HM Treasury

Discounting

Green Book supplementary guidance

February 2026

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Chapter 1
Introduction

1.1 The Green Book is the UK government's guidance on appraisal, the process of assessing the costs, benefits and risks of different options for achieving government objectives.[1]

1.2 The Green Book recommends using discounting to compare social costs and social benefits occurring over different time periods on a consistent basis. Discounting enables profiles of costs and benefits stretching over many years to be expressed in 'present value' terms.

1.3 This document supplements the Green Book by providing further guidance on discounting. Table A.1 in Annex A sets out the standard discount factors for appraisal. Practitioners should multiply these discount factors by the social costs and social benefits in the relevant years of an appraisal.

[1] 'The Green Book', HM Treasury, February 2026

Chapter 2
Short-term discounting

The Social Time Preference Rate

2.1 The Green Book discount rate is known formally as the 'Social Time Preference Rate' (STPR). The STPR is currently set at 3.5% in real terms for short-term proposals, which means proposals with a time horizon of up to 30 years. The STPR has two components:

- **Time preference**: The rate at which consumption and public spending are discounted over time, assuming no change in per capita consumption. This captures the preference for value now rather than later.
- **Wealth effect**: The expected growth in per capita consumption over time, where future consumption will be higher relative to current consumption and is therefore expected to have a lower utility.

2.2 The STPR formula sums together estimates for the above two components. It is expressed mathematically as:

$$STPR = \rho + \mu g$$

$$where\ \rho = \delta + L$$

2.3 The parameter ρ (rho) represents time preference. It is the sum of:

- **Pure time preference (δ)**: This is society's 'impatience' – its preference for having social benefits now rather than later. This is denoted by the Greek letter δ (delta).
- **Catastrophic risk (L)**: Also known as 'systemic' risk, this represents an allowance for unpredictable risks that are not normally included in appraisal. It is denoted by the letter L.

2.4 The parameter μg represents the wealth effect. It is comprised of two parameters multiplied together. These are:

- **The elasticity of marginal utility of consumption (μ):** This indicates how the average person's wellbeing will change as their consumption changes. It is denoted by the Greek letter μ (mu).
- **The expected annual growth rate of future real per capita consumption (g)**. This indicates how the average person's consumption of goods and services is projected to change over time. It is denoted by the letter g.

2.5 There are a range of estimates for each parameter in the STPR. Table 2.A shows the values that HM Treasury uses in the calculation of the STPR.

Table 2.A Assumed STPR parameter values in years 0-30

Parameter	Assumed Value
Pure time preference (δ)	0.5%
Catastrophic risk (L)	1.0%
Elasticity of marginal utility of consumption (μ)	1.0
Expected annual growth rate of future real per capita consumption (g)	2.0%

Source: HM Treasury

2.6 The values for pure time preference and catastrophic risk are used to produce an estimate of time preference:

$$\rho = 0.5\% + 1.0\%$$

$$\rho = 1.5\%$$

2.7 The values for the elasticity of marginal utility of consumption and the expected annual growth rate of real future per capita consumption are used to produce an estimate of the wealth effect:

$$\mu g = 1.0 \times 2.0\%$$

$$\mu g = 2.0\%$$

2.8 The estimates for time preference and the wealth effect are added together to produce the STPR:

$$STPR = \rho + \mu g$$

$$STPR = 1.5\% + 2.0\%$$

$$STPR = 3.5\%$$

2.9 The discount factor for a given year is calculated as follows:

$$Discount\ factor\ in\ year\ t = \left(\frac{1}{1+3.5\%}\right)^{t}$$
$$for\ years\ 1\ to\ 30$$

Estimates of pure time preference

2.10 Freeman, Groom and Spackman (2018) show that the plausible values for pure time preference range from 0.0% to 1.0%.[2] The Green Book assumes a value of 0.5% for pure time preference.

Estimates of catastrophic risk

2.11 The risks contained in L could, for example, be disruptions due to natural disasters that are not directly connected to the appraisal. L also includes a small premium for systemic risk because social costs and social benefits are usually positively correlated to real income per capita. The Green Book assumes a value of 1.0% for the probability of catastrophic risk.

Estimates of the elasticity of the marginal utility of consumption

2.12 Available evidence suggests a range of plausible values for the elasticity of marginal utility of consumption (μ). For example:

- The 2003 edition of the Green Book assumed a value of 1.0.[3]
- Layard et al. (2008) provides an estimate of 1.3.[4]
- Groom and Maddison (2018) use several techniques to estimate a pooled value of 1.5.[5]

2.13 The Green Book assumes a value of 1.0 for the elasticity of the marginal utility of consumption.

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2 'Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury', Freeman, Groom and Spackman, February 2018

3 'The Green Book', HM Treasury, January 2003

4 'The marginal utility of income', Layard, Mayraz and Nickell, *Journal of Public Economics*, Vol. 92, pp. 1846-1857, August 2008

5 'New Estimates of the Elasticity of Marginal Utility for the UK', Groom and Maddison, *Environmental Resource Economics*, Vol. 72, pp. 1155–1182, March 2018

Estimates of future consumption growth

2.14 Available evidence suggests a range of plausible values for the expected growth rate of future real per capita consumption (g). For example:

- The 2003 edition of the Green Book assumed a value of 2.0%.
- Freeman, Groom and Spackman (2018) reference average real annual per capita consumption growth for the UK for the period 1949 – 2016 of 2.2% per year.[6]
- Estimates based on ONS data from the recent past (1996 to 2016) are lower at 1.7% per year.[7]
- Previous long-run forecasts of GDP growth (rather than consumption) from the Office of Budget Responsibility indicated growth of 2.2% per year in real terms. This implies an annual projected growth rate of real GDP per capita of 1.9%.[8]

2.15 The Green Book assumes a value of 2.0% for the expected annual growth rate of future real per capita consumption.

Health discount rate

2.16 The social costs and social benefits of a proposal may include effects on the health or life of individuals. These health and life effects should be discounted at a lower rate of 1.5%, rather than the standard STPR of 3.5%. This is because the 'wealth effect' component of the discount rate is excluded. The diminishing marginal utility associated with higher incomes does not apply, as the welfare or utility from additional years of life will not decline as real incomes rise.

2.17 The health discount rate applies in every year of the appraisal. All other social costs and social benefits of that proposal that do not

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6 'Social Discount Rates for Cost-Benefit Analysis: A Report for HM Treasury', Freeman, Groom and Spackman, February 2018

7 The ONS quarterly national accounts publication provides historical consumption data. Based on analysis in December 2017, the approximate compound annual growth rate in consumption per capita between 1996 and 2016 was 1.7%. Freeman, Groom and Spackman (2018) provide a range of estimates for different historical horizons

8 'Long-term economic determinants – November 2017 Economic and fiscal outlook', Office for Budget Responsibility, November 2017

concern health or life should be discounted at the STPR. Table A.2 sets out the health discount factors for appraisal.

Discounting and ODA proposals

2.18 The Green Book guidance on discounting may not be suitable for appraising Official Development Assistance (ODA) proposals. Factors such as long-term growth rates and the probability of catastrophic risk can differ significantly across countries. Consequently, for projects where social costs and social benefits fall on people in other countries, alternative discount rates may be appropriate. Practitioners should contact the Foreign, Commonwealth and Development Office (FCDO) for further guidance.

Discounting and inflation

2.19 Discounting is distinct from adjusting for inflation. The STPR must be applied only to values expressed in real terms, meaning that the effects of general inflation have already been removed. Practitioners should first convert social costs or social benefits into real terms and then discount them using the STPR. The inflation rate and discount rate should not be added together and applied to social costs and social benefits because this will produce a mathematically incorrect result.

Discounting historical costs and benefits

2.20 Discounting should not be applied retrospectively to costs and benefits that have already occurred. The values of social costs and social benefits do not increase simply because activities took place in the past.

Chapter 3
Long-term discounting

Proposals with time horizons beyond 30 years

3.1 For proposals with time horizons beyond 30 years, the standard STPR of 3.5% declines over time. This is because there is uncertainty about the future values of its parameters. This means that:

- Practitioners should use the standard STPR of 3.5% for years 0 to 30.
- They should use an STPR of 3.0% for years 31 to 75.
- They should use an STPR of 2.5% for years 76 to 125.

3.2 There is a similar declining discount rate regime for the health discount rate. These long-term discount rates are set out in Table 3.A.

Table 3.A Declining discount rate regime

Year	0-30	31-75	76-125
Social Time Preference Rate	3.500%	3.000%	2.500%
Health discount rate	1.500%	1.286%	1.071%

Source: HM Treasury

Proposals with time horizons beyond 50 years

3.3 The Stern Review concluded that it was not ethically defensible for pure social time preference to be applied to cost-benefit calculations that involve significant and irreversible wealth transfers from the future to the present.[9] This conclusion has been reflected in the UK government's approach to discounting.

3.4 Practitioners should conduct additional sensitivity analysis when an appraisal has a time horizon beyond 50 years. They should initially discount values using the relevant discount rates set out in Table 3.A. They should then discount values using a variant of the discount rate in

[9] 'Stern Review on the Economics of Climate Change', Stern, N., pp. 23-52, October 2006

which pure time preference (δ) is excluded. These discount rates are set out in Table 3.B, with discount factors supplied in Table A.3.

3.5 Practitioners should explain the different appraisal results clearly in the associated business case or impact assessment. The difference between these results provides an estimate of the wealth transfer that is attributable to pure social time preference.

Table 3.B Reduced long-term discount rates for sensitivity testing

Year	0-30	31-75	76-125	126-200	201-300	301+
Reduced STPR for (δ = 0)	3.00%	2.57%	2.14%	1.71%	1.29%	0.86%

Source: HM Treasury

Annex A

Discount factors

Table A.1 Standard discount rates and discount factors

Year	Discount Rate	Discount Factor	Year	Discount Rate	Discount Factor
0	–	1.0000	**31**	3.000%	0.3459
1	3.500%	0.9662	**32**	3.000%	0.3358
2	3.500%	0.9335	**33**	3.000%	0.3260
3	3.500%	0.9019	**34**	3.000%	0.3165
4	3.500%	0.8714	**35**	3.000%	0.3073
5	3.500%	0.8420	**36**	3.000%	0.2984
6	3.500%	0.8135	**37**	3.000%	0.2897
7	3.500%	0.7860	**38**	3.000%	0.2812
8	3.500%	0.7594	**39**	3.000%	0.2731
9	3.500%	0.7337	**40**	3.000%	0.2651
10	3.500%	0.7089	**41**	3.000%	0.2574
11	3.500%	0.6849	**42**	3.000%	0.2499
12	3.500%	0.6618	**43**	3.000%	0.2426
13	3.500%	0.6394	**44**	3.000%	0.2355
14	3.500%	0.6178	**45**	3.000%	0.2287
15	3.500%	0.5969	**46**	3.000%	0.2220
16	3.500%	0.5767	**47**	3.000%	0.2156
17	3.500%	0.5572	**48**	3.000%	0.2093
18	3.500%	0.5384	**49**	3.000%	0.2032
19	3.500%	0.5202	**50**	3.000%	0.1973
20	3.500%	0.5026	**51**	3.000%	0.1915
21	3.500%	0.4856	**52**	3.000%	0.1859
22	3.500%	0.4692	**53**	3.000%	0.1805
23	3.500%	0.4533	**54**	3.000%	0.1753
24	3.500%	0.4380	**55**	3.000%	0.1702
25	3.500%	0.4231	**56**	3.000%	0.1652
26	3.500%	0.4088	**57**	3.000%	0.1604
27	3.500%	0.3950	**58**	3.000%	0.1557
28	3.500%	0.3817	**59**	3.000%	0.1512
29	3.500%	0.3687	**60**	3.000%	0.1468
30	3.500%	0.3563			

Source: HM Treasury

Table A.2 Health discount rates and discount factors

Year	Health Discount Rate	Health Discount Factor	Year	Health Discount Rate	Health Discount Factor
0	–	1.0000	**31**	1.286%	0.6316
1	1.500%	0.9852	**32**	1.286%	0.6236
2	1.500%	0.9707	**33**	1.286%	0.6157
3	1.500%	0.9563	**34**	1.286%	0.6079
4	1.500%	0.9422	**35**	1.286%	0.6002
5	1.500%	0.9283	**36**	1.286%	0.5926
6	1.500%	0.9145	**37**	1.286%	0.5850
7	1.500%	0.9010	**38**	1.286%	0.5776
8	1.500%	0.8877	**39**	1.286%	0.5703
9	1.500%	0.8746	**40**	1.286%	0.5630
10	1.500%	0.8617	**41**	1.286%	0.5559
11	1.500%	0.8489	**42**	1.286%	0.5488
12	1.500%	0.8364	**43**	1.286%	0.5419
13	1.500%	0.8240	**44**	1.286%	0.5350
14	1.500%	0.8118	**45**	1.286%	0.5282
15	1.500%	0.7999	**46**	1.286%	0.5215
16	1.500%	0.7880	**47**	1.286%	0.5149
17	1.500%	0.7764	**48**	1.286%	0.5083
18	1.500%	0.7649	**49**	1.286%	0.5019
19	1.500%	0.7536	**50**	1.286%	0.4955
20	1.500%	0.7425	**51**	1.286%	0.4892
21	1.500%	0.7315	**52**	1.286%	0.4830
22	1.500%	0.7207	**53**	1.286%	0.4769
23	1.500%	0.7100	**54**	1.286%	0.4708
24	1.500%	0.6995	**55**	1.286%	0.4649
25	1.500%	0.6892	**56**	1.286%	0.4590
26	1.500%	0.6790	**57**	1.286%	0.4531
27	1.500%	0.6690	**58**	1.286%	0.4474
28	1.500%	0.6591	**59**	1.286%	0.4417
29	1.500%	0.6494	**60**	1.286%	0.4361
30	1.500%	0.6398			

Source: HM Treasury

Table A.3 Reduced long-term discount factors for sensitivity testing

Year	Reduced Long-Term Discount Factors	Year	Reduced Long-Term Discount Factors
0	1.0000	**21**	0.5375
1	0.9709	**22**	0.5219
2	0.9426	**23**	0.5067
3	0.9151	**24**	0.4919
4	0.8885	**25**	0.4776
5	0.8626	**26**	0.4637
6	0.8375	**27**	0.4502
7	0.8131	**28**	0.4371
8	0.7894	**29**	0.4243
9	0.7664	**30**	0.4120
10	0.7441	**40**	0.3196
11	0.7224	**50**	0.2479
12	0.7014	**60**	0.1923
13	0.6810	**75**	0.1314
14	0.6611	**80**	0.1182
15	0.6419	**90**	0.0956
16	0.6232	**100**	0.0774
17	0.6050	**125**	0.0455
18	0.5874	**150**	0.0298
19	0.5703	**200**	0.0127
20	0.5537	**300**	0.0035

Source: HM Treasury

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