a certainty-equivalent value of risks and incorporating that value into the financial contingency of the project.

Overall, if we believe that STPR is the best discount rate approach, serious consideration needs to be given to the extent to which appraisal practitioners effectively account for risks quantitatively in other parts of the cost–benefit analysis. To better assess whether this is currently an issue in government appraisal, we would encourage the reviewers to investigate how many Treasury business cases

accurately quantify certainty-equivalent values of risks and include those in the contingency calculations. This could be done by requesting access to a sample of business cases across different policy domains and budget envelopes, placing particular focus on reviewing the economic and financial case components.

Q11. Following a prior review, HM Treasury concluded that "...the Green Book should not change the discount rate for environmental impacts" and, instead, "...favoured improved valuation for environmental impacts and updating these estimates to reflect latest evidence", such as using relative price change adjustments. HM Treasury is now again seeking guidance on this question. In your opinion, should the social discount rate be adjusted for environmental scarcity and the limited substitutability of nature?

The approach outlined in the question and in the relevant section of the Green Book appears to refer to the methodology described in Drupp et al. (2024). While we agree with the problem outlined in that paper and the theoretical approach described to correct for the issue of environmental degradation in policy appraisal, often the data required for such adjustments is unavailable to policymakers and appraisal practitioners.

One option to mitigate this problem could be to adopt an approach similar to that outlined by Reaud et al. (2025): where information about relative price changes is available for the specific area of the policy intervention, an adjustment should be made using real data. Where that information is not available, practitioners could take a scenario approach and show a range of results. For example, they could show how the results of cost–benefit analysis change if relative prices were to increase by 1%, 2% or 5%, explaining why those changes are reasonable. This would provide decision-makers with more complete information about the value of the environment and the investment overall, even in the absence of accurate data.

However, while this approach is valid in the case of policy interventions specifically targeting the reduction of greenhouse gas emissions or managing risks to the natural environment, it is not immediately obvious how this would apply in cases when the intervention under consideration is not primarily climate-related. A serious area of concern is whether proposals for non-climate-related interventions effectively account for the impacts the policy will have on emissions and therefore climate change, in particular the costs of climate change and environmental degradation. Consider, for example, an investment into the expansion of an airport. This would affect the environment both in the short term (through land use change and construction emissions), but also in the long term (through consistently higher emissions from an increase in air traffic). It is important that these environmental impacts are appropriately accounted for in a value–for–money analysis, in addition to the more direct costs and benefits of the investment.

One way to address this issue could be by changing the growth rate used in the Ramsey Rule, choosing a rate that better accounts for environmental impacts, as described in our answer to Question 3. Otherwise, working with the current Green Book guidance, the only other option is to ensure that environmental costs are accounted for correctly in the appraisal. This is a complicated and concerning issue, because when future environmental costs of a policy are difficult to estimate, due to uncertainties or lack of data, the risk is that environmental costs will only be appraised qualitatively. This would lead to a biased cost–benefit analysis where the value of benefits of the investment is rated as high, but costs are underestimated. For instance, in the airport expansion example, it might be difficult to estimate long-term environmental costs because the extent to which emissions will increase due to air traffic will not depend only on how many flights the airport will be able to accommodate, but also on future technological progress on sustainable fuels or aircraft efficiency that cannot be easily estimated in the present.

We would encourage the reviewers to investigate the degree to which environmental costs may be underestimated in government appraisals. This could be achieved by requesting access to a sample of business cases across different policy domains and budget envelopes, focusing in particular on reviewing the value-for-money section in the economic case. If the review revealed that environmental costs were not appraised systematically and consistently across policy areas, the next best alternative would be an adjustment to the discount rate, as discussed above.

Q12. This discount rate review is being actioned "...to make sure that the government is taking a fair view of the long-term benefits that arise from transformational investments". The current version of the Green Book defines "transformational change" as "... a radical permanent qualitative change in the subject being transformed, so that the subject when transformed has very different properties and behaves or operates in a different way". Should the social discount rate be adjusted for transformational projects?

We would advise against the use of adjusted discount rates for transformational projects. Typically, arguments in favour of adjusted discount rates for transformational projects would recommend using lower discount rates in these instances. This is based on the assumption that transformational investments will return significant long-term benefits to society which get discounted heavily if the discount rate employed is high. If that is the case, when compared with other projects, transformational projects are unfairly overlooked.

However, this line of argument might not consider two cost-related issues. Firstly, non-transformational projects with spending happening in the short term will appear cheaper in present terms than transformational projects, which will reduce the incentive to invest in transformational projects even further. Secondly, non-transformational projects might have long-term costs on the environment and natural resources. However, if the discount rate applied to non-transformational projects is high, once again the present value of costs will be unjustifiably low.

For these reasons, we would argue that it is preferable to use a single, lower discount rate across the portfolio of government investments (in line with our answer to Question 3). This would ensure that the long-term benefits of transformational projects were not overly discounted, while allowing a fair comparison across all projects.

However, if the goal is "...to make sure that the government is taking a fair view of the long-term benefits that arise from transformational investments" (HM Treasury, 2025a), regardless of the discount rate chosen, a quantitative cost–benefit analysis alone is unlikely to provide a complete answer. When considering a transformational project, a quantitative cost–benefit analysis will almost always produce partial results, as benefits are uncertain and difficult to appraise quantitatively.

In recent years recognition has grown among practitioners of the importance of incorporating a substantial qualitative component into any value-for-money analysis, to prevent decision-making from being based solely on imperfect and incomplete benefit-to-cost ratios. The latest versions of the Green Book have started to be more explicit about the importance of qualitative approaches to value–for–money analysis, for example by referencing cost-effectiveness analysis as an alternative tool to cost–benefit analysis. However, the Green Book traditionally has mostly focused on quantitative techniques, providing little guidance to practitioners on what approaches the Treasury would endorse for qualitative value–for–money analysis. While this is probably beyond the scope of this review, we would encourage the Treasury to provide additional guidance on how to incorporate qualitative considerations into business–case value–for–money analysis. This could be done in the form of supplementary Green Book materials, and ideally providing case studies and step-by-step examples for practitioners.

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