

VII. Introduction to Cost Benefit Analysis

A. Philosophical Basis

When there is market failure, a government program can improve the situation in principle.

But when can it improve it in practice?

If we must choose between different programs, which one should we choose?

How to Decide?

Recall **Pareto Optimality**.

We could use the principle: "Program X improves the welfare of society if it makes at least one person better off and no one worse off."

Problem: We would never adopt any programs because almost every program makes at least someone worse off.

Kaldor-Hicks Rule

Uses the idea of Pareto Optimality, but considers side payments:

The idea:

"Program X has positive net benefits if the gainers could in principle compensate the losers and still be better off."

Restated for multiple options, we get the following rule based on the Kaldor-Hicks Principle:

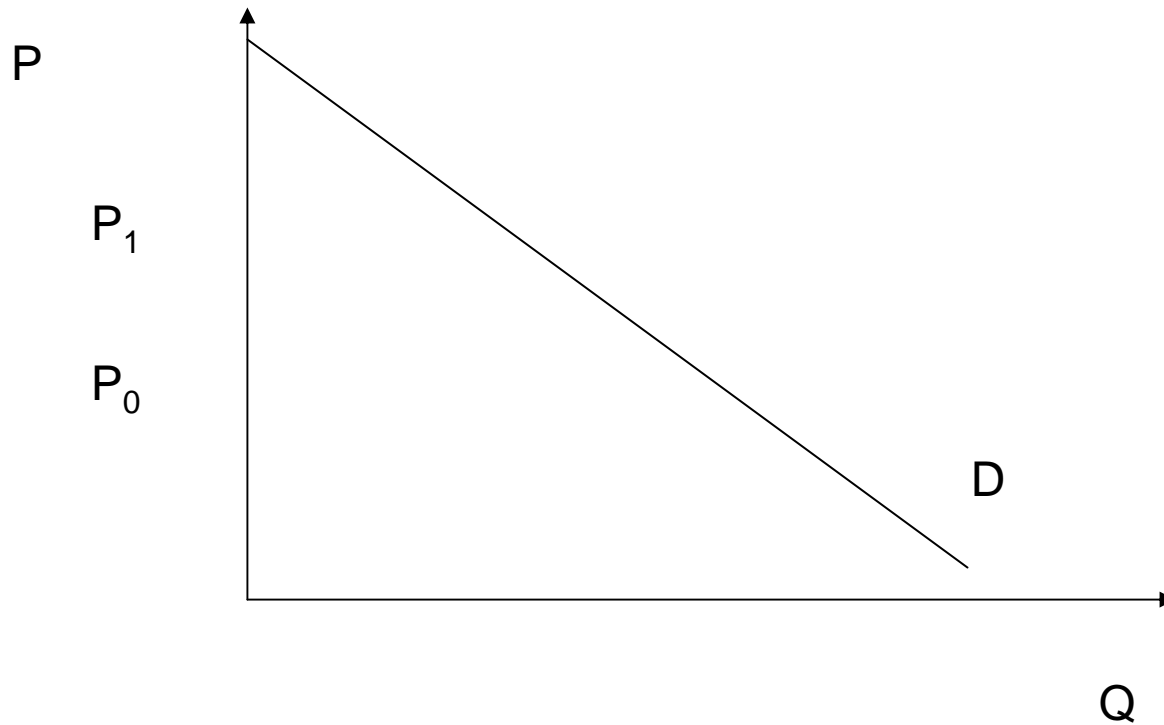
Fundamental Principle of Cost-Benefit Analysis:

"In any choice situation, select the policy that produces the greatest net benefit."

Compensation might be paid to losers, but not necessarily.

B. Valuation of Costs and Benefits

1. Changes in Consumer and Producer Surplus

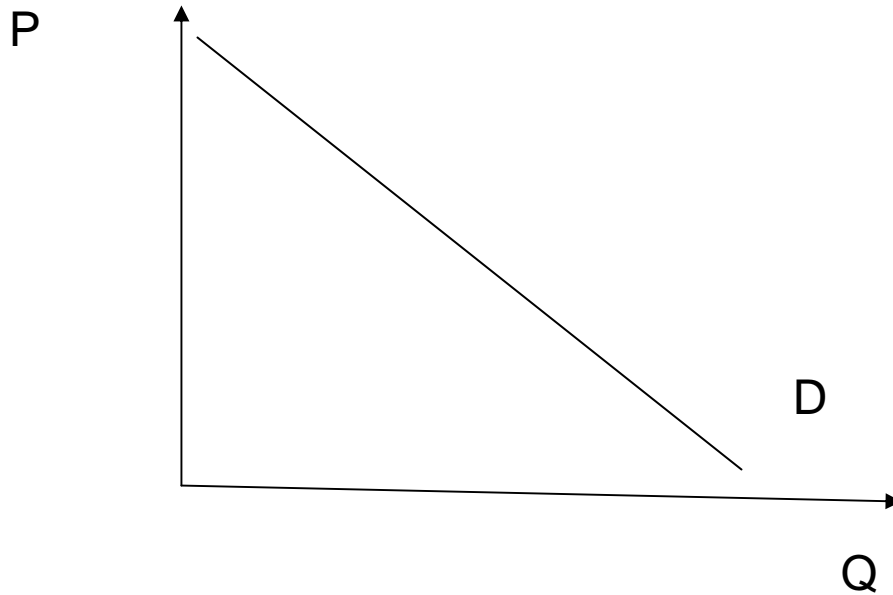


2. Implications for Taxes

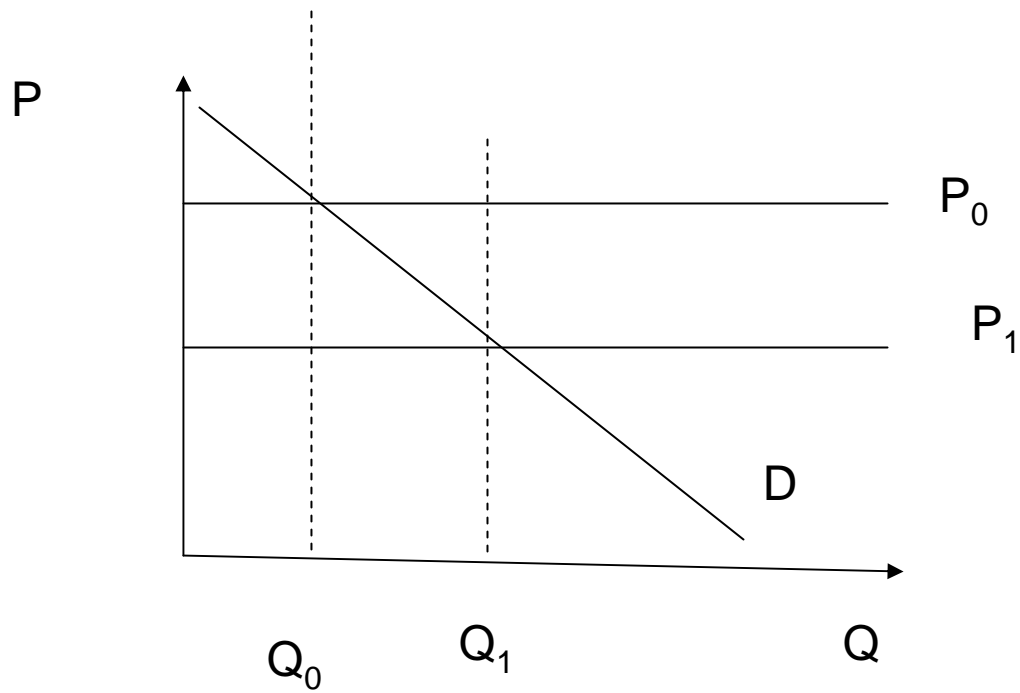
Suppose we assess a quantity tax in order to raise revenue. The Kaldor-Hicks net benefit tally is:

Inferring Project Benefits: Complications

1. The shape of the demand curve

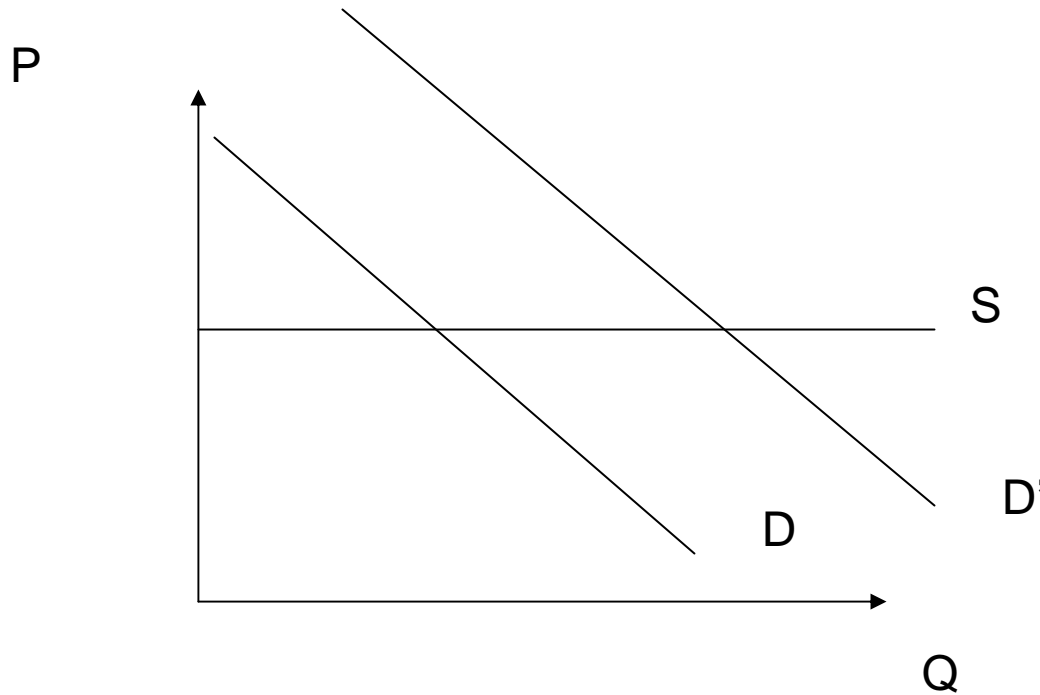


2. Externalities

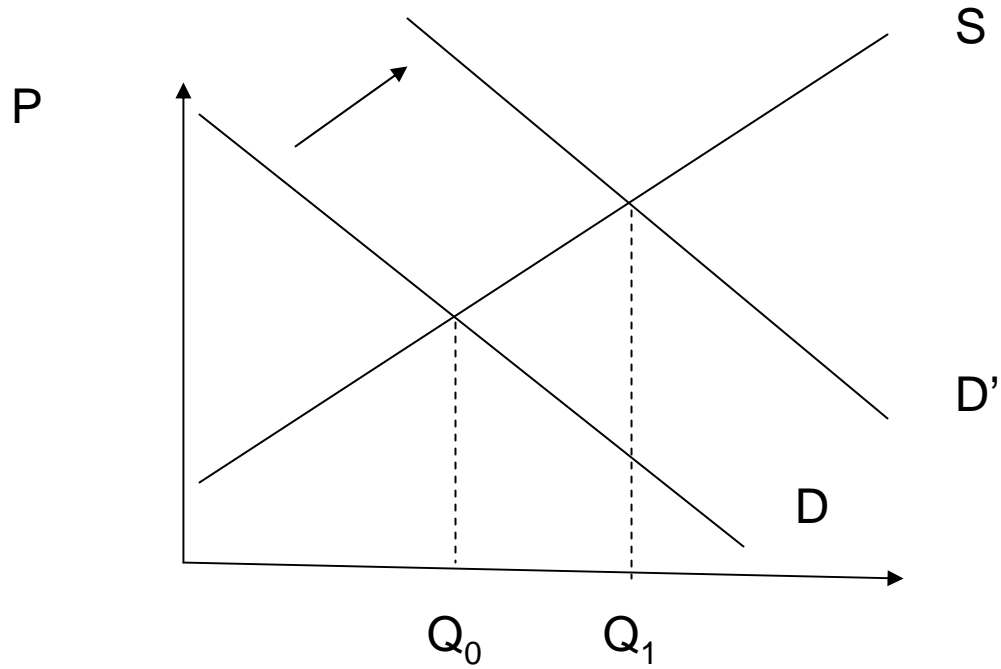


Inferring Project Costs

1. Constant MC



2. Rising MC



Costs and Benefits Realized at Different Times

- Question: How do you compare costs and benefits when they occur at different times?
- Question: How do you compare one time costs to recurrent benefits?
- Solution: Convert everything to common units, known as *present values*. We do this by *discounting*.

Mechanics of Discounting

You have \$1,000 now. If you spend it today, you can buy \$1,000 worth of stuff today. If, instead, you save it for a year and earn interest you will have more tomorrow.

Formulas

Let B_t be a benefit. Then the present value of a benefit earned t periods from now if the interest rate is r , is:

Formula for recurrent benefit or cost

Suppose benefits from a project are received for T years, starting next year.

Formula for an infinite stream of benefits or costs

Suppose a project gives off a constant stream of benefits B beginning next year and lasting forever.

Formula for a recurrent stream of constant benefits or costs

Suppose we take the example in part C, but assume that the constant stream of benefits lasts only up to year T . Using clever tricks and algebra, we find that the present value of receiving B each year for T years and starting next year is:

Restated Fundamental Principle of Cost-Benefit Analysis

In any choice situation, pick the policy that produces the greatest present discounted value of net benefits