



Discounting the Future

John Rawls and Derek Parfit's Critique of the Discount Rate

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ABSTRACT

This article concentrates on the critique by John Rawls and Derek Parfit of the use of a discount rate in economics. In a presentation of the basic economics underlying the use of a discount rate, the inherently problematic nature of people's preferences with respect to time are highlighted. The second part discusses the role of the discount rate in economic optimal growth models. An outline of the economic theory of optimal growth is provided, pointing out how Rawls's analysis of justice between generations fits nicely into this economic discussion, thus explaining his interest in the discount rate. For Rawls the basic problem with the discount rate is that one variable is caught between two objectives: guaranteeing an efficient and at the same time a fair solution. Finally Derek Parfit's analysis of the use of discount rates is examined. Parfit points out that a discount rate is often used as a crude rule of thumb which wrongly represents our reasons for discounting. The article concludes with a discussion of a study undertaken by a number of respected economists for the IPCC (International Panel on Climate Change) which exhibits all the mistakes that Parfit warns us against.

KEYWORDS

Cost-Benefit Analysis; Discount Rate; Growth Theory; John Rawls; Derek Parfit

1. The Dubious Nature of the Discount Rate in Cost-Benefit Analyses

1.1 A decision procedure for society

Every community, be it a household, a company or the entire society, has to allocate limited resources. Any project should, therefore, undergo a critical evaluation. A possible evaluation method might run as follows. Sum all the goods necessary to realize the project and find out what the effects are upon the individual persons you have to withdraw the goods from. Then sum all the goods that form the output of the project and again look for the effects of the presence of these goods on the individuals involved. Now compare both effects and conclude that the project is a good idea if the effects connected to the goods needed for the input or less desirable than the effects connected to the goods that follow after the project has been realized.

This method must of course raise many questions. That one judges a project purely by the goods that are involved is not as unacceptable as it sounds: the notion 'good' is flexible and can be extended. Much more controversial is the fact that one only judges by the effects these goods have on individuals, which reflects the presupposition that the total effect of a project upon society is nothing but the aggregated individual effects. This presupposition is part of methodological individualism, an assumption that is popular in modern economics. If you accept these two conditions — judging in terms of goods and their effects on individuals — then you have entered the domain of cost-benefit analysis.¹

In its purest form cost-benefit analysis wants to know all individual welfare effects. This is an immense task. How, for instance, can we discover the welfare effects of resurfacing the street I live

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in. How much welfare gain and loss was involved for me in this operation and how much for my neighbour? It is difficult to find objective measures; all we could do is ask people about the advantages and disadvantages of the operation, a method not really attractive to an economist. Here the market comes in as an, according to economists, acceptable shortcut to find the necessary information. If we can look upon prices as a reliable reflection of an individual's subjective valuation of a good, then we have objective information about the welfare effects involved. And thus we end up with the popular method of cost-benefit analysis: take all goods serving as inputs and produced as outputs, evaluate them at market prices and count up the numbers; if the final sum is positive, do the project. There are various normative problems connected to this method, which I shall not elaborate here, save for one: the time dimension.²

1.2 Elementary economics of discount rates

Almost all projects are extended in time, some of them considerably far. Consider a project on reducing greenhouse emissions. Some of the welfare effects involved stretch over hundreds of years. However, we have to reach a decision now. So we need to know the value of these welfare effects for us living today. At this point the interest rate comes in as a variable transforming future effects into present values.

Why is a transformation necessary? To understand this, consider any good with a positive real interest rate. Take money, as much a good as any other. If real interest rates are positive, saving \$100 now will give me more in the future, say \$105 next year. Now reverse your view. If I receive next year \$105, this is worth less in present terms because the positive interest rate makes \$100 now equivalent to the \$105 next year. I have to diminish the future value of my money by the interest rate of 5%. This is why my subjective evaluation considers \$100 now equivalent to \$105 next year. If somebody wants to use my pure evaluation, he will therefore have to use a 5% discount rate to

get my correct present valuation of future money. In terms of the pure welfare effects we are looking for, it would be a mistake to consider next year's \$105 as of higher value than this year's \$100. The same holds for any good carrying a positive real interest rate. One has to consider net present values to have a proper estimation of the welfare effects. Call the interest rate one uses to calculate present values the *discount rate* and conclude that the use of a discount rate in cost benefit-analyses is a necessity whenever an economy reveals itself as being productive.

We can trace this idea back to the work of Eugen von Böhm-Bawerk who in 1888 published his *Kapital und Kapitalzins*, a seminal work on the economics of time valuation. But in addition to this reason, Eugen von Böhm-Bawerk introduces a second reason why future goods are worth less than present goods, this time not connected to a property of the world, but rather to a certain state of mind of the individual. It is generally known as positive time preference, impatience or myopia. In the words of von Böhm-Bawerk:

We must now consider a second phenomenon of human experience — one that is heavily fraught with consequence. That is the fact that we feel less concerned about future sensations of joy and sorrow simply because they do lie in the future, and the lessening of our concern is in proportion to the remoteness of that future. Consequently we accord to goods which are intended to serve future ends a value which falls short of the true intensity of their future marginal utility. *We systematically undervalue our future wants and also the means which serve to satisfy them.*³

Until now our consumer was as much interested in today as in tomorrow. This changes: a moment of myopia enters and expresses itself by a lower valuation of future goods only because they are further away in time. We shall label this phenomenon 'positive time preference'. Why do people have a positive time preference? Irving Fisher, an economist who extended Böhm-Bawerk's analysis, mentions in his *Theory of Interest* (1930) six



reasons determining a person's time preference: foresight, self-control, habit, life expectancy, concern for the lives of others and fashion. I will briefly examine these reasons.

Foresight has to do with rational planning. Both Fisher and von Böhm-Bawerk point to primitive tribes to illustrate this factor. Fisher has a story about a primitive farmer who never mends his leaky roof. When it rains he cannot stop the leak and when it does not rain there is no leak to be stopped. Eugen von Böhm-Bawerk refers to the Indians who preferred to sell the land by which they made their living for fire-water. Very short-sighted attitudes express extreme positive time preference and are to be contrasted with the attitude of the prudent businessman who thinks about the future constantly and is permanently looking for ways to master the future. Absence of extreme positive time preference is clearly looked upon as a virtue by both authors. *Self-control*, a second determinant of time preference, must be linked to the will. Eugen von Böhm-Bawerk gives the example of a worker who, well knowing that his wife and children are waiting for him, cannot resist the temptation of the bar and again wastes his pay on booze, whereupon another week of hunger and misery follows. *Habit* is to be connected to lifestyle. He who lives expensively will find it difficult to change this, even if he does not have the means anymore. The Scotsmen on the other hand, with their tradition of thrift, will have zero or even negative time preference. *The possibility of death* certainly induces positive time preference, according to Fisher, but a factor at least as strong and diametrically opposed is the *concern for the family*. Both motivations can be found in different mixtures. Two extremes are, on the one hand, the unmarried sailor who hardly thinks about his future and, on the other hand, the parents of an all-American family where the parents see themselves living on through their children — one reason why 'junior' is such a popular name. Finally, there is *fashion*, a factor that again can work both ways. The law of imitation, a very important factor in human life according to Fisher, induces American

millionaires to consider it disgraceful to die rich and believe it *de rigueur* to give the bulk of their fortunes to universities, hospitals or other public institutions. In doing this, they express a very long-term time perspective, reaching far beyond their personal life.

Whichever factor happens to be responsible for strong positive time preference, one must conclude that always a certain amount of irrationality, lack of control or even low moral standards are involved. It burdens positive time preference with an unpleasant smell. In as much as positive time preference is an important factor to explain positive interest rates, the negative connotation ends up with the interest rate itself, though this was clearly not the intention either of Eugen von Böhm-Bawerk or of Irving Fisher.

Nowadays positive time preference is an important parameter in economic models. But because modern economics starts from given preferences, the entire analysis of reasons for this preference present in the work of Eugen von Böhm-Bawerk, Fisher and Marshall, to name just a few, has disappeared. The axiomatic revolution of the 1930s in economics brushed aside all moral and psychological analysis as 'not our concern'. At the same time, the questionable aspects inherent in the notion of time preference disappeared from sight, but that does not mean that pure time preference is not every bit as questionable as it was for Böhm-Bawerk and Fisher.

What happens when we question time preference once again? Does this affect economic theory? I shall argue here that at least in the domain of cost-benefit analysis, questioning positive time preference might induce some serious shifts in the decision procedure.

1.3 Discounting the fate of future generations

When economists discuss the greenhouse problem they need to compare the long-term costs and benefits associated with greenhouse emissions or with emission-reducing measures we might want to take. Again, we can use the market price method



of cost-benefit analysis to give us some idea about the welfare impact of projects concerning the above-mentioned problems. However, some of the persons involved are not present now. We need to know the welfare effects of these projects on future persons, but as they do not take part in present markets we have no prices to give us information about the estimated value of the future goods. Now we have a serious problem. While problems connected to cost-benefit analysis are mainly of a practical nature, this one can never be overcome and keeps us at quite a distance from a pure method. What to do? Shall we abandon our decision method?

Several answers are possible. One can point out that future generations depend upon us in a radical way. If we choose not to have children anymore, mankind stops here. Time is a one way road. Whether you like it or not, the preferences of this generation are decisive. That is why the above method does not really go wrong, it is simply impossible to represent future preferences in our estimation. This is, in fact, the position of Stephen Marglin when he writes:

I want the government's social welfare function to reflect only the preferences of present individuals. Whatever else democratic theory may or may not imply, I consider it axiomatic that a democratic government reflects only the preferences of the individuals who are present members of the body politic.⁴

Pigou responds to this problem differently. He believes it necessary to represent the interests of future generations in a government body that can oppose the present preferences of individuals. Pigou distrusts present preferences and believes they are fundamentally selfish and express themselves in a very strong time preference. If we would take these preferences into account, the fate of future generations is seriously threatened. In his own words:

But there is wide agreement that the State should protect the interests of the future in some degree against the effects of our irrational discounting and

of our preference for ourselves over our descendants. The whole movement for 'conservation' in the United States is based on this conviction. It is the clear duty of Government, which is the trustee for unborn generations as well as for its present citizens, to watch over, and, if need be, by legislative enactment, to defend, the exhaustible natural resources of the country from rash and reckless spoliation.⁵

Pigou, writing in the 1920s and 1930s belongs, like Keynes, to a generation of economists where moral arguments still had a part to play. Economics is political economy and this leaves room for the question whether it is really axiomatic for a democratic society to take only present preferences into account. After the Second World War, the question disappeared and when Stephen Marglin, cited above, started an extensive discussion on the choice of a discount rate, the methodological assumption that existing preferences should not be questioned was already firmly engrained. But let us for a moment return to Irving Fisher and consider the reasons for the positive time preference of individuals: lack of foresight, weakness of the will, a wasteful attitude or a lack of concern for one's descendants. Whichever way you look at it, all these reasons seem unattractive. Must we then not doubt the positive time preference based on such reasons? And if we do, must we not, at the same time, doubt an interest rate and the associated discount rate which is (partially) based on such preferences?

Economists will generally recoil from tackling these questions. It leads them back to the old swamp of political economy, happily left behind in the methodological revolution of the 1930s and 1940s. But, unfortunately, leaving behind a style of reasoning does not imply that the questions have been solved. Pigou's problem is a genuine one, and any choice of a social discount rate is an implicit answer to that question.

Contemporary approaches to discounting find their intellectual roots in the market-based time concept. The starting point are free acts of choice in an appropriate environment — i.e. the market



— appropriate in the sense that from a procedural justice point of view the market is considered the proper place for individuals to reveal their preferences in a reliable manner. Once this procedural justice aspect is satisfied, it becomes possible to attach moral significance to the revealed choices of market participants. Nowhere in the analysis is there any probing for the grounds upon which choices are made: that is a private matter. Nowhere is the nature of preference formation discussed, nor a distinction between first-order and second-order preferences introduced.⁶ Consumer sovereignty plus the interpretation of market prices as direct revelations of personal valuations cut through all political problems and reduce the question of the choice of an appropriate discount rate to one of the aggregation of personal discount rates. It is a rather brutal method, one that might at times be informative about people's valuation of the future, but when it guides public decision-making on a long-term horizon, we must conclude that the time preference approach to public discounting holds the welfare of future generations hostage to the prevailing sentiments of current citizens.

2. John Rawls's Critique of the Discount Rate

2.1 The economic background to Rawls's analysis of intergenerational equity

In their *Handbook of Mathematical Economics*, Arrow and Intriligator present eleven important topics in mathematical economics. One of them is growth theory, a highly abstract theory that captures the functioning of an entire economy in a highly simplified equilibrium model.⁷ The background to growth theory is empirical and theoretical at the same time. On the empirical side the dominant macroeconomic fact in developed economies of the last two centuries is that of output growth, usually measured as GNP growth. For the period 1820-1986 real GNP growth in the US averaged 3.7% a year. It is easy to see from an extrapolation into the past (you quickly end up with a marginal GNP), that this is a new phenomenon,

not seen before in history. Connected to growth are all sorts of macroeconomic problems like fluctuations in output, employment and welfare, and changes in labour and capital productivity. From all this it follows that it would be nice to know what really drives growth. On the theoretical side, basic growth models allow us to focus on the fundamentals of consumption and capital accumulation. They function as a laboratory allowing economists to understand, for instance, whether the choice between tax and deficit financing affects capital accumulation, or what the basic relation between interest and savings, and between savings and growth might be. It is along these latter lines that we can return to Frank Ramsey's original contribution to growth theory. His problem was that of determining whether a nation should consume or save its income, given the goal of maximizing welfare over the entire (infinite) horizon. It became a prototype for studying the optimal intertemporal allocation of resources and is part of every economist's curriculum. Remarkably enough, on the sidelines of the allocation problem, looms a normative problem: what is the weight of future generations? Should we take account of them in our optimal savings decisions, and to what extent? Again this problem is crucially connected to one variable: the discount rate.

The question of what to do for future generations got a somewhat definitive answer in Edmund Phelps's fable of growth. In this fable about the fictitious nation Solovia, a man named Oiko is confronted with the problem of what to do for future generations. In order to solve the problem he turns to a neoclassical growth model, along the lines of Ramsey, and comes to the conclusion that, given the very abstract nature of a neo-classical growth model, in which only consumption influences a person's situation, the best possible solution is one which guarantees maximal consumption for as many people as possible. It turns out that this solution is easy to determine. We have to reach the steady state that guarantees the highest, sustainable level of consumption and thereby make all Solovians, present and future, happy. In an



additional lemma Phelps shows that every future generation, interested in getting their consumption as high as possible, will independently from each other choose the same steady state. Therefore this steady state is rightly called the *golden age*.

Now that we have picked the best state, the question remains: how do we get there? Again the answer is provided by Oiko: follow the *golden rule*, which states that the discount rate should be equal to the population growth rate. If we follow this rule, we will reach the golden rule capital stock in the shortest amount of time and the economy will converge to the best possible golden age, i.e. with the highest consumption level lasting for the longest possible period of time.⁸ If we do not follow that path, and stay below the optimal capital stock needed for the golden age to come true, the investment of one unit of consumption by one generation will result in more than one unit consumption to any future generation, a result that must convince economists inspired by utilitarianism to strive for the golden rule. This famous golden rule, introduced by Phelps, became an important reference point thereafter in growth theoretic discussions.

2.2 Modified golden rules and the just savings rate

Although Phelps's golden rule solved the problem of what to do for future generations the problem of the weight of future generations in a growth model did not disappear altogether. There was one element which struck many economists as problematic, and that was the distribution of savings efforts over time. Phelps's solution was perfectly efficient, and still not necessarily the most attractive. In order to understand why economists were inclined to give up the efficient solution, we can turn back to Irving Fisher, whose theory of household savings under a zero time preference closely resembled Phelps's fable.

The Fisherian household is asked to save as long as the optimal capital stock — which guarantees the highest possible sustainable consumption level for the rest of the time — has not been reached. In this

sense, savings by a multi-period household became an allegory of the proper accumulation by a multi-generation society. But not everybody was satisfied with this analogy. After all, the Fisherian household did not sacrifice enjoyment, it merely postponed enjoyment for the sake of larger lifetime enjoyment — a sensible decision, but why should a generation sacrifice its lifetime enjoyment for the sake of any future generation? The present generation might well complain that it was being asked to suffer for its purely accidental place in history. At the same time economists came to realize that following the golden rule implied monstrous savings efforts by the first generations and little effort from all the others. This was considered unrealistic and unjust. The result of both considerations was an adaptation of the golden rule into the *modified golden rule*, which puts the discount rate higher and thus accepts an element of pure time preference in the optimal planning. But exactly how far this pure time preference element should go, and what was to be considered an acceptable savings, remained unclear. One of the best monographs which addressed this problem was undoubtedly Chakravarty, a careful analysis about how we should distribute the burden of saving on an equitable basis for all generations.⁹ Under this discussion the discount rate moved from being an instrument which guaranteed an efficient solution to the primary variable which brings about a fair distribution of the savings effort.

It is probably this change in the mood of the discussion which brought the topic to the attention of John Rawls. In his *A Theory of Justice*, the problem of future generations and his ideas on time preference are completely determined by the economic literature introduced above.¹⁰ That he discusses the acceptability of pure time preference and limits the problem of justice between generations to that of the choice of just a savings rate directly reflects the existing economic discussion.¹¹ Furthermore, his rejection of the difference principle as a solution to the savings problem can only be understood with the image of a steadily growing economy — the standard economic growth model — in mind. Under a steadily growing



economy which starts with a capital stock well below the golden rule capital stock, the least well-off generation is always the first generation that has to start the savings process. Applying the difference principle, according to Rawls, would imply that the whole growth process (which rests on capital accumulation) could never take off. This he deems unacceptable, and therefore goes on to look for a different solution.

Whatever the merits of Rawls's own solution to the future generations question, it is clear that he has been a good reader of the economic literature, for his critique of the economists' approach is possibly the most destructive critique of the entire debate about what a suitable discount rate in a growth model should be:

...having started with the idea that the appropriate rate of saving is the one which maximizes social utility over time (maximizes some integral), we may obtain a more plausible result if the welfare of future generations is weighed less heavily; and the most suitable discount may depend upon how swiftly population is growing, upon productivity of capital, and so on. What we are doing is adjusting parameters so as to reach a conclusion more in line with our intuitive judgements. We may find that to achieve justice between generations, these modifications in the principle of utility are required. Certainly introducing time preference may be an improvement in such cases; but I believe that its being invoked in this way is an indication that we have started from an incorrect conception.¹²

In the end the problem lies with the utilitarian background that frames the economic discussion and imposes efficiency as the highest norm. Fiddling with the discount rate is but a backward move in order to escape this framework, or with Rawls:

Unhappily I can only express the opinion that these devices [e.g. modified golden rules] simply mitigate the consequences of mistaken principles.¹³

Chakravarty's book is an excellent example of this fiddling. On the one hand the author believes that

efficiency demands high savings rates; on the other hand he is enticed by the observation that existing savings rates are so far remote from the theoretical optimal ones, and that imposing these would seem to carry such a gross injustice in the distribution of the savings burden, that an adaptation of the considered optimal path is needed. Throughout his book Chakravarty will constantly move back and forth between the perfectly efficient golden rule path and the distributive justice properties of the efficient solution — unacceptable on the basis of moral intuitions. It is a hopeless exercise in which the discount rate is asked to deliver more than it can: guarantee a just distribution of burdens, while at the same time not giving in too much on efficiency.

For Rawls, the mistake is of course the utilitarian idea that efficiency should come before justice, rather than the other way around. This implies that we need to answer first what a just and fair distribution of the savings burden could be, and then continue to look for an efficient path, one that is likely not the most efficient of all. It turns the research strategy which Koopmans invoked upside down. Forget the mathematical frame and ask yourself what justice between generations entails, then do the math.¹⁴

3. Derek Parfit's Critique of the Use of a Discount Rate in Cost-Benefit Analyses

According to a social discount rate (SDR), the present moral importance of future events, especially benefits and losses, declines at a rate of n per cent per year. There might be good reasons for discounting future monetary benefits or losses. Suppose inflation pushes future market prices for certain goods, involved in the cost-benefit calculation exercise, then it would be foolish not to correct for this inflation by introducing a discount rate. Likewise, when an economy is productive, it seems reasonable to take these productivity gains into account: \$1000 today is simply not equivalent to \$1000 in ten years time. So when you are interested in estimating the pure welfare effects of a



project, discounting seems advisable. Enough has been said about this in the first point.

But economists use many different reasons for discounting not only future monetary benefits or losses, but also future welfare, and not all these reasons are equally acceptable. As Derek Parfit has pointed out, *time* discounting is often a vehicle for discounting something quite different.¹⁵ What follows is a slightly adapted, summary version of his critique.

1. We should discount because our successors will be better off and everybody faces diminishing marginal utility. Considering the economic evolution of the last 200 years, we have strong reasons to believe that our successors will be better off than we will. If we measure costs and benefits in a monetary way, we might refer to the traditional assumption that marginal utility diminishes with rising utility levels and thus conclude that a future increase in benefit should be discounted to be comparable to a present increase. There could also be an argument from distributive justice, suggesting that an egalitarian view of the distribution of welfare over generations, requires us to take less account of the better-off future generations, and thus we must discount future benefits. However, the ground for discounting is not the fact that these benefits lie in the future, but rather that they will go to people who are better off. A social discount rate is only justified when it *exactly* traces the growth process in future welfare, if not, the discount rate leads us astray.

2. Some people are more near to us than others. If this is the case, we could be induced to say that we ought to give priority to our own parents and children. In that case we ought to attach more importance to effects which concern the next generation, or on the community level, that a country ought to give special weight to its own citizens. Here we would discount for degrees of kinship. Such a discounting factor bears a direct relation to time. That is why the use of a social discount rate would come fairly close to the use of a discount rate for kinship. This might be true for the link

between a present and the subsequent generation, but as the social discount rate walks further through time, its implications become less obvious. Why for example should we attach less weight to the fate of the fifth generation than that of the sixth?

3. Future events are uncertain. Future events bear a great deal of uncertainty, so one should discount the outcomes connected with future events. There are two questions involved in this argument: a) Is a prediction of future events less likely to be correct? b) If a prediction is correct, can we give it less weight because it is further away in the future? Most people would answer yes to the first question, but this answer does not tell us anything about the second question. Take the following example: suppose that ignoring the greenhouse effect implies the possibility of a major catastrophe in 400 years, killing about 299 million people. Then, if we use a social discount rate of five percent, this implies that the death of one person tomorrow is more important to our decisions than the possible death of 299 million persons in 400 years. A traditional rationalization of this outcome would be that there is a very small chance of this catastrophe happening, or that technological improvement will make sure that future generations can prevent this catastrophe from happening. If our assumptions are reasonable, this conclusion might in fact be justified, only the way in which we take account of this conclusion is wrong. We ought not to discount over time but over probabilities. When we discount over time we misrepresent our reasons for discounting, suggesting that we attach lesser importance to what happens in the future while in fact we attach lesser importance to what is uncertain. Now one could argue that the further you go in time, the more uncertain outcomes become, so time discounting would in fact amount to probability discounting. But not only would this give a misrepresentation of our real views, but it is also very unlikely that probability discounting is in all circumstances the same as time discounting; and if it is not the same, time discounting will point to wrong conclusions.



4. The time preference of people and our democratic attitude oblige us to discount. When most people agree that what happens in the future is less important than what happens now, the government ought to respect this choice and use a social discount rate or fall into a paternalistic, authoritarian attitude. In fact the government should only reflect the preferences of present individuals. Again we must distinguish two questions: a) Is it morally acceptable that individual people or a community cares less about more remote effects? b) If most people answer yes to the first question, should the government stand behind this preference? The argument from democracy gives a clear answer to the second question, but does not say anything about the first, unless one would be willing to accept that what the majority thinks is good, is good in a moral sense. So if a majority or even all people prefer to attach less weight to what happens in the future, this does not mean that we ought to attach less weight to the future, nor does it imply that the government ought to use a social discount rate in evaluating different projects. Even if it is the case that people have time preference, this does not morally justify the use of a time discount rate. This argument touches upon the moral basis of welfare economics in general and cost-benefit analysis in particular: is it morally correct to take only present preferences into account as the ultimate source of all value? Most welfare economists would answer yes; Parfit says no.

So much for Parfit's arguments. His main reproach to the social discount rate is that it works like a crude rule of thumb, incorrectly representing our reasons for discounting and very often going astray. All the different reasons for discounting should be judged separately if we do not want to be blinded to our genuine moral sensibilities. And to illustrate the utter absurdity of a temporal discount rate Parfit ends his exposé as follows:

Remoteness in time correlates with a whole range of morally significant facts. But so does remoteness in space. Those to whom we have the greatest obligations, our own family, often live with us in the same

building.... Most of our fellow citizens live closer to us than most aliens. But no one suggests that, because there are such correlations, we should adopt a spatial discount rate. No one thinks that we may care less about long-range effects of our acts, at a rate of n percent per yard. The temporal discount rate is, I believe, as little justified.¹⁶

Parfit's critique of the social discount rate is, as far as I can see, still one of the best philosophical critiques. Unfortunately, economists have not heeded it. In 1995, a group of distinguished economists was asked to search for an appropriate discount rate, to be used in policy choices related to the greenhouse effect.¹⁷ In their survey-like paper, they discuss and accept the following reasons for discounting:

- The consensus view among economists is that the argument from democracy obliges us to take account of the pure rate of time preference when valuing the welfare of future generations.
- The possibility of extinction should be reflected in a positive discount rate.
- Emphatic distance with people living further away in time, provides us with a good reason for discounting future utility.
- Rising levels of consumption and utility in the future indicate that we must discount future consumption.

All these arguments are lumped together; specific figures are assigned to each one and in the end the authors come up with what they consider to be a plausible figure for the social discount rate: somewhere between 2 and 3 percent.

When I was asked to comment upon this paper, my first reaction was one of bewilderment. Here were a number of first-rate economists, all of whom had contributed significantly to the economic theory supporting the use of a discount rate, coming up with an absurdly simplistic conclusion. In 1982, these same authors had contributed to one of the best books on the problem of discounting, Robert Lind's *Discounting for Time and Risk in Energy Policy*, which led to a number of well-balanced conclusions, of which I shall mention only the following two:



- There is no such thing as a single rate of discount that can be used for all public investments and would accurately reflect the opportunity costs of investment, the social rate of time preference and differences in risk. The appropriate rate of discount is always project-specific and depends upon a multitude of factors relating to the structure of the economy, the nature of market imperfections, the behaviour of government, and the nature of the benefits and costs themselves.¹⁸

- Cost-benefit analysis has never been a tool for resolving issues of equity among members of one generation or for individuals in different generations. Although of great value in providing guidance about how to think about such issues, the theory itself does not decide the issues. The choice of a discount rate affects the distribution of benefits and costs over generations, but the issue of intergenerational equity, of how these costs and benefits ought to be distributed, should not be decided by, or buried in, the choice of a discount rate.¹⁹

It utterly contradicts these conclusions to use a discount rate of around 2 percent for all public projects related to the greenhouse problem.²⁰

I must admit that I am still puzzled by this paper. It was clearly policy-oriented; it was supposed to bring a practical solution, but it would have been better to repeat the above conclusions from 1982, and abstain from any firm decision,

than to produce an arbitrary figure that buries all the real choices connected to the greenhouse problem. I was forced to conclude that, when it comes to normative choices, it is no luxury to keep a sharp eye on the results produced by economic research.

Concerning the discount rate, one problem is that a pure method demands that the researcher determine the specific interest rate of every good involved, whereas in practice only one discount rate is used to calculate present values and this rate can be nothing but a rough approximation. A further and more important problem is that the market price method works well when the costs and benefits of a project all end up with the same group of people. But this is seldom the case and at that point further presuppositions are needed to make the method reliable. One important and often-used presupposition is that the marginal utility of money is equal for all persons. This seems very implausible in a world with gross inequality. These are just a few problems. Whichever way you look at it, one has to conclude that cost-benefit analysis remains a crude method. The intentions are good. Working it out, however, necessitates some major and not entirely innocent steps. For Mill and Hausman, this is the typical and somewhat unfortunate situation in which economists find themselves whenever they are asked for advice.

Notes

¹ Note that economists need not accept that the *total* impact of a project upon society is grasped by taking the aggregate of the individual effects. It is sufficient to accept that looking only at individual effects gives you nevertheless a *fairly good idea* of the impact on society. The individualism involved is methodological, not ontological.

² A classic problem for cost-benefit analysis is for instance that some markets, and thus the prices of some goods, might be missing, or that there are failures in existing markets (due to the presence of externalities or public goods) and thus the prices that come out of these markets do not really reflect the valuation that individuals really hold.

³ Eugen von Böhm-Bawerk (1959), 268. Emphasis in original.

⁴ Stephen Marglin, "The Social Rate of Discount and the Optimal Rate of Investment," *Quarterly Journal of Economics* 77(1963): 97.

⁵ Arthur Cecil Pigou, *The Economics of Welfare* (London: MacMillan, 1952), 29-30.

⁶ Marglin's public goods approach to the social discount rate introduces a distinction between individual and social time preference maps, but this distinction does not rest upon different sets of preferences (one being better informed than



the other for instance), on the contrary, there is only one set of preferences, but the constraints differ and so we end up with two separate optimization problems, which result in two discount rates. Agents remain sovereign and the welfare of future generations continues to be contingent upon present preferences.

⁷ Basic contributions to growth theory have been: Samuelson and Solow (1956), Samuelson (1965), Uzawa (1964), Koopmans (1965, 1967), Cass (1965, 1966), von Weizsäcker (1965), Shell, ed. (1967), and Cass and Shell, eds. (1976). The initial problem was formulated by Ramsey (1928), an article that was decades ahead of its time. Growth theory resurged in the nineties as a microeconomic basis for macroeconomics and as a more empirical discipline.

⁸ This path also has a fairness property. Given an exogenous savings rate, along this path each generation invests on behalf of future generations that part of its income which it would have had past generations invest on behalf of itself.

⁹ Sukhamoy Chakravarty, *Capital and Development Planning* (Cambridge: MIT Press, 1969).

¹⁰ It is on the whole remarkable to see how much the John Rawls of *A Theory of Justice* was involved with economic theory. The entire book is loaded with footnotes referring to 1960s state of the art economic theory. There are many more references to Arrow, Sen and Harsanyi, for instance, than to Searle, Hegel or Hobbes. On the whole economic theory, and certainly welfare economics, was in the sixties an exciting and rapidly expanding domain. It seems that part of this economic spirit is retained in the *Theory*, and this might partially explain why Rawls was willing to state that «on the contract view the theory of justice is part of the theory of rational choice» (Rawls, *A Theory of Justice* (Cambridge: Harvard University Press, 1971), 47).

¹¹ Chakravarty's *Capital and Development Planning* is a clear reference point for his discussion.

¹² Rawls, 298.

¹³ Rawls, 297.

¹⁴ After the publication of *A Theory of Justice*, the 'rights of future generations' became an established topic in Anglo-American philosophy. It even turned into a political weapon when the Brundlandt report defined the notion 'sustainable development' in terms of the rights of future generations. The report invoked awareness of our duties to posterity as an instrument to contain the growth path of the world economyCa laudable exercise and one that is far from finished. It turns the entire theoretical exercise above into a painfully realistic task.

¹⁵ Derek Parfit, *Reasons and Persons* (Oxford: Clarendon Press, 1984), appendix F.

¹⁶ *Ibid.*, 486.

¹⁷ Kenneth Arrow, William Cline, Karl-Goran Maler, Mohan Munasinghe and Joseph Stiglitz, 1995, Intertemporal Equity and Discounting, preliminary version of chapter 4 of the IPPC report, 1996.

¹⁸ Robert C. Lind, *Discounting for Time and Risk in Energy Policy* (Washington: Resources for the Future, 1982), 443.

¹⁹ *Ibid.*, 457.

²⁰ There are other absurdities in the report. The authors refuse, for instance, to discount for risk, and stand with Parfit when they say that risk should be treated separately, and not included in the choice of a discount rate. The risk of extinction, however, which they catalogue as uncertainty, is included in the discount rate figure. But do we really believe that the risk of extinction rises at a constant rate of n percent per year? Broome for one does not (see John Broome, *Counting the Cost of Global Warming* (London: White Horse Strand, 1992), 102).

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