

THE DILEMMA OF DISCOUNTING: THE IMPOSSIBILITY
OF SETTING A CONTEXT INDEPENDENT RAMSEY
DISCOUNT RATE FOR HUMAN WELLBEING

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Abstract. Cost benefit analysis of future change and possible policy responses to it have been shown to rely heavily upon the rate at which human wellbeing is discounted over time. Advocates of differing discount rates assume that 1) the same discount rate can be used when analysing situations in which long term climate change occurs and those in which it is prevented and 2) that the same discount rate that is used to analyse long term change can also be useful in analysing current behaviours. In this paper, I shall examine and reject this proposition in relation to discount rates derived from the standard Ramsey formula. Instead, I will argue that non-zero Ramsey discount rates must take into account certain features of the context set by each differently modelled outcome, and cannot be used outside of that context unless the two are shown to be similar in all relevant respects. In particular, I shall argue that attempts to produce a single, context independent, non-zero discount rate fall upon the horns of a dilemma. They must either be derived positively, with reference to observed human behaviour, or normatively, with reference to our moral duties.

DEBATES surrounding the economics of climate change have often focussed on the size of discount rate used when making comparisons between present and future wellbeing. Analysis of the Stern Review and its critics has found that its relatively low discount rate has a more significant effect on the social price of carbon it uses than the rest of its economic analysis (Disgupta 2007: 6). Critics of the Stern review often complain that its discount rate does not reflect the actual economic behaviour of either individuals or policy makers. For instance William Nordhaus argues that if Stern's discount rate were correct then market interest rates should be much lower than they are and saving rates should be much higher (Nordhaus 2007: 202). Stern replies that his discount rate reflects our ethical duties towards future generations, and that using Nordhaus's discount rate would imply that we should do much more to redistribute resources from the young to the old and/or from the rich to the poor (Stern and Taylor 2007: 203-204).

Debates such as this point to a distinction between discount rates that are set normatively, with reference to people's duties to the future, or positively, with reference to people's current behaviour². In this essay, I shall move beyond this distinction and focus on what appears to me to be a far more important feature of discount rates, their context dependency. Both Stern and Nordhaus rely in their arguments on the assumption that a discount rate used in one decision can be used to explain another that is made in a relevantly different context.

POSITIVE AND NORMATIVE APPROACHES TO SETTING RAMSEY DISCOUNT RATES

The classic economic view of discounting dates back to Frank Ramsey's 1928 mathematical theory of saving, which holds that a social

²The distinction between normative and positive approaches that I use in this essay is from Weisbach D and Sunstein C. 2008 pp 12-23, however it reflects a broad division amongst economists, dating back at least to the 1996 report of the ICC.

discount rate for utility³ (r) is derived from two separate values:

1. The pure rate of time preference (Δ) and
2. The elasticity of marginal utility with respect to consumption (ε) multiplied by the expected future growth rate of consumption (g)

In the following formula

$$r = \Delta + \varepsilon g$$

Hence, a discount rate can be derived from either one or both of these two values and it is not necessary to obtain both in the same way. However, whether we derive them in a normative or positive way our results will vary with features of the context we are considering, where that context is set by both the decision we are taking and the possible outcomes that might result from our actions. Hence, no discount rate can be applied without reference to the rest of any analysis it is being used for, with the exception of a zero rate representing the rejection of both Δ and ε .

THE PROBLEM WITH POSITIVISM

A positively derived value for ε represents the observed increase in utility of additional consumption. However, the value we arrive at in this way will vary with the individuals being observed, and more importantly with features of their situation. There are at least four reasons to think this. Firstly, evidence from the study of subjective wellbeing indicates that the elasticity of marginal utility is

³Ramsey's equation is strictly for discounting the value of future money. However it is based upon the value of this money to an individual as a source of wellbeing. Its use in discounting the results of Cost Benefit Analysis derives from the expression of costs and benefits in terms of individual willingness to pay. Since this is also based upon the value of money solely as a source of wellbeing I use the term utility and understand it to mean both money and wellbeing, although the two are strictly separate. I also believe this is partly the source of the formula's somewhat loose usage for discounting both money and wellbeing.

not linear. It may vary with the level of consumption or even be nothing but a short-term trend created by rising levels of relative consumption that in the long term vanishes due to our ability to adapt to ever-increasing consumption, known as the hedonic treadmill (Layard 2004: 41-55 and Diener, Lucas, Ulrich and Helliwell 2009: 171-174). Secondly, the opportunity costs of capital with respect to other goods may vary. For instance, as people get richer and the environment is degraded, the opportunity cost of consumption with regards to environmental goods will fall, effectively devaluing consumption as a means of obtaining utility (Weisbach and Sunstein 2008: 17). Thirdly, the elasticity of marginal utility to consumption is likely to change significantly under catastrophic scenarios, such as environmental disasters, government failure or economic collapse. Finally, there is a cultural element to the elasticity of marginal utility to consumption, with clear differences observable between different social and religious groups, often irrespective of their wealth (Diener and Oishi 2003: 185-218). Whilst some individual differences in the elasticity of marginal utility may even out across a society, these are all features of a person's context that one can expect to change in a systematic way, particularly when considering long-term environmental, demographic and technological changes.

A positive value of Δ represents people's time-regarding preferences once growth in their expected consumption is taken into account. Economists have long argued about the nature of such pure time preferences and many see them as irrationalities, or attempt to reduce them to some other value (Stern 2007: 31-33). However, even if we do include people's undoubted pure time preferences in a discount rate, studies in behavioural economics suggest that they are not linear, but vary, with people showing stronger time preferences for the near future than they do for the distant future (Sunstein and Thaler 2003: 1185). Behavioural economics also indicates that people's pure time preferences are affected by framing, and that they discount the value of that which they consider 'good' more rapidly than that which they consider 'bad'. For instance, people show a clear preference for a policy that saves lives now rather than in

the future, but are relatively indifferent between policies that cause deaths now and in the future (Sunstein and Thaler 2003: 1179 - 1180). Pure time preferences will also be affected by personality and culture, for instance varying with the degree to which people have experienced security or upheaval in the past. It is also possible that once people start suffering significantly from intergenerational injustice imposed on them by current actions this will also affect their own preferences about what they leave to future generations. Finally, people do not discount their own wellbeing over time in the way that they discount that of other people⁴, and are likely to discount the wellbeing of those close to them, and especially their children, in yet another way. These variations may not even out across individuals since they are all affected by contextual features of long-term environmental, demographic and technological change.

NIGGLES ABOUT NORMATIVISM

Since normative duties are intended to be objective, it may be hoped that setting the social discount rate with reference to them, as Stern does, is more likely to produce a single, context independent value. However, although they may be context independent themselves, the application of normative duties depends upon their interaction with the situation, which renders the final results context dependent. Normatively speaking the value of Δ reflects our attitudes to the passage of time and the 'distance' between ourselves and those we are considering (t) as well as the risk that nobody will benefit from our actions due to human extinction (r). The value for ε meanwhile reflects a general concern with equality, either for ethical or pragmatic reasons which encompass our attitudes to intergenerational justice, intragenerational justice (social justice between people

⁴For instance Revesz R 1999 draws a clear distinction between discounting within a single life, where time necessarily implies that a cost or benefit will be experienced closer to the end of life, and discounting between present and future lives, where this will not hold true as the cost or benefit could be experienced at any point within each life.

who are alive at the same time) and risk.

Two normative arguments can be used to defend a non-zero value for Δ . The first, as used by Stern and accepted by Nordhaus, is that over time there is a growing possibility that there will be nobody around to gain utility, I shall label this r . Stern argues for a low probability of 0.001 per year whilst rejecting all other arguments for a pure time preference. However, it should be clear that r does not represent a fixed level of risk but will vary with certain factors, for instance the chance of a global environmental catastrophe or prolonged nuclear war. In the context of climate change this means that the value of r should increase for scenarios in which climate change is not limited to a safe level, but will be reduced by our efforts to prevent and abate it.

A second, less reputable, defence of a positive value for Δ is based on the agent relative ‘distance’ between the agent and those they are considering, q . There is a significant strand of ethics that justifies agent relative considerations, such as q , as valid parts of our ethical decision-making and is thus in a position to advocate using Δ in long-term decision-making (Beckerman and Hepburn 2007: 196-197). However, it will be hard to justify a value for q that excludes other types of ‘distance’. This can either reflect a ‘psychological’ distance such as identity and personal relationships or a morally relevant physical distance in time or space, for instance one that reduces our ability to help others even if we had a duty to do so. Hence, for example, an argument for q should justify discounting the future utility of one’s family members or compatriots less than that of a stranger. This is entirely consistent with both an ethical view of agent relativism and people’s actual agent relative preferences, as we have already noted. Hence, whatever position an analysis of climate change is undertaken from, it should not separate q from other types of distance that may be relevant to people in that position, thus potentially preferring a situation in which my family prospers, but yours does not, from one in which the opposite occurs. When group preferences need to be taken into account it is even more difficult to understand how such distance is to be used, for instance whether it

should be distance from the ‘nearest’, ‘median’ or ‘mean’ member and whether other factors should be taken into account.

From a normative perspective, the value of ε indicates a preference for equality. However, this does not imply the discounter is an egalitarian who believes that there is always something good about a group having greater equality in wellbeing or a prioritarian who believes that people with the lowest levels of wellbeing should always take priority in our ethical considerations. It is also possible to justify a positive value for ε purely on the utilitarian grounds that we are in a better position to raise the utility of the worst off rather than that of those who are better off, given limited resources and decreasing marginal utility of consumption. I shall not differentiate between these positions, since it is enough for my position that all relate to the utility of individuals, rather than that of groups, such as entire generations of people.

Because it is a preference for equality between individuals, the use of ε implies a preference for at least three things:

1. A preference for promoting the wellbeing of poorer generations over richer generations (usually interpreted as promoting the wellbeing of the present over the future due to an assumption of continuous economic growth)
2. A preference for promoting the wellbeing of the poor over the rich at any one time
3. A preference for future scenarios that carry a low risk of exceptionally high or low levels of utility - effectively a preference for equality between different ‘possible worlds’ that could result from our actions (Beckerman and Hepburn 2007: 192-193).

It is clear that only the first of these is captured by the value of ε in a context independent Ramsey discount rate since the other two are not directly related to time and economic growth but depend on intervening factors. Furthermore, it is clear that climate change, and other long-term environmental, technological and demographic

The Dilemma of Discounting

changes, can affect both equality between people at any one time and equality between better and worse possible futures. The use of ε does not only imply that we must discount the average wellbeing of future generations that consume more than we do, it also implies that we must discount the wellbeing of those who consume most within future generations more than we do the wellbeing of those who consume least, and that we must discount the wellbeing of people living in more catastrophic possible future scenarios more than we do those living in prosperous ones. Indeed, using ε to set a discount rate implies negatively discounting the wellbeing of anyone whose utility is lower than ours. This means that the combination of increasing global inequality in most potential future scenarios, and a significant risk of scenarios in which the global economy shrinks rather than grows, could require us to set a negative discount rate for future wellbeing, even if the expectation is for economic growth.

CONTEXT DEPENDENCY AND CLIMATE CHANGE

Before concluding, I would like to point out the possible bias that failing to take account of the contextuality of discount rates might impart to our view of climate change. For instance, if we adopt Stern's model of discounting then we should also do the following:

- adopt a larger value for Δ when discounting a business as usual case to one in which we act to abate climate change
- increase the value of ε as the global economy becomes less equal and
- increase the value for ε as the risk of potentially catastrophic future scenarios increases.

Taken together, these imply using a far higher discount rate for analysing a policy of business as usual to one in which action is taken to abate climate change, effectively boosting the economic efficiency of such activity. That such a move would be controversial

may explain why discount rates are often so varied across contexts, but if anything it appears to me that it is an additional argument for why such variations should be taken into account.

CONCLUSION

“While the DU model assumes that intertemporal preferences can be characterized by a single discount rate, the large empirical literature devoted to measuring discount rates has failed to establish any stable estimate. There is extraordinary variation across studies, and sometimes even within studies.” (Frederick, Loewenstein and O’Donoghue 2002: 393)

This should not surprise us, nor should the fact that our attitudes towards the global poor and towards saving for our own future point in radically different directions when applied to the economics of climate change. Every Ramsey discount rate is dependent upon features of its context, the only exception to this, as far as I can tell, being a hard to justify zero discount rate. Discounting due to Δ and ε , whether positively or normatively derived, renders it dependent on certain features of the context within which it is being used. For instance, people’s behaviour is affected by the choices open to them, the way these choices are framed, their relationships with others and their personality and culture. Any attempt to produce a discount rate normatively, based on our duties to future generations, will need to take into account such ethical considerations as the risk that they will never exist, the nature of our relationships, whether they live in an equal or unequal society and the probability that things may be better or worse for them. It is very unlikely that features such as these will be the same now as they are in the future, and they may well even be different in different possible futures, depending on our current choices, for instance whether or not we tackle climate change. However, just as the diversity of discount rates should not surprise us when we consider the diverse contexts for which they are set, so the effect of context upon discount rates should not surprise us either.

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