

# Efficency, equity and sustainability

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# Positive versus Normative

- Environmental economics is about the allocation, distribution and use of environmental resources
- Some of these questions are positive, many are normative
- **Positive economics** is relatively scientific (testable) and focuses on value-free descriptions of and predictions about economic relationships
  - If A happens then B will follow
- **Normative economics** deals with values and addresses what should be rather than what is.
  - statement of opinion: cannot be tested

# Efficiency

- description of the way a scarce resource is used based on a range of competing uses
- the most efficient use of a resource is that use which provides the greatest value to society

BUT... efficiency says nothing about who owns or controls a resource.

# Equity

- Subjective indicator of fairness (e.g. income distribution)
- Equity is multi-dimensional and is concerned with who owns resources
- Equity is a value judgment that means different things to different people
- **Equity is not the same as equality** (indeed there can be a conflict between the two)

# Efficiency versus Equity

- Neo-classical economic perspective: So long as we have a competitive market, our markets left all to themselves will be efficient
  - they typically never are when it comes to EE (air and water underpriced) hence the need for intervention**
- ◆ Saying that a market outcome is efficient doesn't mean that the outcome is necessarily desirable
- ◆ **It is often - but by no means always – worth trading less efficiency for more equity**
- ◆ **Efficiency is not a goal in itself to be pursued at the expense of other goals. It is only a way to achieve our goals more effectively –whatever those goals may be**

# Efficiency versus equity trade offs

- Ex. Disabled designated parking spaces in a busy parking lot
- A conflict between:
  - equity, making life fairer for disabled people and
  - efficiency, making sure that all opportunities for making people better off have been fully exploited by never letting parking spaces go unused
- How far should policymakers go in promoting equity over efficiency?
  - **normative question**

# Tradeoffs

## ◆ Efficiency v. Equity

◆ *Efficiency* means society gets the most that it can from its scarce resources.

◆ *Equity* means the benefits of those resources are distributed fairly among the members of society.

Example: Tax paid by wealthy and then distributed to those less fortunate.

Outcome: Increased equity and reduced efficiency

- deadweight losses associated with taxation as well as incentive effects (economists differ a lot when it comes to how important these incentive effects are)

# Efficiency versus equity

- We can say that competitive markets in equilibrium will be efficient.
- Does this mean that this will be fair/equitable?
  - depends I guess on what you mean by fairness (intrinsically subjective)
- Reasonable to say that distributional matters to people (to varying degrees).
  - We might care for example not only about the value of the environment (the size of the pie) but how this value is shared as well (the size of each piece to all recipients).
- What about future generations? – this is where it gets really difficult and answer depends on our own values/attitudes – normative question
  - we implement various policies (e.g. taxes) to promote equity among current inhabitants of the world
- **Should we do something similar to take into account the well-being of future generations?**



# Intertemporal welfare

- Question is should future generations' interests be discounted just because of their futurity?
- A democratic government often chooses to reflect the preferences of individuals who are present members of the body politic.
  - national governments are beholden only to the interests of their own electorate
- Future generations are not present to resort to retaliatory action
  - May be a pragmatic but not a very ethical approach
- **Acceptance of sustainable development implies that governments should acknowledge a duty to constituencies of the future**

# Intertemporal welfare

- What legacy should we leave for later generations?
- A starting point for thinking about intergenerational equity is provided by philosopher John Rawls in his monumental work: *A Theory of Justice*
- Whereas Utilitarianism is concerned with the maximization of the overall good irrespective of who gains or loses, the Rawlesian theory of Justice “*denies the losses of freedom for some is made right by a greater good shared by others*” (Rawls 1972)
- Utilitarianism
  - The “good”: utility (human welfare)
  - The “right”: maximize the good
  - What maximizes aggregate utility is (also) just

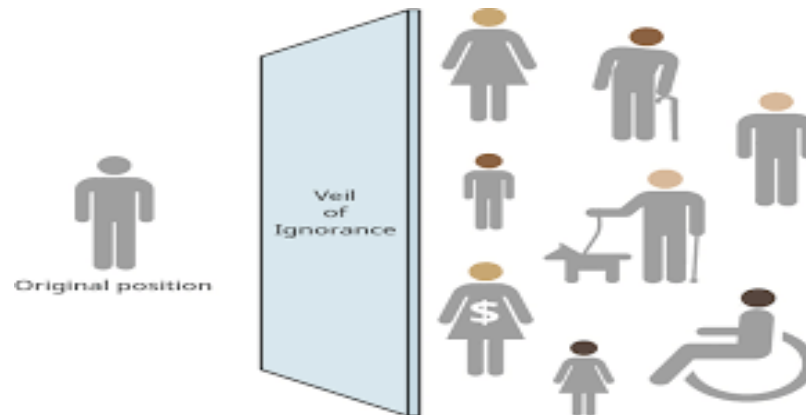
As Nobel prize winner Amartya Sen Describes “maximising the sum of individual utilities is supremely unconcerned with interpersonal distribution of that sum”.

# Intertemporal welfare

- Rawls believes that no one should be advantaged or disadvantaged by social circumstances
  - one particular important and enduring inequality in the inequality in life chances
- Rawls describes that the appropriate basic structure of society should be determined by what *free and rational persons* concerned to further their own interests would accept in an initial position of equality
  - *Connects the theory of justice with the theory of rational choice*
- The aim of this original position is to make it impossible for individuals to tailor principles of justice according to their particular circumstances e.g. whether they are rich or poor

# Intertemporal welfare

- **Rawls Veil of Ignorance – do this thought experiment for yourselves**
- “A rational man would not accept a basic structure merely because it maximised the algebraic sum of advantages irrespective of the permanent effects on his own basic rights and liberties” (Rawls 1972)



# Intertemporal welfare

- Rawls theory of justice seeks to **nullify the accident of natural endowments**
- Imagine a hypothetical meeting of all members of present and future generations under a “veil of ignorance”
- What type of rule might emerge from such a meeting?
- Would an efficient allocation be fair?

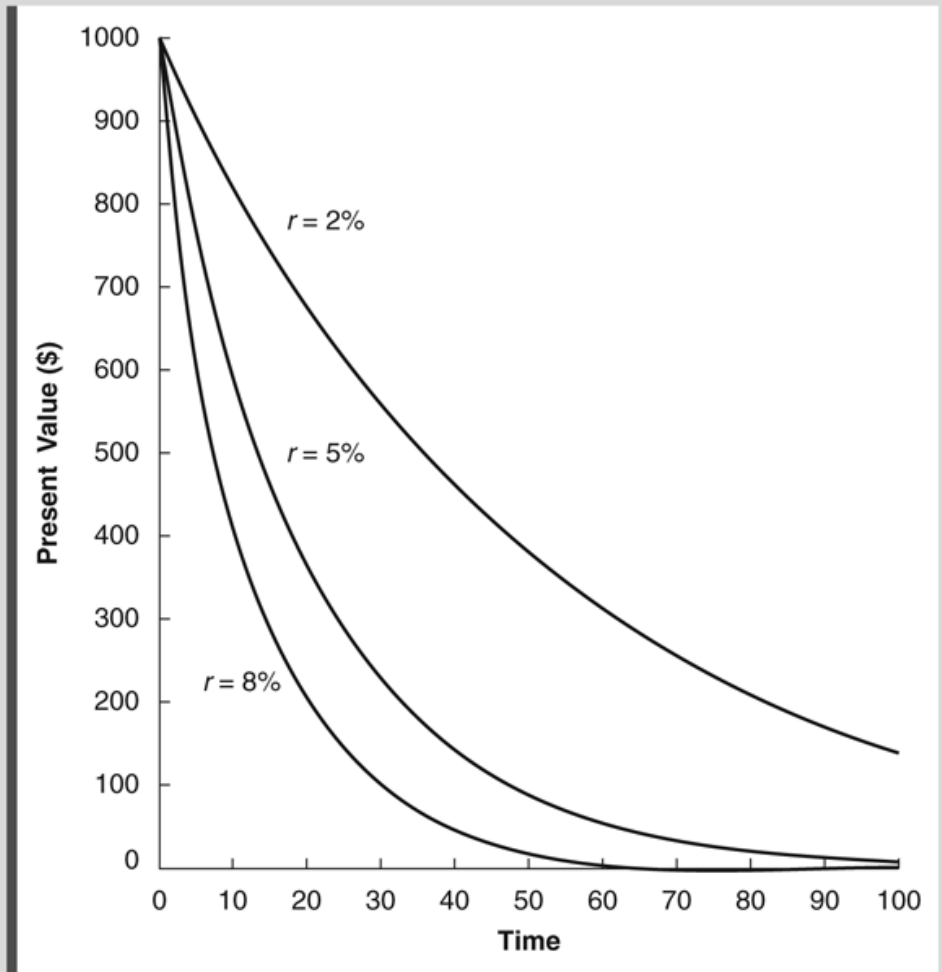
# Dynamic efficiency and fairness

- Do we take into account the needs of future generations?
- With a discount rate greater than zero, an economically efficient allocation will allocate more of a resource to the first period than the second. Net benefits will be greater in the first period than the second.
- There can be a disparity between sustainable development which is what governments and people say they favour and discounting which is what governments and people actually do, in assigning future benefits and costs
- **Applying a strict commercial discounting principle, ecological destruction could be seen as quite 'rational' and even 'optimal'**

# The Effect of Time on \$1,000 in Future Value.

**FIGURE 14.2** The Effect of Time on \$1,000 in Future Value.

This figure shows the effect of time on \$1,000 in future value using three different interest rates. In all three cases, the value falls rapidly; it falls much more rapidly with higher interest rates. Values in the very distant future are worth little in present-value terms.



# Sustainable development

World Commission on Environment and Development Definition: **Sustainable development is a process by which current generations can “meet their needs without compromising the ability of future generations to meet their needs.”**

<https://www.youtube.com/watch?v=0cWTLj6h3zA>

## Other definitions

- Improvements in the quality of human life within the carrying capacity of supporting ecosystems (World Wildlife Fund)
- Economic growth that provides fairness and opportunity for all the world's people, not just the privileged few, without further destroying the world's finite natural resources and carrying capacity.



# Weak versus strong sustainability

- **The key choice is whether one believes that natural capital should be afforded special protection or that it can be substituted by other forms of capital, especially produced capital**

## Weak sustainability

- Hartwick (1977) derived the intuitive rule that the rents from non-renewable resource depletion should be re-invested in produced capital
- ➔ Weak” sustainability, suggests that sustainability is based on the aggregate stock of man-made and natural capital, i.e. that there is a certain amount of substitutability between man-made and natural capital.

# Weak versus strong development

- Current generation has been given an endowment which consists of environmental and natural resources (natural capital) and physical capital (such as buildings, schools, roads etc.)
- Under weak sustainability, sustainable use of this endowment implies that we should ensure that the value of the total capital stock is maintained not depleted.
- Some degradation or loss of natural capital is acceptable if it is compensated for by accumulation of physical capital
  - may allow for instance the cutting down of forests to expand agriculture or industry as long as the value generated in new human made capital was greater than the value lost
- Some resources / ecosystem capabilities may deteriorate if the value extracted is reinvested in substitutable capabilities

# Weak sustainability

- The principle of weak sustainability is closer to standard economic theory
- A private owner presumably would not be willing to exchange a higher value resource for a lower valued one. Government intervention may be required, however, to meet even weak sustainability when:
  - Private owners fail to consider the full ecological value of natural capital (presence of externalities)
  - Property rights in natural resources are not properly defined leading to rapid plundering of holders with short term concessions or illegal users
  - Common property resources

# Strong sustainability

- **Can we trust that a world with much more human made capital but a severely depleted resource base will meet the needs of the future?**
- Strong sustainability is the idea that there are certain functions that the environment performs that cannot be duplicated by humans.
- Advocates of strong sustainability argue that natural systems should be maintained intact wherever possible. In this view, for example, maintaining soil's natural fertility is essential – even if it is possible to compensate for degraded soils with extra fertiliser
- **Critical natural capital**
- The global environmental and ecological system that provides us with the basic functions of food, water, breathable air and a stable climate are almost certainly impossible to substitute
- Precautionary principle

## The Alaska Permanent Fund

One interesting example of an intergenerational sharing mechanism currently exists in the State of Alaska. Extraction from Alaska's oil fields generates significant income, but it also depreciates one of the state's main environmental assets. To protect the interests of future generations as the Alaskan pipeline construction neared completion in 1976, Alaska voters approved a constitutional amendment that authorized the establishment of a dedicated fund: the Alaska Permanent Fund. This fund was designed to capture a portion of the rents received from the sale of the state's oil to share with future generations. The amendment requires:

*At least 25 percent of all mineral lease rentals, royalties, royalty sales proceeds, federal mineral revenue-sharing payments and bonuses received by the state be placed in a permanent fund, the principal of which may only be used for income-producing investments.*

The principal of this fund cannot be used to cover current expenses without a majority vote of Alaskans.

The fund is fully invested in capital markets and diversified among various asset classes. It generates income from interest on bonds, stock dividends, real estate rents, and capital gains from the sale of assets.<sup>7</sup> To date, the legislature has used some of these annual earnings to provide dividends to every eligible Alaska resident, while using the rest to increase the size of the principal, thereby assuring that it is not eroded by inflation. The 2010 dividend was \$1,281.

Although this fund does preserve some of the revenue for future generations, two characteristics are worth noting. First, the principal could be used for current expenditures if a majority of current voters agreed. To date, that has not happened, but it has been discussed. Second, only 25 percent of the oil revenue is placed in the fund; assuming that revenue reflects scarcity rent, full sustainability would require dedicating 100 percent of it to the fund. Because the current generation not only gets its share of the income from the permanent fund, but also receives 75 percent of the proceeds from current oil sales, this sharing arrangement falls short of that prescribed by the Hartwick Rule.

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Source: The Alaska Permanent Fund Web site: <http://www.pfd.state.ak.us/>