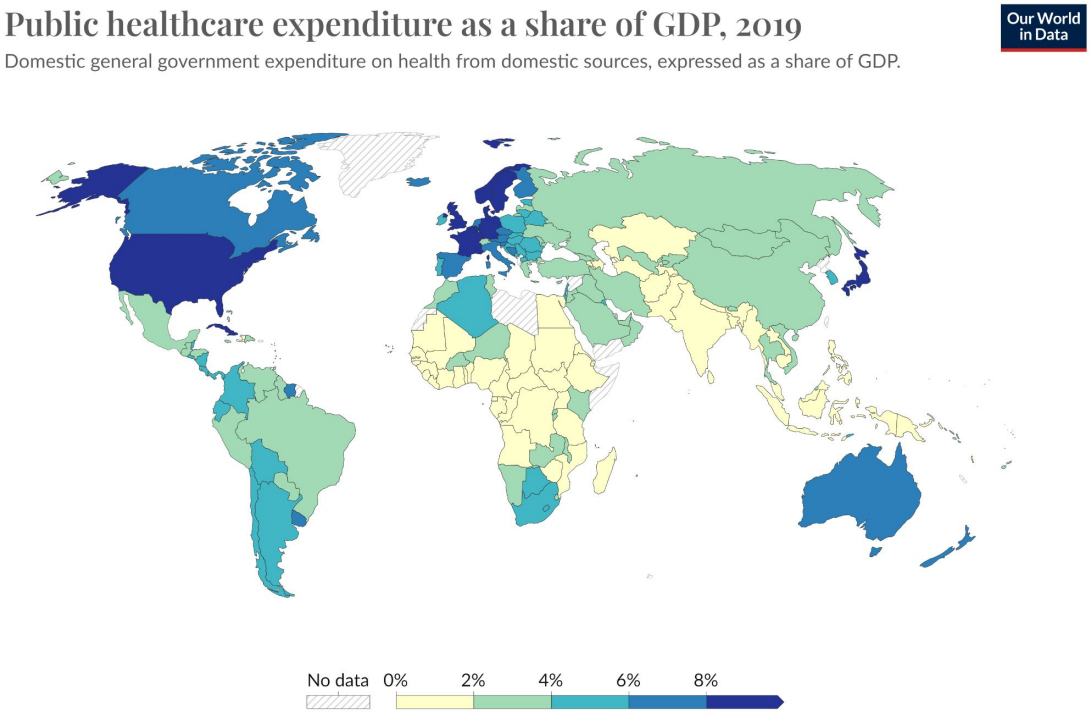
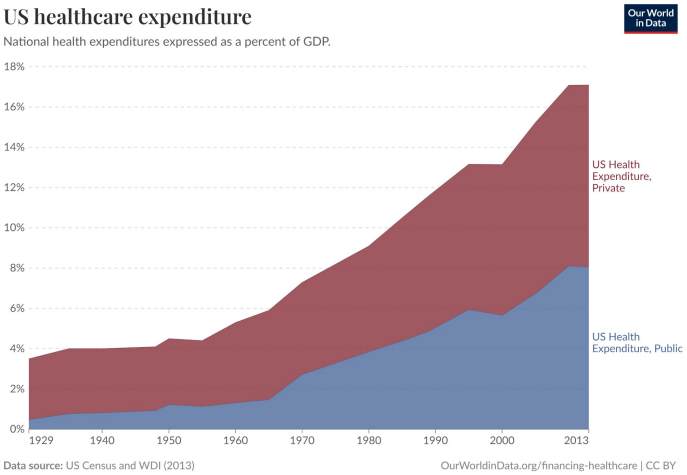
Choice of social discount rate and social appraisal of projects

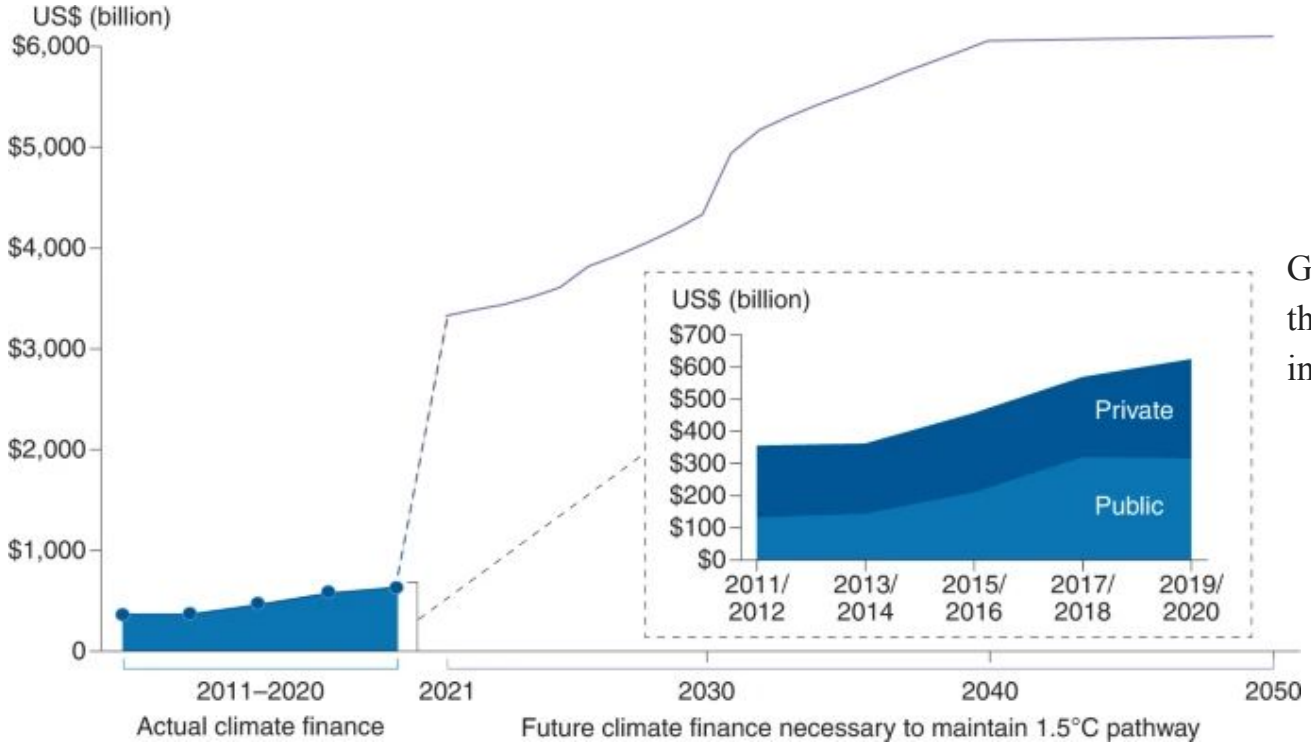
Chapter 5

Introduction



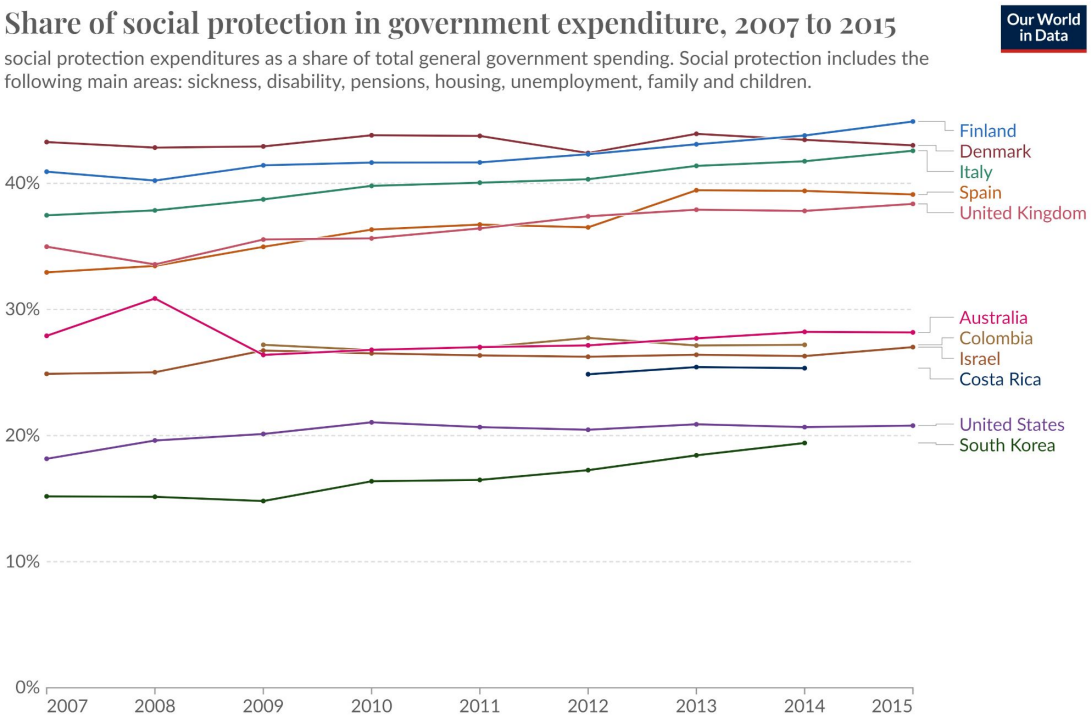


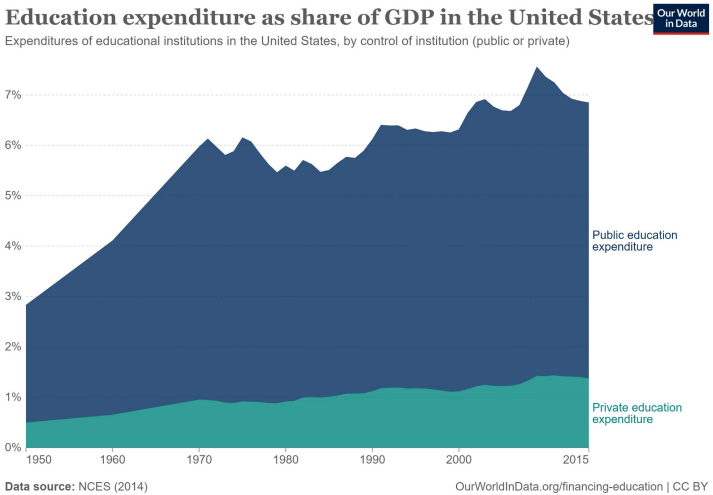
Introduction



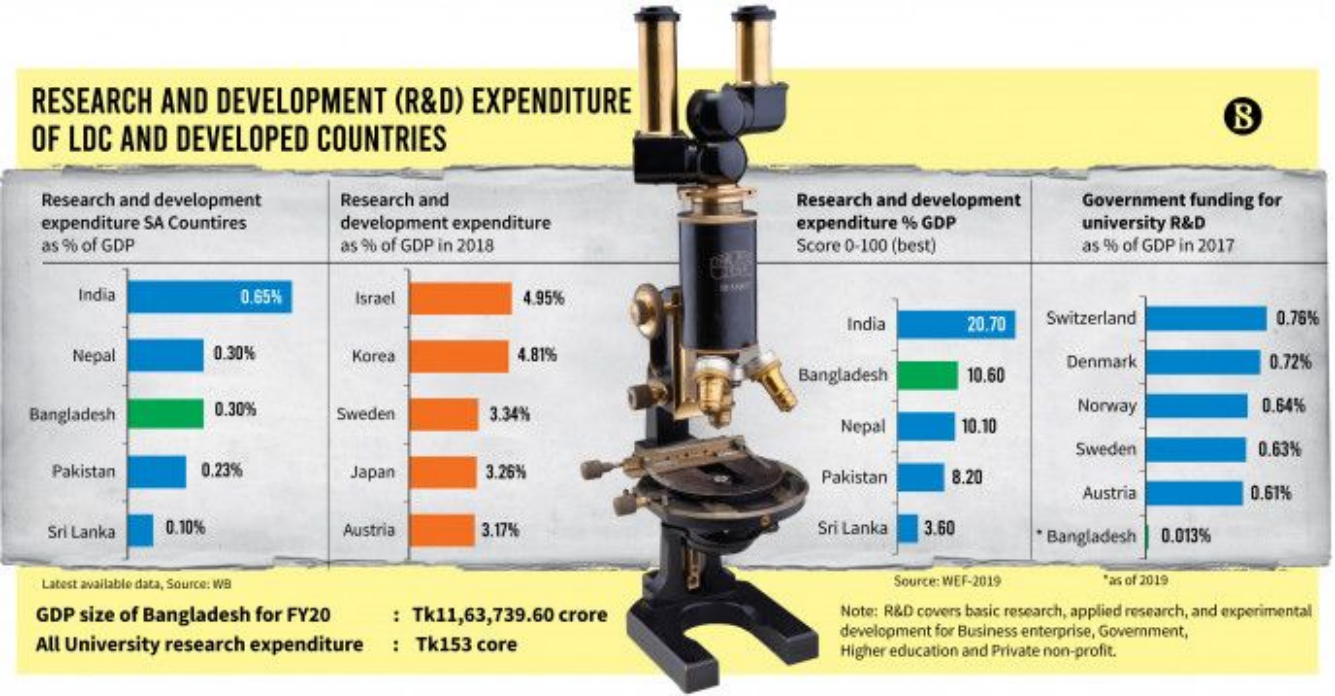
Global tracked climate finance flows and the average estimated annual climate investment need through 2050.

Introduction



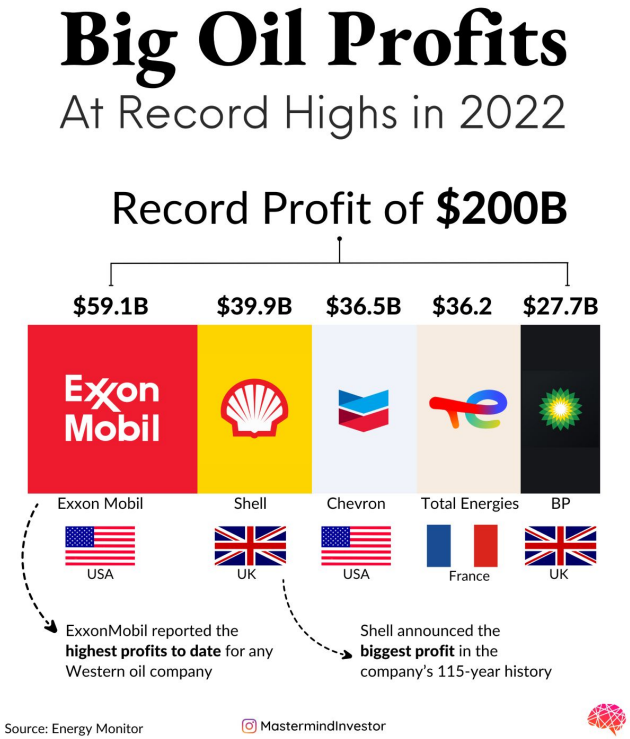


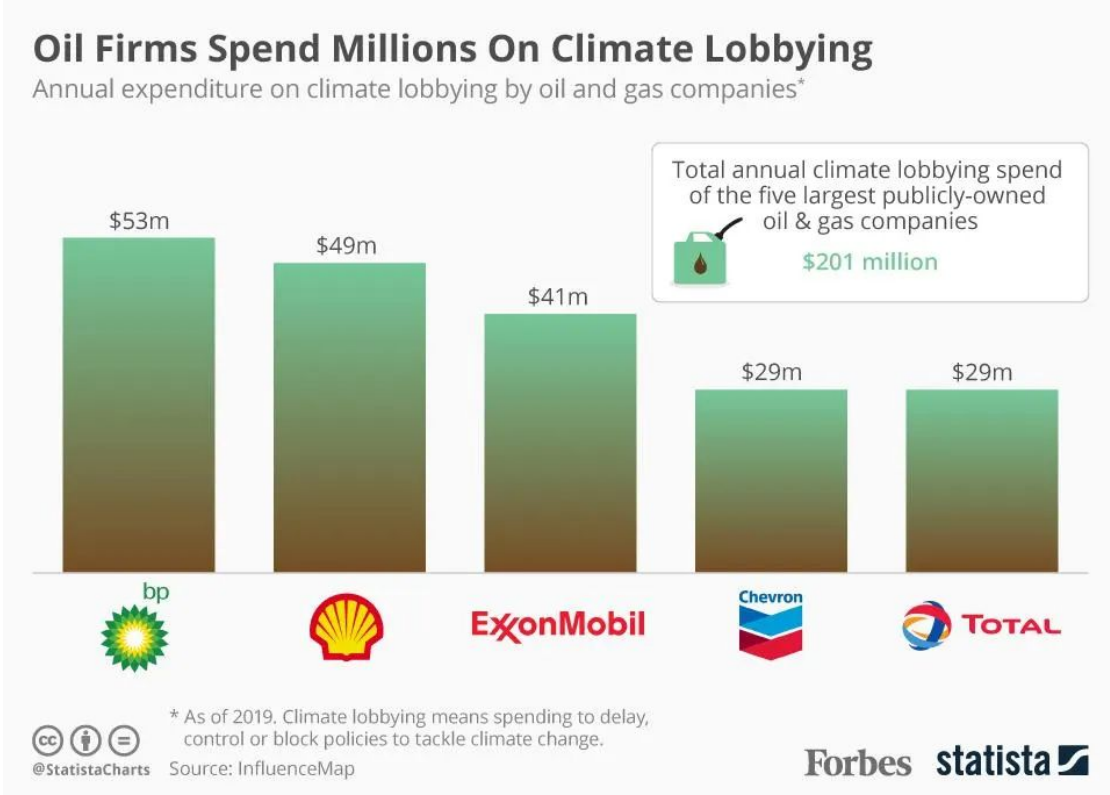
Introduction



In Bangladesh, each public university, on average, spent 1.14% of their total budgets on research while the ratio stood at 2.96% in the case of private universities.

Introduction





Introduction

Does a private project consider future generations?

Are private investments sufficient for a sector's development?

Are private projects too expensive?

Does the market rate of interest reflect society's current preference?

Are resources worth spending on a particular project?

Is it worth spending public funds on a new highway instead of healthcare?

Is it possible to undertake a project (use resources) later even if NPV>0 currently?

Introduction: why we need social discount rate

The concept of social time preference reflects the view that the market rate of interest does not accurately reflect society's preference for present as opposed to future consumption, and that a discount rate based on a social time preference rate should be used to calculate NPVs from a public interest viewpoint. Public projects assume lower discount rate and favor long-term future benefits.

The concept of social opportunity cost is based on the notion that, because of tax-induced distortions to the pattern of resource allocation, the opportunity cost to the economy of raising public funds for government expenditures is higher than the nominal amount raised (So, the "opportunity cost"—what the economy gives up—is higher than the money the government actually gets).This suggests that a public project should have a present value of benefits sufficiently large not only to offset project costs (the NPV>0 rule), but also to offset the premium on the cost of public funds if the project is to make a net contribution to efficiency.

The fact that a project has a NPV>0 does not necessarily imply that now is the most efficient time to implement it. Because additional information about the project variables – prices, costs etc. – may accrue in the future there could be an advantage to keeping open the option of undertaking the project. **Option value represents the potential benefit that people place on retaining the ability to use a resource in the future (even if there is no current use of it), which should be considered.**

Introduction: why we need social discount rate

The main rationale for social benefit-cost analysis is the existence of market failure. Because of distortions and ill-defined property rights, the actions of private agents operating through the market will not necessarily result in an efficient allocation of resources, thereby creating a possible role for government in the scrutiny and regulation of proposed private projects and the undertaking of public projects.

If the needs of future generations are not adequately taken into account in the operation of private capital markets, too few investment projects will be undertaken by the private sector. These problems could be addressed by using a social time preference rate, lower than the market rate, as the discount rate in social benefit-cost analysis.

The effect of using a discount rate that is lower than the market rate of interest will be to both increase the number of potential public sector projects having a positive NPV and, to favour those that are more capital intensive and generate higher rates of saving and re-investible funds.

Social discount rate: fallacies of private market

In private market, while discounting future benefits and costs, interest rates are determined by the interplay of demand for, and supply of, investible funds. The demand for investible funds is determined by the opportunities for investment which exist in the economy.

The supply of investible funds is determined by individual preferences for present as opposed to future consumption. **The market rate of interest is used by individuals to discount values of future consumption goods for comparison with current consumption values in making choices.** From the viewpoint of individual consumers the market or consumption rate of interest needs to be positive for **two reasons: consumer time preference and economic growth**.

Consumer time preference refers to the fact that individuals discount future utility in making choices, thereby placing less weight on it than on utility enjoyed in the present. Discounting of utility may simply be an expression of tastes, but it may also reflect the fact that the future is uncertain.

The second reason for discounting future consumption is the expectation of being wealthier in the future because of **economic growth**. If wealth is expected to be higher in the future, the marginal utility obtained in the future from spending a dollar will be less than the marginal utility obtained from spending it now.

Social discount rate: fallacies of private market

Individuals have two reasons for discounting future consumption in making saving and investment decisions.

One reason is that the **extra future consumption yields less than present consumption (diminishing marginal utility rule applies).** This consideration is accommodated in the present value calculation by the utility growth factor.

The other reason is that **future utility is worth less to an individual than present utility, either intrinsically because of tastes, or because of the uncertainty which attaches to it through human mortality.** This consideration is accommodated by the utility discount factor.

The sum of the utility discount factor and the utility growth factor is the consumption rate of interest.

Individuals care only for their own present and future consumption, and that for this reason it is necessary to use a shadow-rate of interest in the form of the social discount rate to calculate net present values from a social viewpoint.

Social discount rate

Individuals do take the needs of future generations into account. People regularly leave substantial bequests to their children, sums in excess of those which could be explained by the difficulty of planning to exhaust one’s wealth on the day of one’s death.

The Social Opportunity Cost of Public Funds

The **social opportunity cost of funds** is the value of what society gives up when the government raises money through taxes, borrowing, or creating money. **Public funds contributed to a project, or public funds generated by a project, need to be shadow-priced in social benefit-cost analysis to properly reflect their opportunity cost.**

Most **taxes** change the way markets work, so prices don't always show the true cost of using resources. When tax rates go up to pay for more government spending, these changes become bigger (maybe less buying or selling), and resources are used less efficiently. **Selling bonds** takes money away from private investments. Because of the way taxes work, private investments usually make more money before taxes than the investor actually gets to keep after taxes. So, selling bonds can reduce investments that are more profitable overall. **Printing money** leads to inflation which affects the efficiency of markets and results in an inefficient pattern of resource allocation in the economy.

So, the social opportunity cost measures the **total cost to society**, including lost economic activity or efficiency, not just the dollar amount raised. **If the government is rational and informed it will use each of these three sources until the cost of raising an extra dollar is the same for all three sources. In this way the total cost of collecting any given quantity of public funds is minimized.**

The Social Opportunity Cost of Public Funds

There are three main costs of raising tax revenues: collection costs, compliance costs and deadweight loss: collection costs are costs incurred by the private and public sectors in the battle over the amount of tax due; **compliance costs** are costs of tax-form-filling incurred by the private sector; and **deadweight loss is the cost of changes in economic behaviour induced by the structure of the tax system, with the consequent inefficient allocation of resources.**

While collection and compliance costs may be substantial, they do not increase significantly with an increase in tax rates. In other words, **in calculating the shadow price to apply to changes to tax flows, only the deadweight loss needs to be taken into account.**

The benefits of the public project (B) would need to be at least as large as the project opportunity cost (C), plus the deadweight loss, (D), plus any additional collection and compliance costs, to make the project worthwhile. Ignoring additional collection and compliance costs, the NPV rule for deciding to undertake the project is:

$$NPV = B - (C + D) > 0, \text{ or } B - C\left[\frac{(C + D)}{C}\right] > 0,$$

where B, C and D are present values of the benefit, opportunity cost and deadweight loss streams respectively.

The Social Opportunity Cost of Public Funds

$$NPV = B - (C + D) > 0, \text{ or } B - C\left[\frac{(C + D)}{C}\right] > 0,$$

When the opportunity cost of the project inputs is the same as its nominal cost (i.e. when there is no need to shadow-price project inputs other than public funds), the term **(C+D)/C measures the marginal cost of public funds – the extra cost to the economy per extra dollar of tax revenue raised. The marginal cost of public funds can be used to shadow price the nominal project cost, C, in the NPV calculation.** Expressing the NPV rule in the form of a benefit/cost decision-rule gives:

$$\frac{B}{(C + D)} > 1, \text{ or } \frac{B}{C} > \frac{(C + D)}{C}$$

where the shadow-price of public funds replaces unity as the cut-off benefit/cost ratio.

The Social Opportunity Cost of Public Funds

Sources of deadweight loss:

- since eventually all taxes are borne by labour the main deadweight loss stems from distortions to the incentive to work (e.g., minimum wage).
- indirect taxes distort consumers' choices among commodities (e.g., sales tax, VAT)
- the distorting effect of direct taxes on the level and pattern of investment (e.g., income tax, corporate tax).

The cost of public funds in developing economies is likely to be higher than this because of the additional difficulties associated with designing and running an efficient tax system in these countries.

Weighting net benefits to account for income distribution

If there is a choice where two projects have the same net present value but one results in a more equitable distribution of net benefits, then the latter will generally be preferred.

Suppose that we are required to advise on the best choice of projects taking into consideration the government's commitment to the twin objectives of economic efficiency and improving income distribution. In this Table 1 we have before us three possible projects, A, B and C, of which only one can be undertaken. Project B can be rejected purely on economic efficiency grounds – its aggregate net referent group benefits (measured at efficiency prices) is less than that of both A and B, and the distribution of benefits among the rich and poor is less egalitarian than that of either A or C. So, the question is whether to choose A or C. As long as there is a commitment to select projects in conformity with the objective of improving income distribution, Project C will be preferred. Aggregate net referent group benefits are the same, but the distribution of benefits is more favourable towards the poor in the case of Project C.

	Referent Group Net Benefits ($NPV)		
Project	Rich	Poor	Total
A	60	40	100
B	50	30	80
C	20	80	100

Weighting net benefits to account for income distribution

Here the choice is much less straightforward. Project D would be preferred on purely economic efficiency grounds, whereas Project E might be preferred on purely distribution grounds. As long as there is a commitment to the objectives of economic efficiency and income distribution, a conflict arises. Choose D and we sacrifice distribution; choose E and we sacrifice efficiency. This choice is a classic example of what economists call a trade-off.

	Referent Group Net Benefits ($NPV)		
Project	Rich	Poor	Total
D	60	40	100
E	40	50	90

Weighting net benefits to account for income distribution

At this stage the analyst needs further information to make the relative importance of these objectives explicit in the project selection process. This information takes the form of a particular “weight” or “factor” which can be applied to the additional income that accrues to the poor beneficiary. Let us assume for the moment that we weight each additional dollar of net benefit received by the poor by three times as much as each additional dollar of benefit received by the rich. For example, let us assign a weight of 1.0 to the net benefits accruing to the rich, and a weight of 3.0 to the net benefits accruing to the poor. We can now make an explicit decision on the choice between the two projects as shown in Table 3.

Clearly, Project E is favoured, as the total value of its net benefits, adjusted according to the weights described above, exceeds that of Project D.

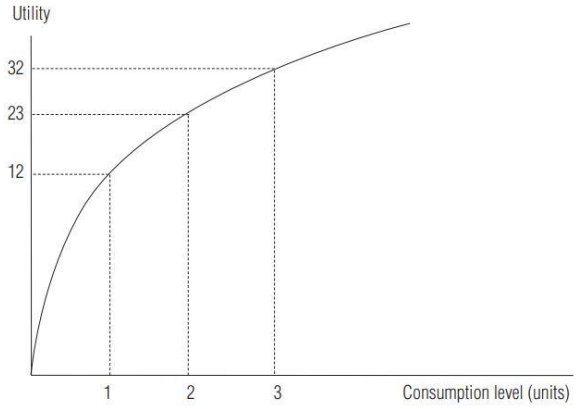
	Referent Group Net Benefits ($NPV)			Weighted (Social) Benefits ($)		
Project	Rich	Poor	Total	Rich	Poor	Total
D	60	40	100	(60x1.0)+(40x3.0) = 180		
E	40	50	90	(40x1.0)+(50x3.0) = 190		

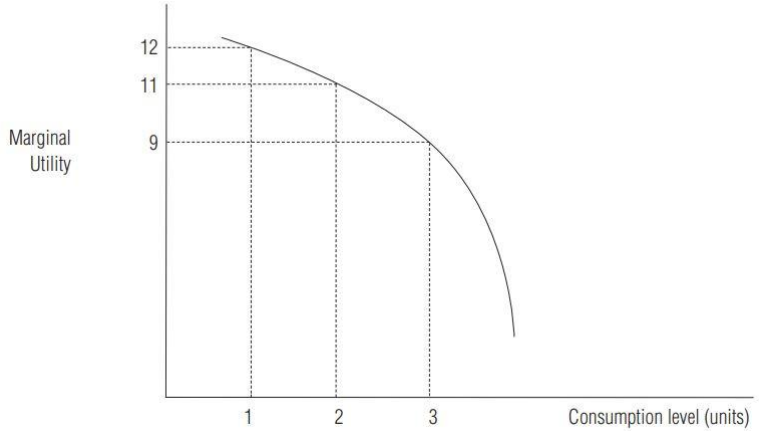
Weighting net benefits to account for income distribution

- in order to make a choice between projects taking into account both the economic efficiency objective and the income distribution objective, we could attach explicit weights to the net benefits accruing to the different categories of project beneficiaries;
- the difference between the weights attached to the net benefits to the rich and the poor would vary according to how much importance the policy-makers gave to the equality of income distribution objective. The greater their commitment to this objective, the greater the difference between the weights.
- If the government decided not to attach different distributional weights to the net benefits accruing to different groups, projects would be selected purely on the basis of their aggregate referent group net benefits.

The Derivation of Distributional Weights

The approach to this problem most commonly proposed is based on the concept of diminishing marginal utility of consumption. This assumption simply means that the more one has of a particular good, or of consumption in general, the less utility or satisfaction one gets from consuming an additional unit. As one's consumption increases, so the total satisfaction one derives also increases, but the amount by which satisfaction increases, as a result of each extra unit of consumption, gradually declines. This can be represented graphically as in Figure 1. Figure 2 shows that the higher the level of consumption of the good, the lower the marginal utility of extra consumption.





The Derivation of Distributional Weights

It is from the concept of diminishing marginal utility that distribution weights are rationalised and derived, the idea being that the weight attached to additional consumption by an individual should be based on the marginal utility that she receives at her particular level of income, relative to some base level, and given that marginal utility declines as income and consumption increase, **the higher the level of income and consumption, the lower is the distributional weight**.

Approaches to distributional weights and social cost-benefit analysis:

- **Harberger**
- **Sandmo**
- **Drèze**
- **Squire and van der Tak**

Harberger approach

Developed by Arnold Harberger, this approach emphasizes the use of market-based valuations to assess the marginal social costs and benefits of a project.

The efficiency-based approach to the social discount rate, which dates back at least to Harberger (1969), boils down to determining the opportunity cost of capital used in the project: what benefits to society would the funds have returned if left in the private sector. This 'opportunity cost' is the appropriate discount rate to determine a project's capital value. The discount rate for capital investments should be the economic opportunity cost of funds obtained from the capital market. **This rate is a weighted average of the marginal productivity of capital in the private sector and the rate of time preference for consumption.**

For projects in which capital expenditures are incurred at the beginning of the project while benefits are spread over the life of the project applying one discount rate for the streams of costs and another for the streams of benefits can be tricky and empirically difficult for each project. The informational requirements are very demanding for converting all the streams of costs into consumption equivalents in a consistent manner. The problem becomes more complicated when the stream of costs and benefits occur simultaneously and are spread over all years. **Using a weighted average of the economic rate of return on alternative sources of funds, the discount rate based on the opportunity cost of forgone investment and consumption can avoid the complicated adjustments.**

Harberger approach

Identification of Costs and Benefits:

- Identify all relevant costs and benefits associated with the project. This includes direct costs (e.g., construction, operation, maintenance) and indirect costs (e.g., environmental impact, social disruption).
- Similarly, identify direct benefits (e.g., increased production, improved services) and indirect benefits (e.g., health improvements, environmental gains).

Valuation Using Market Prices:

- Use market prices to value the identified costs and benefits. This involves adjusting prices for taxes, subsidies, and other distortions to reflect true economic values.
- In cases where market prices are unavailable or inappropriate, alternative valuation methods such as contingent valuation or hedonic pricing may be used.

Discounting Future Values:

- Discount future costs and benefits to their present values using an appropriate discount rate. The choice of discount rate is crucial as it reflects the time preference for money and the opportunity cost of capital.
- A higher discount rate reduces the present value of future benefits and costs, while a lower rate increases them.

Calculation of Net Present Value (NPV):

- Sum the discounted benefits and subtract the discounted costs to obtain the NPV of the project. A positive NPV indicates that the project's benefits outweigh its costs, while a negative NPV suggests the opposite.

Harberger approach

The government is considering building a road that connects two towns. Here's the data:

Project Costs:

- Construction: $5 million (paid to local contractors)
- Maintenance over 10 years: $1 million (discounted to present value)

Project Benefits:

- Reduced travel time (valued at $3.5 million)
- Lower vehicle operating costs: $1.5 million
- Increased economic activity: $2.5 million

Harberger approach

Let’s assume:

- The market prices for construction labor are **overstated by 20%**, so we adjust construction costs down by 20%.
- All other values are assumed to be close to economic prices.

So, **Adjusted Construction Cost** = $5M × 0.80 = **$4 million**

Total Adjusted Costs = $4 million (construction) + $1 million (maintenance) = **$5 million**

All benefits are considered at their **economic values**, no weighting:

Total Benefits =

- $3.5 million (travel time)
- $1.5 million (vehicle costs)
- $2.5 million (economic activity)
  = **$7.5 million**
- Net Benefit $2.5 million
- Benefit-Cost Ratio 1.5

Conclusion
According to the Harberger approach:
The project yields net social benefits of $2.5 million.
With a B/C ratio > 1, it is economically efficient and should be undertaken.
No concern is given to who benefits, only that the project increases total economic welfare.

Sandmo approach

Introduced by Agnar Sandmo, incorporates the consideration of distributional effects and welfare weights to better reflect social welfare implications. This approach emphasizes the importance of accounting for how different groups within society are affected by a project, recognizing that the impact on income distribution and social equity is crucial in evaluating public projects.

The concept of the MCF (marginal cost of funds) has in principle two different uses, although the two are related. On the one hand one may look upon the MCF as a convenient conceptual tool for thinking about the overall balance between the private and public sectors. The MCF will differ according to the marginal source of finance, and the choice of this source is in the large majority of cases the responsibility of the central government, not the individual agencies. If the marginal source of funds varies over time, differing from one government budget to another and possibly also within budget periods, it is not obvious that much is gained by asking individual agencies to employ the MCF in their calculations. One pragmatic solution to this problem is perhaps to settle on a value of the MCF which is a rough average of the MCFs for the different sources of funds, assuming also that the weights in the average will be approximately constant over time. However, **the MCF must necessarily be sensitive to the design of the tax system; indeed, one of the purposes of a major tax reform is frequently stated to be a reduction of the marginal cost of public funds.**

Sandmo and Drèze (1971) expand the formula to an open economy context by incorporating the international borrowing rate, with weights being estimated from the interest derivatives of the domestic and foreign supplies of funds.

Sandmo approach

Identification of Costs and Benefits:

- Similar to the traditional approach, identify all relevant costs and benefits associated with the project.
- Categorize these costs and benefits according to the affected groups or segments of society.

Application of Welfare Weights:

- Determine welfare weights for different groups. This can be based on income levels, social priorities, or policy objectives.
- Apply these weights to the costs and benefits to reflect their relative importance in terms of social welfare.

Adjustment of Valuations:

- Adjust the valuations of costs and benefits by multiplying them by their respective welfare weights.
- This step ensures that the analysis captures the social value of impacts rather than just their economic value.

Calculation of Adjusted Net Present Value (NPV):

- Discount future adjusted costs and benefits to their present values using an appropriate discount rate.
- Sum the discounted adjusted benefits and subtract the discounted adjusted costs to obtain the adjusted NPV.
- A positive adjusted NPV indicates that the project contributes positively to social welfare, considering distributional effects.

Sandmo approach

Road Construction Project
Project Cost: $5 million (construction + maintenance)

Project Benefits:

Time savings: $3.5 million

Vehicle cost savings: $1.5 million

Economic stimulation: $2.5 million

Total Market-Valued Benefits: $7.5 million

Governments often raise funds through distortionary taxation. Sandmo incorporates a **Marginal Cost of Public Funds**, say **MCPF = 1.2**.

- This means **$1 of public spending costs society $1.20** due to inefficiencies in tax collection.

So, **Adjusted Project Cost** = $5M × 1.2 = **$6 million**

Sandmo approach

Let’s assume:
High-income beneficiaries (urban commuters) receive $3M in benefits
Low-income beneficiaries (rural communities) receive $4.5M

Now apply distributional weights based on income:
Group | Income Level | Weight | Adjusted Benefit
High-Income | $20,000 | 1.0 | $3M × 1 = $3.0M
Low-Income | $2,000 | 5.0 | $4.5M × 5 = $22.5M

Total Weighted Benefits = $25.5 million
3. Recalculate Net Benefit and BCR
Weighted Net Benefit: $25.5M – $6M = $19.5M
Weighted Benefit-Cost Ratio: 25.5 / 6 = 4.25

Conclusion (Sandmo Perspective)
Even if the efficiency gain (Harberger) is moderate, the social value of the project is much higher under Sandmo’s approach.
Why? Because:
The cost of public funds is internalized (makes costs slightly higher).
The distributional impact is recognized — poor communities gain more, and their benefits are valued more.

Drèze approach

Developed by Jacques Drèze, emphasizes the use of shadow prices and the consideration of opportunity costs in evaluating public projects. This approach is particularly useful in settings where market prices do not accurately reflect the true economic value of resources due to market imperfections, externalities, or public goods.

One **definition of the shadow price of a good: it is the effect on social welfare of a marginal increase in the supply of that good from the public sector. This definition is the natural one in case of any (small) project whether it increases welfare: this will be the case if the value at shadow prices of the change in net supplies represented by the project is positive.**

The definition also reflects two central features, of this approach. First, while working in terms of social welfare; in other words it is assumed that there is a well-defined criterion against which the planner can evaluate outcomes. Secondly, there is just one environment corresponding to each public production plan so that the planner is able to work out the consequences of any particular change in public supplies.

Relative shadow prices for traded commodities will coincide with relative world prices. This rule applies (commodity-wise) when either trade clears the market or an optimal quota can be set (in addition the amount traded does not affect producers and consumers except through the scarcity constraints). When world demand or supply curves are not perfectly elastic, one has to replace world prices by marginal costs or revenues.For a non-traded good, when an optimal ration can be imposed on producers, or the producer price can be chosen independently of the consumer price, the shadow price is equal to the marginal social cost of production plus the shadow value of extra profits generated by extra production.

Drèze approach

Identification of Costs and Benefits:

- Identify all relevant costs and benefits associated with the project, similar to traditional SCBA.
- These include direct costs (e.g., construction, operation, maintenance) and benefits (e.g., increased production, improved services), as well as indirect impacts (e.g., environmental effects, social changes).

Determination of Shadow Prices:

- Calculate shadow prices for inputs and outputs, reflecting their true economic value.
- This involves adjusting market prices to account for externalities, taxes, subsidies, and other distortions.
- Techniques such as shadow wage rates for labor, shadow exchange rates for foreign currency, and environmental shadow prices for ecological impacts are used.

Calculation of Opportunity Costs:

- Assess the opportunity cost of resources used in the project by considering what else those resources could have been used for.
- This involves evaluating alternative uses and the potential benefits they could generate.

Discounting Future Values:

- Discount future costs and benefits, valued at shadow prices, to their present values using an appropriate social discount rate.
- The social discount rate reflects the time preference for consumption and the opportunity cost of capital in the context of social welfare.

Calculation of Net Present Value (NPV):

- Sum the discounted benefits and subtract the discounted costs to obtain the NPV, using shadow prices.
- A positive NPV indicates that the project's benefits, when valued correctly, exceed its costs, suggesting it is economically viable and socially beneficial.

Squire and van der Tak Approach

Developed to improve the evaluation of public projects, particularly in developing countries. the major feature of the Squire and van der Tak methodology is that they 'take explicit account of the impact of the project on the distribution of income both between investment and consumption and between rich and poor' . This approach emphasizes adjustments for market distortions and the incorporation of social prices to better reflect true economic costs and benefits.

1. The numeraire or unit of account is fundamental in determining the weights to be attached to the growth and equity objectives. This numeraire is assumed to remain constant over time and is expressed in terms of 'border' or 'world' prices by converting into local currency using the official exchange rate.
2. Valuation and Accounting Prices: Squire and van der Tak define accounting prices as 'the value of the contribution to the country’s basic socio-economic objectives made by any marginal change in the availability of commodities or factors of production'. Therefore, the values estimated for the various economic accounting and social accounting prices are dependent upon both the objectives of the country and the economic environment in which the marginal changes occur.

Squire and van der Tak Approach

Identification of Costs and Benefits:

- Identify all relevant costs and benefits associated with the project, similar to other SCBA methods.
- This includes both direct and indirect effects on the economy and society.

Adjustment for Market Distortions:

- Adjust the identified costs and benefits for any market distortions. For example, remove the effects of taxes and subsidies to find the true economic value.
- Use social prices to replace market prices where necessary, ensuring that all values reflect their opportunity costs.

Application of Distributional Weights:

- Apply distributional weights to costs and benefits to reflect the social importance of impacts on different income groups.
- This step ensures that the analysis takes into account equity considerations and the relative welfare impacts on different segments of the population.

Squire and van der Tak Approach

Use of a Social Numeraire:

- Select an appropriate numeraire for the analysis, such as a composite good or foreign exchange, which helps in standardizing the values and facilitating comparisons.
- Ensure that the numeraire reflects the social perspective and the context of the economy being analyzed.

Discounting Future Values:

- Discount future costs and benefits to their present values using an appropriate social discount rate.
- The discount rate should reflect the time preference for social welfare and the opportunity cost of capital.

Calculation of Net Present Value (NPV):

- Sum the discounted benefits and subtract the discounted costs to obtain the NPV using social prices and adjusted values.
- A positive NPV indicates that the project is expected to generate a net benefit to society, considering both efficiency and equity.

Squire and van der Tak Approach

Road Construction Project (Base Case)
Financial Cost: $5 million

Benefits (market valued): $7.5 million

Time savings: $3.5 million

Vehicle cost savings: $1.5 million

Economic stimulation: $2.5 million

Let's make these project-specific adjustments:

- **Labor:** Market wages are higher than opportunity cost (due to underemployment). Assume 25% overvaluation.
  - Adjusted labor cost = $3 million × 0.75 = $2.25 million

- **Foreign goods (imported machinery):** Tariffs distort the price. Assume shadow exchange rate increases real cost by 10%.
  - Adjusted machinery cost = $2 million × 1.10 = $2.2 million

Total Economic Cost = $2.25M (labor) + $2.2M (machinery) = $4.45M
If we include the marginal cost of public funds (assume **MCPF = 1.1**):

- **Final Adjusted Cost = $4.45M × 1.1 = $4.9 million**

Squire and van der Tak Approach

Squire & van der Tak suggest using consumption-based weights (less sensitive than income).
Assume:

Urban, better-off group gets $3 million of benefits — weight = 1.0
Rural poor gets $4.5 million — weight = 2.5 (moderate)
Group | Benefit | Weight | Weighted Benefit
Urban | $3M | 1.0 | $3.0M
Rural Poor | $4.5M | 2.5 | $11.25M

Total Weighted Benefit = $14.25 million

Final Results (Squire & van der Tak)
Adjusted Cost: $4.9 million
Weighted Benefit: $14.25 million
Net Benefit: $9.35 million
Benefit-Cost Ratio: 14.25 / 4.9 = ~2.91

Conclusion (Squire and van der Tak Approach)
The project is highly desirable, both economically and socially.
By adjusting for real resource costs and valuing benefits to the poor more highly, it captures true development impact.
It integrates both efficiency and equity, specifically tailored to developing country realities like underemployment and distorted markets.