

Chapter 10

FUTURE GENERATIONS

MANY ENVIRONMENTAL ISSUES ARE OF LITTLE CONSEQUENCE FOR PEOPLE LIVING now, but will become major problems for people who are alive in the future. For example, the emission of greenhouse gasses, such as carbon dioxide and methane, is causing only mild climate change today, showing up now as heat waves and the melting of polar ice. But one hundred years in the future, if the world continues with business as usual, its effects may include severe droughts, decreased food production, flooding of low-lying coastal areas in countries such as Bangladesh, and the forced migration of millions of people. The disposal of radioactive waste from nuclear reactors, the depletion of non-renewable resources such as fossil fuels, and the exhaustion of agricultural resources by soil erosion, are causing small problems now, but have the potential to be severe problems for people not yet born. None of us, however, will be alive in a hundred years, so why should we care about what happens to future people?

Many people are ethically committed to the idea of sustainable development, which the Brundtland Report of 1987 defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Many farmers are committed to the idea of sustainable agriculture, agricultural processes that do not undermine our future capacity to successfully practice agriculture. We should have ethical reasons for these commitments, yet developing these is not as easy as it might seem. Extending moral

standing to future generations creates some conceptual puzzles that environmental policy-makers should be aware of, and take into consideration in their analyses.

Learning Objectives

1. To understand what ethical egoist, contractarian, deontological, utilitarian, and justice-based approaches say about our obligations to future generations.
2. To understand some of the conceptual problems with the deontological approach regarding duties to posterity.
3. To understand some of the weaknesses of the utilitarian approach to obligations to future generations.
4. To understand the idea of discounting the interests of future generations and the effects of the choice of discount rate.
5. To understand some of the reasons people give for discounting the future, and the weaknesses of these reasons.

ETHICAL EGOISM AND FUTURE GENERATIONS

We will begin our survey of ethical theories and obligations to future generations with ethical egoism. Ethical egoism claims that the only entity with moral standing is oneself. So agents have no obligations to any people but themselves. Therefore, they have no obligations to future people.

Ethical egoism still has all the problems we have looked at before. For example, the ultimatum game shows that people are able to consider more than their own interests, and thus that the empirical theory, psychological egoism, on which ethical egoism is based, is false. The prisoner's dilemma game shows that consistent ethical egoists will have difficulty cooperating, and will thus be condemned to lives that are "nasty, brutish, and short." Ethical egoism is still an arbitrary approach because ethical egoists cannot point to any non-arbitrary feature of the self that other people do not share. Thus, it is difficult to accept the ethical egoist position in general, let alone in its conclusion that we have no obligations to future generations.

The contractarian approach allows ethical egoism to escape some of the difficulties of pure ethical egoism, but it, too, leads to the conclusion that we have no obligations to future generations. Agents need consider only other agents with whom they have entered into mutually advantageous, coercively enforced arrangements to avoid prisoner's dilemma type situations. Agents cannot make such contracts with future people because future people do not exist to contract with. Thus, agents have no obligation to future people. The typical contractarian lament is, "What has posterity done for me?" Again though, the contractarian approach is still susceptible to all the weaknesses of ethical egoism except its difficulty with cooperation. Contractarianism is still based on an implausible theory of human nature, psychological egoism. Contractarians are still susceptible to the paradox of egoism, which means some good things like true friendship are unavailable to them.

NATURAL RIGHTS AND FUTURE GENERATIONS

The deontological approach holds that what ethically matters is the principle that a moral agent follows when performing an action, and not the consequences of the action, or the character of the agent. In a natural rights version of deontology, duties are always correlative duties owed to the particular person who possesses natural rights. Natural rights are the rights of some particular person; they create correlative duties because of features that this particular person has. An existing person who actually has the capacity for autonomous choice has a natural right to liberty because of his or her actual possession of that feature. An existing person has a property right to an object because of a chain of actual historical transactions connecting him or her to an act of initial acquisition. This creates conceptual difficulties when we try to talk of correlative duties to people who are not yet born. A rights-based, deontological approach that requires direct correlative duties to particular people has difficulties accounting for the moral standing of unborn generations. The difficulties arise either because particular future people do not exist or because our policies will change the particular people who do exist in the future.

The first conceptual difficulty with applying the natural rights approach to future generations is the Temporal Location Argument. It goes like this:

1. Correlative duties are always direct duties to some particular person.
2. If a particular person does not exist, then we cannot have duties to him or her.
3. Future people do not exist.
4. Therefore, agents have no correlative duties to future people.

Another way of thinking of this conceptual problem goes as follows. Present people have no duties to imaginary people, such as Harry Potter, because imaginary people do not exist. However, future people do not exist either. Therefore, present people have no obligations to future generations of people. The problem arises because of the conceptual structure of rights. Rights always require current duties to some particular person or entity, and future persons do not now exist and so cannot be the bearers of natural rights. This problem also arises for rights theorists who extend moral standing to entities other than people. Someone who believes in animal rights will have difficulty explaining why moral agents have duties to future animals.

The consequences of the Temporal Location Argument for the rights-based approach are very counter-intuitive. Before we were born, we did not exist. Before we were born, the previous generation had no obligations to our generation. Therefore, prior to our births, the previous generation had no obligation to conserve natural resources, or reduce pollution, for our generation. Similarly, we have no duty to future generations to mitigate greenhouse gas emissions, take care of our toxic waste, or preserve non-renewable resources. Unfortunately, the conceptual situation gets even worse.

A second way that correlative duties to a particular person cause conceptual difficulties for the rights-based approach is the Disappearing Beneficiaries Argument. The problem arises because of the extreme contingency of people. Who one is depends on one's genetic makeup, which, in turn, depends on which sperm fertilizes which egg at conception. If a person's parents had never met, or had met at a different time, or had not had sex at a particular time, or if another one of the millions of sperm produced by the father had won the race to fertilize the egg, then that person would not have been born. Other people would have been born instead. The coming into existence of any particular person is a very delicate matter that different circumstances could easily have changed.

If we accept the premise of the contingency of persons, then the Disappearing Beneficiaries Argument goes like this:

1. Correlative duties are always direct duties to a particular person.
2. The circumstances of one's conception determine who one is.
3. Different environmental policies will result in different people meeting and/or different times of conception.
4. Therefore, different environmental policies will result in different particular people being born in the future.
5. Therefore, policymakers have no correlative duties to any particular persons in the future to implement any particular environmental policies.

We would like ethics to give some guidance regarding the goals of environmental policy. For example, if we pursue policies that are more stringent on carbon dioxide emissions, then people may travel less. If people travel less, then they are likely to meet and mate with different people than they would have under a business-as-usual policy. Consequently, over a hundred years, climate change mitigation is likely to result in a completely different set of people being born than would have been born under a business-as-usual policy. The duty-based approach does not give much guidance here on what we should do. Do we owe the people born under climate change mitigation a duty to pursue climate change mitigation? Alternatively, do we owe the people born under business-as-usual a duty to pursue business as usual? If duties and rights are always duties to particular persons or the rights of particular persons, then duties and rights do not give ethical guidance to policymakers.

One way to argue for something like the moral standing of future generations within a rights-based approach would be to argue that present children have a natural right that present adults preserve the planet's environment and resources. Thus, present adults (generation A) owe a duty to present children (generation B) to preserve the planet for them. In another generation, these present children (B) will themselves be adults and will owe a duty to children in generation C to preserve the planet for generation C. In another generation, generation C will owe a preservation duty to a new generation D, and so on. Even though, at the present time generation A has no determinable duties to generation D, the whole structure of inter-generational duties will have the same results as though generation D did have moral standing for generation A.

THE UTILITARIAN APPROACH TO FUTURE GENERATIONS

It appears that utilitarians can avoid the conceptual problems faced by the deontological approach. First, when a consequentialist agent is making a decision, the consequences are always in the future. Thus, utilitarians should have no problem with Temporal Location Argument. Second, utilitarians are not concerned with particular persons, but only with the satisfaction of preferences, the production of pleasure, or the avoidance of pain. It does not matter who has these preferences, pleasures, or pains. So it does not matter which set of people is the beneficiary of an environmental policy. Hence, utilitarianism has no problem with the Disappearing Beneficiaries Argument.

Accounting for obligations to future generations, however, raises a whole other set of problems for the utilitarian approach: ignorance of the future, population policy, whether to discount future lives, and how much to discount future preferences.

The first problem for the utilitarian approach regarding obligations to future generations is the Argument from Ignorance. It begins by observing that present people know very little about people who will be born far in the future, say, a hundred years from now. We are very uncertain about who will be born, what they will need, want, or be interested in, what technology they will possess, or even if any people at all will exist in the distant future. Yet we need to know what people are like in order to know what consequences our actions will have for them, and so what our obligations to them are. For example, if future people invent cheap fusion power, then we do not need to conserve fossil fuels for them. To the extent that present people do not have sufficient information about future people, present people have no obligations to them. Another form of ignorance is about the long-term effects of our actions. In some cases, we can predict them, but in many cases, especially regarding very long-term effects, we just do not know.

We can make a reasonably satisfactory reply to this argument that covers some of the uncertainties. We do know that future people will have certain basic interests. Whatever their lives are like, they will need sufficient food, clean, safe air and water, and a liveable climate. Thus, we have an obligation not to make the world such that they cannot satisfy those basic interests. We know, for example, that climate change is going to make their lives more difficult than otherwise, no matter what particular preferences may be in fashion in the far future. But the reply does not cover all cases. What we should do now to mitigate climate change will depend in part on how rich and technologically sophisticated future people will be. Some people argue that we owe posterity no obligation to mitigate climate change because future people will be so rich that they can easily absorb the costs of adaptation to the new climate.

A second problem with applying utilitarianism to future generations is the conclusions to which it appears to lead regarding population policy. There are two ways to understand the utilitarian injunction to cause the maximum amount of net utility. Average utilitarianism says that policies should bring about the highest possible amount of net utility per person. Total utilitarianism says that policies should bring about the highest possible amount of net utility without regard to how many persons the policy spreads that utility across. As long as the

number of persons is the same in two policies that we are ethically assessing, then it does not matter which variety we use. In the near term, most environmental policies have no effect on the number of people affected by the policy. In the far future, this assumption breaks down. Environmental policies, which include population policies, will have an effect on the number of people alive in the far future. Environmental and population policy can change the size of future generations.

Total utilitarianism has what the philosopher Derek Parfit, who first pointed out the problem, called a “repugnant conclusion.” If we can increase the total utility in the world by adding one more person, then we should do so. If the added person is even slightly happy, then the addition of that person will increase the total happiness. We should go on increasing the human population as long as each additional person is marginally happy. Total utilitarianism implies a population policy that keeps increasing the number of people in the world, even at the expense of environmental degradation, until the point at which the total world happiness begins to decline. This will result in an average level of happiness that is very low, even though it maximizes the total happiness. Most people will find this conclusion repugnant.

Unfortunately, average utilitarianism also has a difficulty once we consider applying it to the future and allow the possibility of changing the population size. Average utilitarianism enjoins us to adopt policies that result in the maximum amount of happiness per person. It follows that if anyone is born whose life will have less than the present average level of happiness, then that person will bring the average down. Thus, we should prevent from being born any person who is likely to be depressed or less happy than the average. This conclusion is also repugnant. It is likely possible, however, for the indirect version of average utilitarianism to avoid this difficulty. This version would argue that the implementation of such a population policy would cause so much anxiety among would-be parents that the utility costs of implementation would outweigh any effects of unhappy children on the average level of happiness.

A third problem for the utilitarian approach is that it appears to discount, or count for less, the lives of people born in the future. To see this problem, we need to consider the economic utilitarian argument for discounting the future. How much should a person be willing to pay now to get a \$100 item that she wants very much, but which she will not receive until a year later? Would she pay \$100 now? The answer is no, if she is reasoning rationally as an economic utilitarian would. An economic utilitarian will argue that she can get, say, a 7% return by investing her money in the stock market. If she will not get the item for a year then she should take \$93 plus change now and invest it in the stock market. Then in a year's time, she should take the money, now \$100, out of the stock market and buy the item. That way, it will have cost her only \$93 plus change. To figure out the present value of a future cost, she should discount it by the relevant percentage rate. We call this percentage the **DISCOUNT RATE**. When economic utilitarians do cost-benefit analyses, the choice of discount rate is crucial to their policy recommendations. The discount rate that we should use in environmental economics is a huge ethical question, as will become clear in what follows.

We should also discount environmental costs that will fall on future generations when comparing them to costs in the present. The amount by which we should discount future costs can be quite large because of the power of compound interest. When someone is

calculating the value of a \$100 investment in the bank at 7% interest after 10 years, he should not just add \$7 ten times to get \$170. He should reason as follows: At the end of 1 year, he will have \$107. In the second year, he will receive interest not on \$100, but on \$107. Thus at the end of the second year, he will receive \$107, at 7% in interest, which is more than \$7. His interest will compound. We could use a spreadsheet or financial calculator to calculate the future value (FV) of an investment whose present value is PV after t years at an interest rate of r. Instead, we will avail ourselves of a little trick that enables us to look at distant future values by estimating the doubling time of a present value at different interest rates.

To estimate the doubling time of a present value for a given interest (discount) rate we will use either the Rule of 70 or the Rule of 72. These rules are only approximations, so we will choose the version that makes the arithmetic easiest. To estimate doubling time use the

1. Rule of 70 for discount rates of 2%, 5%, 7%, 10%, 12%, 14%, which all divide nicely into 70 without remainder, or
2. Rule of 72 for discount rates of 3%, 4%, 6%, 8%, 9%, which all divide into 72 without remainder.

To apply one of the rules, we divide either 70 or 72 by the discount rate that we are considering. This gives the doubling time.

RULE OF 70	2%			5%		7%			10%	12%	14%
RULE OF 72		3%	4%		6%		8%	9%			
DOUBLING TIME	35	24	18	14	12	70/7=10	9	8	7	6	5 years

TABLE 10.1: Doubling (or halving) times at various discount rates

For example, using the Rule of 70, at a discount rate of 7%, the doubling time equals 70 divided by 7, which equals 10. At an interest rate of 7%, every 10 years the future value of an investment will double. Correspondingly, at a discount rate of 7%, every ten years the present value of a future cost will halve.

Now suppose that we want to know what happens in 50 years. In 50 years at 7%, a present value will double 5 times, that is, $2 \times 2 \times 2 \times 2 \times 2$, which is 32 times. Thus, at 7%, an investment of \$1 will be worth \$32 in 50 years. At a discount rate of 7%, after 50 years, we will need to use a discount factor of 32. Correspondingly, according to economic utilitarian reasoning, we should consider a cost of \$32 incurred 50 years in the future to be the same as a cost of \$1 in the present.

Discounting the future may seem a plausible way to proceed for investments and even costs in the short term, but it seems repugnant to apply this style of reasoning to human lives. Discounting the future seems wrong when applied to serious life and death concerns. If \$1 today is worth \$32 in 50 years, it seems to follow that one life today is worth 32 lives in the future. For example, if we are using economic utilitarian reasoning to evaluate a policy that saves 2 lives today but kills 32 people in the future, then we should save the 2 lives today at the expense of killing 32 people in 50 years. This is a controversial conclusion.

Utilitarian reasoning suggests that we should put a dollar value on the intensity of preferences and discount the intensity of future preferences according to some discount rate. A third problem for the utilitarian approach is determining what discount rate we should choose. The choice of discount rate has a large effect on what policy utilitarian reasoning will recommend.

Consider the following scenario drawn from a real environmental controversy. It models a debate between two economists, Nicholas Stern and William Nordhaus, about whether to take action now to prevent future climate change (Broome 2008). Both economists assume that climate change will cause one trillion dollars' worth of damage to the planet in 100 years. They agree that the cost, now, to prevent this damage is 50 billion dollars. The two economists, however, disagree about the appropriate discount rate: Stern says 1.4% while Nordhaus says 6%. We can use the rule of 70 (or 72) to show how the choice of discount rate affects the outcome of this cost-benefit analysis.

In Table 10.2, Stern chooses a discount rate of 1.4%. Using the rule of 70 for convenience, this gives an estimated doubling time of $70/1.4 = 50$ years. In 100 years, this will imply 2 doublings and a discount factor of $2 \times 2 = 4$. If the damage caused in 100 years is \$1 trillion, then the present value of that future cost is $1/4$ of \$1 trillion, which is \$250 billion. However, the present cost of climate change mitigation is only \$50 billion, so Stern's policy advice is to reduce greenhouse gas emissions now.

Nordhaus, on the other hand, chooses a market discount rate of 6%. Using the rule of 72, this gives a doubling time of $72/6=12$ years. In 100 years, this will give $100/12=8.5$ doublings and a discount factor of 2 multiplied by itself 8.5 times, which is somewhat more than 256 ($2 \times 2 = 256$). If the damage caused in 100 years is \$1 trillion, then the present value of that future cost is less than $1/256$ of \$1 trillion, which is less than \$4 billion. However, the present cost of climate change mitigation is \$50 billion, so Nordhaus's policy advice is not to reduce greenhouse gas emissions and instead leave climate change as a problem for future generations.

	STERN	NORDHAUS
<i>Future value of damage in 100 years</i>	\$1 trillion	\$1 trillion
<i>Discount rate</i>	1.4%	6%
<i>Doubling (halving) time</i>	$70/1.4 = 50$ years	$72/6 = 12$ years
<i>Number of doublings (halvings)</i>	$100/50 = 2$	$100/12 = 8.5$
<i>Discount factor</i>	$2 \times 2 = 4$	$2 \times 2 = 256+$
<i>Present value of future damage</i>	\$250 billion	< \$4 billion
<i>Present cost of cleanup</i>	\$50 billion	\$50 billion
<i>Policy recommendation</i>	Act now!	Delay!

TABLE 10.2: Effect of the choice of discount on policy recommendations

At least three ethical considerations affect our choice of a discount rate: pure time preferences, market discount rates, and the likelihood of a richer future.

In our own lives, we prefer to have something valuable now to having it in the future, or to pay a cost in the future rather than pay it now. This is partly due to impatience and procrastination (psychological) and partly due to knowing that there is a chance we will not be around in the future (risk). The technical term for this phenomenon is “pure time preference.” The problem is that the choice of discount rate in a problem involving future generations involves comparisons between different lives, not a choice within a life. Pure time preference is relevant to choices within a life but not between different people’s lives. If Tom is impatient and Vera is not, then it is not fair to impose Tom’s implicit discount rate on Vera, or vice versa, without further justification.

Economists like to believe that economics is a science that does not make value judgments. Thus, they prefer to use a discount rate that they believe is revealed in the market. One such rate is the interest rate on investments that will induce people to postpone consumption now and invest their money for the future. People can usually get a 6% return on a not too risky investment in the financial market. Economists also argue that using the discount rate revealed in the market is democratic because it leaves ethical decisions to the public. There are several problems with this argument.

First, it is again illegitimate to argue from the principles that people do use to make decisions within their own lives (for example, their investment decisions regarding their own old age) to the principles that people should use to make decisions respecting the lives of different people in future generations.

Second, the market uses many different interest rates. There is the overnight bank rate determined by the central bank. There is the prime rate at which banks lend to their biggest customers. There are the mortgage rate, the rate of interest paid on savings accounts, the rate available on treasury bonds, the rate available on long-term government bonds, the rate available on corporate bonds, and the rate of return available in the stock market. They all differ from one another, and it is not at all clear which one we should use as the discount rate when dealing with future costs.

Third, it is not clear that the expression of preference for a certain interest rate by consumers of investment products is a very good guide to the beliefs about value that citizens hold. Democracy does not mean following consumer preferences, it means debate and deliberation in the political process.

Fourth, this argument seems to violate the *is/ought* gap. From the fact that it *is* the case that people use a 6% discount rate when dealing with future costs, it does not immediately follow that it *ought* to be the case that they use a 6% discount rate to make policy decisions that affect future generations.

Income, like every other good thing, has a declining marginal utility. As income increases, each additional increment provides a smaller and smaller amount of satisfaction. An additional \$100 means more to a poor student than it does to a billionaire like Bill Gates of Microsoft. If, because of economic growth, people are richer in the future than they are now, then environmental policies will maximize utility if future people bear a proportionately

larger share of the costs of cleaning up pollution. Policymakers can incorporate this consideration into policy recommendations by using a higher discount rate for future costs. One problem with this suggestion is that, with potential environmental catastrophes like climate change, it may be false that growth will continue and that the future will indeed be a lot richer than the present.

INTERGENERATIONAL JUSTICE

As we have seen, utilitarian policy prescriptions frequently raise distributive justice issues. The utilitarian tells us to maximize expected net benefits, but the theory by itself tells us little about how to distribute these benefits. We can see this problem in Nordhaus's policy advice above. He tells us that we will maximize net economic benefits if the costs of climate change are borne by future generations. This seems intuitively unfair because the people who are benefitting from burning fossil fuels and thus causing climate change are the present generation (us). Usually we think it is fair that the polluter pays, not the victim. His reasoning says that we polluters should escape any costs of cleanup just because of the time of our birth and the discount rate he has chosen. This conclusion neglects consideration of inter-generational justice.

Justice requires that environmental policy treat people as equals. This does not mean that it should treat everyone the same. Treating people as equals requires that organizations do not treat them differently based on morally arbitrary features. Examples of morally arbitrary features include race, sexual orientation, economic class, and perhaps country of birth. The question for inter-generational justice is whether *time of birth* is a morally arbitrary feature of people.

One way to think about this is to use the thought experiment suggested by John Rawls that we have looked at before. Rawls thinks his theory of distributive justice would be chosen by any person who could completely discount all the morally arbitrary features of people like their race, sex, etc. To visualize this, he imagines people meeting to choose the principles of justice in a hypothetical "original position" behind a "veil of ignorance." Should people in the original position behind the veil of ignorance be aware of their time of birth or generational membership? If they were aware of their generational membership, would they assign differential benefits and burdens based on this feature? If we answer No to these questions then we have a theory of intergenerational justice.

Intergenerational justice is concerned with the *distribution* of rights and duties. A moral right is not, in itself, fair or unfair. What is fair or unfair is who has it. What is fair or unfair is the distribution of rights. For example, the distribution of people in a geographic region is not the same as the people themselves. The distribution may be even or uneven, lumpy or smooth; the people themselves are neither even nor uneven and neither lumpy nor smooth. Consequently, distributive justice is not concerned with particular people. It treats all people, present and future, as equals.

The intergenerational justice approach apparently avoids the conceptual problems of the natural rights approach that we discussed earlier. Neither the indirect utilitarian approach

nor the social contract approach distributes legal rights to particular people based on the actual possession of a natural feature by a particular person. Instead, they distribute rights and duties to whoever it happens to be who occupies certain roles in society. For example, some people occupy the role of police officers, and people in civilian roles have a correlative duty to obey them. The right of a police officer to be obeyed is not a natural right created by some special feature of that particular police person. The right of a police officer to be obeyed goes with the role the officer occupies, and the duty to obey the officer goes with the role the civilian occupies. Rights and responsibilities are assigned to these roles within a worked out theory of distributive justice. In a similar way, a theory of intergenerational distributive justice could assign duties and responsibilities regarding future generations to the roles that we occupy in the present.

SUMMARY

1. Though it may seem obvious that environmental ethics should assign moral standing to future people, there are some conceptual problems with this idea.
2. As we might expect, ethical egoism and contractarianism, with their concern only for maximizing self-interest, assign no moral standing to future people.
3. The natural rights approach, which concentrates on direct duties owed to particular people, has difficulty assigning moral standing to people who do not yet exist, and gives us no ethical guidance when we must choose between policies that will affect the identities of who will be born in the future.
4. Utilitarianism is oriented toward the production of future consequences, but it has trouble because of our ignorance of what these consequences will be in the far future.
5. Utilitarianism must apply in either its average or total form, but both of these lead to unattractive conclusions when applied to population policy.
6. Utilitarian reasoning, in its economic form, leads to the problem of how to weight the interests of future generations through the choice of discount rate.
7. A theory of inter-generational justice may allow us to distribute rights and responsibilities between generations without having to worry about duties to particular persons.

ONLINE READING QUESTIONS

The book's website contains reading questions on this chapter. Working through these questions will help you understand, remember, and apply important concepts from the chapter. Some of the questions supply useful hints for the study questions.

STUDY QUESTIONS

Using the text and hints from the online reading questions, write out, type, dictate to your computer, or at least formulate in your head answers to the following questions.

1. Explain why a contractarian ethics implies that people have no obligations to future generations.
2. Why does the argument from temporal location conclude that we have no correlative duties to future people?
3. Why does the disappearing beneficiaries argument conclude that we have no correlative duties to future people?
4. Why does the argument from ignorance conclude that we have no utilitarian obligations to future people?
5. What is the “repugnant conclusion” and how does it pose a problem for utilitarian obligations to future generations?
6. Explain why pure time preference might produce high discount rates in a cost-benefit analysis.
7. Explain why economists wish to use market interest rates as discount rates in a cost-benefit analysis.
8. Why is future growth an argument for using a relatively high discount rate in a cost-benefit analysis?
9. What is inter-generational justice?

QUESTIONS TO PONDER

Spend a few minutes thinking about the following questions, or, better yet, discuss them with fellow readers of this book.

1. Unborn people will actually exist at future times. They will then have natural features like a capacity for autonomous choice, and, in the future, they will have historically justified property rights. Will they not also have rights against us, rights that we are currently violating by failing in our duty to preserve the environment for them?
2. Why do you think that Stern and Nordhaus differ in their choice of a discount rate? Who is right?
3. Experiments in behavioural economics show that people discount the future in an inconsistent fashion over time. For example, if offered either \$100 today or \$110 a year from today, many people would choose \$100 today. However, if offered either \$100 ten years from today or \$110 eleven years from today, many people would choose \$110 in eleven years. The implicit choice of a discount rate by these subjects changes with time. They use a discount rate of more than 10% per year today, but see their future selves as using a discount rate of less than 10% per year. How is this dynamic

inconsistency relevant when an economic utilitarian tries to specify an empirically determined discount rate?

4. If robots could be police officers, would civilians still have a duty to obey them? Would robot police officers have any natural features grounding their rights to be obeyed?
5. Do you think that the following modification of the rights-approach could provide a way that the rights-approach could recognize the rights of future generations? An action is wrong when it has the *potential* to violate *somebody's* rights. There is not any particular person whose rights you violate when you park in front of a fire hydrant, but were there a fire, somebody's right to have that looked after efficiently by the fire department could be violated.