

Should we discount future health benefits when considering cost-effectiveness?

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1 Overview

Quite often organisations, Giving What We Can included, must choose how much we value benefits and costs that occur in the future as compared to those which occur today. In cases where people decide to value benefits and costs in the the future less than those in the present, the amount that we lower the value of things each year into the future is known as the 'discount rate'.

For instance, if we applied a 'discount rate' of 5%, then something gained in a year's time would be worth 95% as much as something gained today, and something in two year's time worth 90.5% as much. In almost all analysis the same discount rate is applied in each year. This is the only way to ensure people don't want to do different things depending on when they are making the decision. A constant discount rate is known as 'geometric discounting'.

There are several clear reasons we might want to discount the value of money or assets gained in the future:

- a given number of dollars is worth more earlier on because of inflation;
- a given number of dollars is worth more earlier on, because you can buy assets with them (that is to say, invest them) and earn money over time from doing so.

There is general agreement that this is appropriate. The discount rate necessary to factor in inflation simply depends on the rate of inflation at the time. We will ignore inflation for the remainder of this paper. The discount necessary to account for the ability to invest, the so-called 'opportunity cost' of money, is a bit more complicated and depends on the details of a situation. Though it generates some disagreement most answers fall between 3-7%.

Since its inception, this technique of annual discounting of financial assets has also been transferred to other costs and benefits. For instance, climate change will likely cause additional people to die due to tropical diseases. However, most of these deaths will come decades or even centuries in the future. Is it less bad for an extra person to die in the future than it is now? Most cost-benefit analyses of climate change make

this assumption. Doing this, and the rate at which you discount the future, has a huge impact on our conclusions about how bad climate change will be and what we should do about it.

A number of reasons are offered in defence of discounting impacts on health and wellbeing in the same way that we discount the value of money. Below we will discuss each of these, and why we do not believe geometric discounting to be the appropriate way to deal with it. Giving What We Can's position is that there are indeed reasons why the promise of benefits in the future can be less valuable than guaranteed benefits delivered now. However, the causes and likelihood of this should be modelled explicitly; geometric discounting is a poor substitute for doing so.

2 Changing conditions across time

Uncertainty about the future is one possible reason to focus more heavily on the present. Risk of project failure, or any other disturbances that make a project impossible to complete, mean benefits hoped to appear decades in the future are far from assured. In short, a bird in the hand can be worth two in the bush.

A related risk that is often raised is that a service may no longer be needed as much in the future. For example, a project that invests in a vaccine not expected to be available for twenty years, runs the risk that the disease being targetted will decline or disappear in the meantime for some other reason.

However, this is not best factored in by discounting 3-7% each and every year. Such risks are more likely at some times than others, and may be higher or lower than that range depending on the project under consideration.

3 Avoiding infinities in the calculations

Another reason offered for discounting welfare benefits is that failure to do so will result in very large or even infinite benefits showing up in the results. This is believed to confuse decision-making. For instance, without discounting future benefits, wouldn't the total value of the eradication of smallpox, which prevented the death of millions of people each year, end up having infinite value?

In fact it should not. You would only end up with an infinite value, if your model assumed that humanity would survive for an infinite period of time, and in all of that time would never otherwise cure or neutralise smallpox. A more realistic assessment of the good done by developing and distributing a smallpox vaccine right now is that doing so brings forward the elimination of smallpox, not that it prevents smallpox from remaining a menace for billions of years.

A proper model of the good done by any piece of work should produce a finite value if constructed appropriately. This can be hard to do, but imposing a continuous annual discount rate of 3-7% is not a good substitute for trying. Working out what you believe the true 'counterfactual' to be is a key part of performing a meaningful cost benefit analysis.

Finally, it is worth noting that an exponential discount rate won't necessarily avoid infinities if the annual flow of benefits grows more rapidly than the discount rate.

4 Opportunity costs

The central reason for valuing money now more highly than money in the future is that when you spend a dollar today you are giving up the chance to spend an even larger sum in the future. If you invest \$100 in a term deposit for 10 years, you will have somewhere around \$130 by the end of it. In that sense, the cost of spending \$100 today is not spending \$130 in ten years' time. Clearly each dollar today is worth more.¹ Does the same logic apply to other benefits like health improvements?

Well let's say that you were considering two different projects to control contagious diseases. One of these will prevent 100 people from dying next year, while the other will prevent 130 people from dying in ten years' time. Is there any way for this decision maker, whether they are a charities, government, or business, to invest those 100 lives in such a way as to save more lives in the future?

If they were charging for the services provided, then they could invest the profits and spend it in the future, but this is simply the money case, in which discounting is natural. When money does not change hands, what the people whose lives were saved do with the rest of their time on Earth is rightly up to them. There is no way for the decision maker to 'invest' the health in the same way that they could money. The question then is what effect the people saved will voluntarily have on the future. There are a number of ways they could affect others in the future:

- a medical intervention means that they are less likely to become or remain sick, and thereby infect others;
- they will work, earn wages and spend some of it on themselves. On balance this probably doesn't affect others much;
- they will pay some of their wages as tax. For the typical person they pay as much in tax as they get out from the Government, so this probably balances out;
- if they had children, they will 'invest' some of their time and income into fostering their growth and development. This has a significant positive impact on others. They may also have additional children, which will increase population in the future, which could be considered a good or bad thing depending on who you ask
- they will invest some of their time or wages in businesses and productivity enhancing innovations. This will be very positive if it happens,, but how much it occurs will depend a great deal on country and the people involved.

¹Though note that government departments and charitable foundations are often not allowed to delay spending their revenue, for practical and legal reasons, in which case dollars at different points in time can't simply be substituted.

The bottom line is that:

- earlier health gains do improve the future a bit, but much of the benefit is used up right away by the person who enjoys a longer life or better health.
- the benefits 'invested' in making the future better probably won't be spent in the most effective ways (for example, being reinvested in bed nets), rather they are invested in more mundane ways.

Improving a given person's health earlier in life is probably better, because they can make use of that better health to earn more money earlier in their lives, or make further investments in their future health - through exercise for example. This gives a reason to discount health a little bit 'within' individuals, though this doesn't apply 'between' individuals. We won't explore this effect in great detail, because it seems likely to be relatively small.

In light of the above, there is some reason to discount health a bit on the basis of opportunity cost, but probably well under 3%.

5 Time preference

The previous three reasons were all practical or instrumental reasons to discount future value. It was not that things in the future were less valuable just for being in the future, but rather that it was either easier or harder to alter the future relative to the present. But could it be that future benefits are intrinsically worth less? Many think so, and isolate a component of the discount rate called 'time preference' to account for this. However, upon reflection there is actually little good argument to support this kind of discounting.

The first point to make is that we are generally in favour of theoretical simplicity. We should prefer not to complicate our theories of ethics by saying that people in the future do not matter unless there is some compelling reason for doing so. A second point against time preference is that it violates ideas of impartiality and fairness - in this context often called 'intergenerational justice'. The trend through history has been to consider the interests of an ever wider share of creatures to be important. Gradually the interests of groups such as the non-nobility, women, people of different races, and now also animals are taken into account to some extent. Time preference clearly discriminates in favour of people around today at the expense of other people who will be around in the future. This kind of prejudice should not be adopted glibly, but rather demands a compelling justification.

Unless we are willing to accept a strange form of 'dynamic inconsistency', time preference also seems to imply that the past should count for more than the present. A modest 1% time preference rate suggests that it was 60% worse for someone to suffer in the 1960s than it is for them to suffer today. Even more absurdly, a single day of Tutankhamen's life would have been more valuable than the entire lives of all 7,000,000,000 humans alive today put together.

In light of this, it is not surprising that those who developed the time preference approach for describing people's impatience about obtaining benefits for themselves opposed its use in normative contexts, where comparisons were being made between different people at different times. Ramseys well-known ethical position was that such a practice is ethically indefensible and arises merely from the weakness of the imagination, while Harrod was even more scathing, calling pure discounting a polite expression for rapacity and the conquest of reason by passion (Ponthiere, 2003). There is also striking agreement among philosophers that time preference is arbitrary and indefensible, including those with training in ethics and economics. Indeed we know of no moral philosophers who support it which stands out in a field which agrees on remarkably few things.

On the other hand, supporters of time preference observe that people really do seem impatient within their own lives. It is true that most people, when offered the choice, prefer to eat one marshmallow today rather than two in an hour's time (Casey et al., 2011). But do we really need to invoke time preference to explain such a decision? Much of this impatience could be explained by appealing to their uncertainty about the future, their accounting for inflation, their accounting for opportunity costs, as well as their weakness of will, which we could define as people choosing things they themselves wish they would not choose. After properly accounting for those effects, there may not be much if any discounting left over due to time preference.

Finally, the data supposedly used to support time preference is incredibly variable and sensitive to the precise setup of the choices people are given. Astonishingly, observed discount rates range from negative ones, to more than 1,000% per annum, when highly impulsive people are presented with immediate-term trade-offs like one marshmallow today versus two in an hour (Frederick, 2002). The observed form of discounting by most participants in these experiments is not geometric, but rather 'hyperbolic'. That is to say, people are particularly impatient about decisions where they have to give up some immediate pleasure. Adopting this discounting in reflective social decision-making would be very peculiar. It would mean we as a society were committing to always regretting our past decisions, in the same way as someone who always wants to start going to the gym - but never does.

Finally, even if we accept that people are impatient about the benefits that they themselves receive, we should be careful to distinguish preferences we have regarding the welfare of others from those we have for our own welfare. Someone could reasonably prefer eating one cookie today to two tomorrow, but never think for a minute that means people alive in a year's time are less than a millionth as important as those alive today. When people are asked explicitly about how impatient they are about benefits that flow to other people, their apparent time preferences falls to between negative 1% and positive 1% (Frederick, 2002).

A typical example is Frederick (2003), which asked participants whether it was worse for one person to die from pollutants next year or for one person to die from pollutants in 100 years. About two thirds (64%) thought both were equally bad, while 28% thought today was worse, and 8% said today was better. Those who said it was worse on average thought three people dying in a century's time was as bad as one dying today. If we

were to attribute all of this to pure time preference this is a discount rate of around 1% a year.

The bottom line is that pure time preference seems unethical, and is only weakly justified by evidence about people's decisions.

6 Conclusions

In light of the above, Giving What We Can believes that it is inappropriate to just use a single geometric discount rate in the standard 3-7% range as an approximation, or 'hack', to factor in all of the complex issues outlined above. While a geometric discount rate at 5% could produce a reasonable answer, this would only be by pure chance. It could just as well produce a completely incorrect answer.

Instead we will try to:

1. discount money in the normal way to take account of inflation and opportunity costs.
2. build our cost-effectiveness models to explicitly take account of
 - a) uncertainty about whether a project will occur, succeed and still be required in the future;
 - b) the fact that most problems will eventually be solved whatever we do;
 - c) the possibility that humanity may not exist to benefit from our actions forever into the future;
 - d) the likely flow of benefits over time from what we do, such as reduced spread of diseases, greater investment in children, and so on.

This is likely to offer other benefits in forcing us to think through the actual likely effects of our actions.

3. not apply any pure 'time preference'.

Taking this approach is challenging, but we expect it to be worthwhile. Unfortunately, it is not easy to work out the best course of action, and we do not make it so by pretending otherwise.

7 References

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