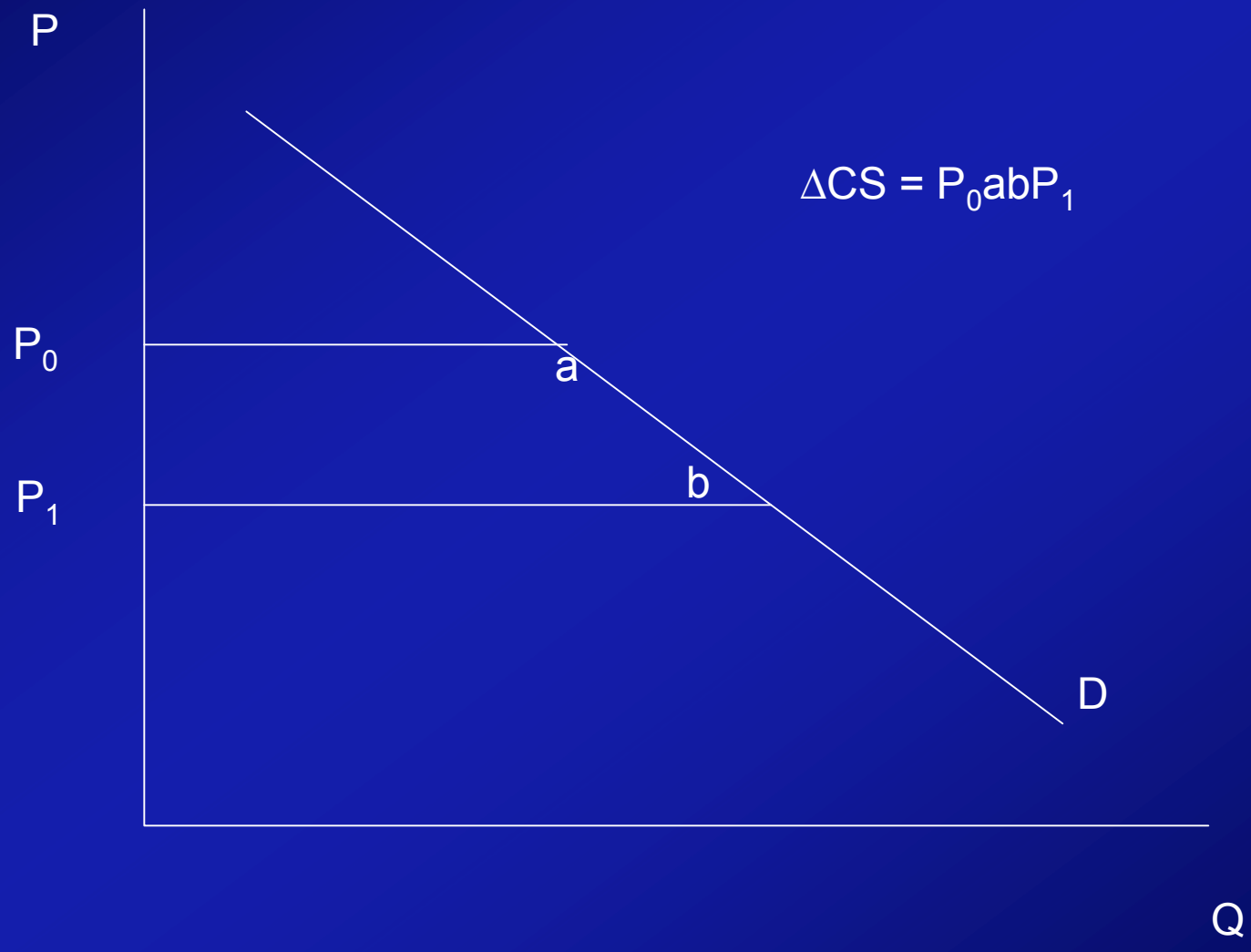
Valuation of Non-Market Goods

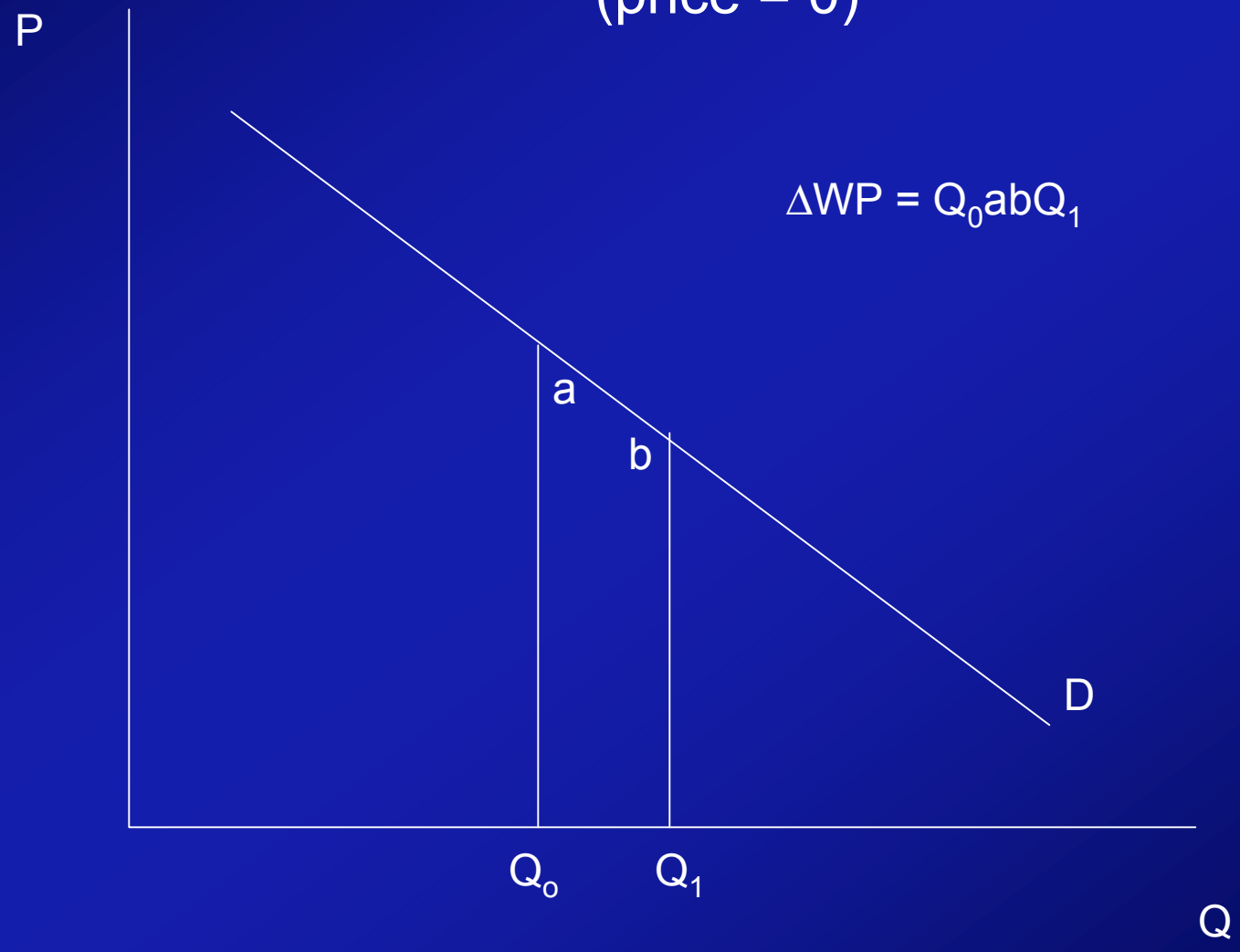
- Normally, in CBA, use CS or WTP to measure benefits

ΔCS - if market price exists



$\Delta CS = P_0abP_1$

∆ WTP - if no market exists (price = 0)



Valuation of Non-Market Goods

- What to do if a project provides a good or service for which there is no market?
  - No market price
  - No market demand curve
  - Cannot measure changes in WTP or CS

Valuation of Non-Market Goods

- A number of CBA techniques have been developed to estimate WTP for non-marketed goods and services
- "Revealed Preference Methods" Boardman et al., Chapter 13
  - See also Zerbe & Dively, Chapter 18

Valuation of Non-Market Goods

- Some techniques:
  - Markets for substitute goods (analogous goods)
  - Hedonic pricing
  - Cost savings and intermediate goods
  - Travel Cost

Substitutes

- Public sector provides a good or service that is identical to what is provided by private sector:
  - Housing
  - Medical services
  - Schools

Substitutes

- But what if the project is not providing a good or service that is not identical (not a perfect substitute) of what private market provides?
- E.g. public housing is low-cost housing in areas with lower property values.
- Use ***hedonic pricing*** technique

Hedonic Pricing

- View demand as implicit demand for a bundle of implicit characteristics that are bound together within a good or service
- Price of house = f(#BR, Sq. ft, lot size, school quality, distance to shopping areas, noise level, crime rate, …..)
- Collect information from a sample of households with different characteristics of these characteristics

Hedonic Pricing

- Regression model:

  House price = $a + b_0(\#BR) + b_1(\text{Sq. Ft}) + b_2(\text{lot size}) + \ldots$

  – Then the estimated coefficients represent the "marginal value of the individual characteristics in the prices of the house.

  – ∂ House price / ∂ #BR = b_0

Hedonic Pricing

- With this information can estimate the value of houses with particular characteristics, in particular locations.
- Projects may also change some of the individual characteristics, and the estimated coefficients can be used to value project outputs
- Estimate the amount that reducing noise level in neighborhood around airport will increase home values in the neighborhood.

Intermediate goods (inputs)

- Theoretically, can use derived demand curve (market demand for the input) to measure changes in WTP, CS
- Often there is not an existing market for the input
  - If the project is providing the input for the first time

Intermediate Goods

- Estimate:

  Income with project – Income without project
- Example – impact of irrigation project
  - Estimate farmers' income with irrigation water with income without irrigation
    - Higher yields, changed cropping patterns
    - Before/after comparisons
    - Returns from farmers in existing irrigated regions
    - In both cases, problem of attributing measured differences to ***only*** the availability of irrigation water

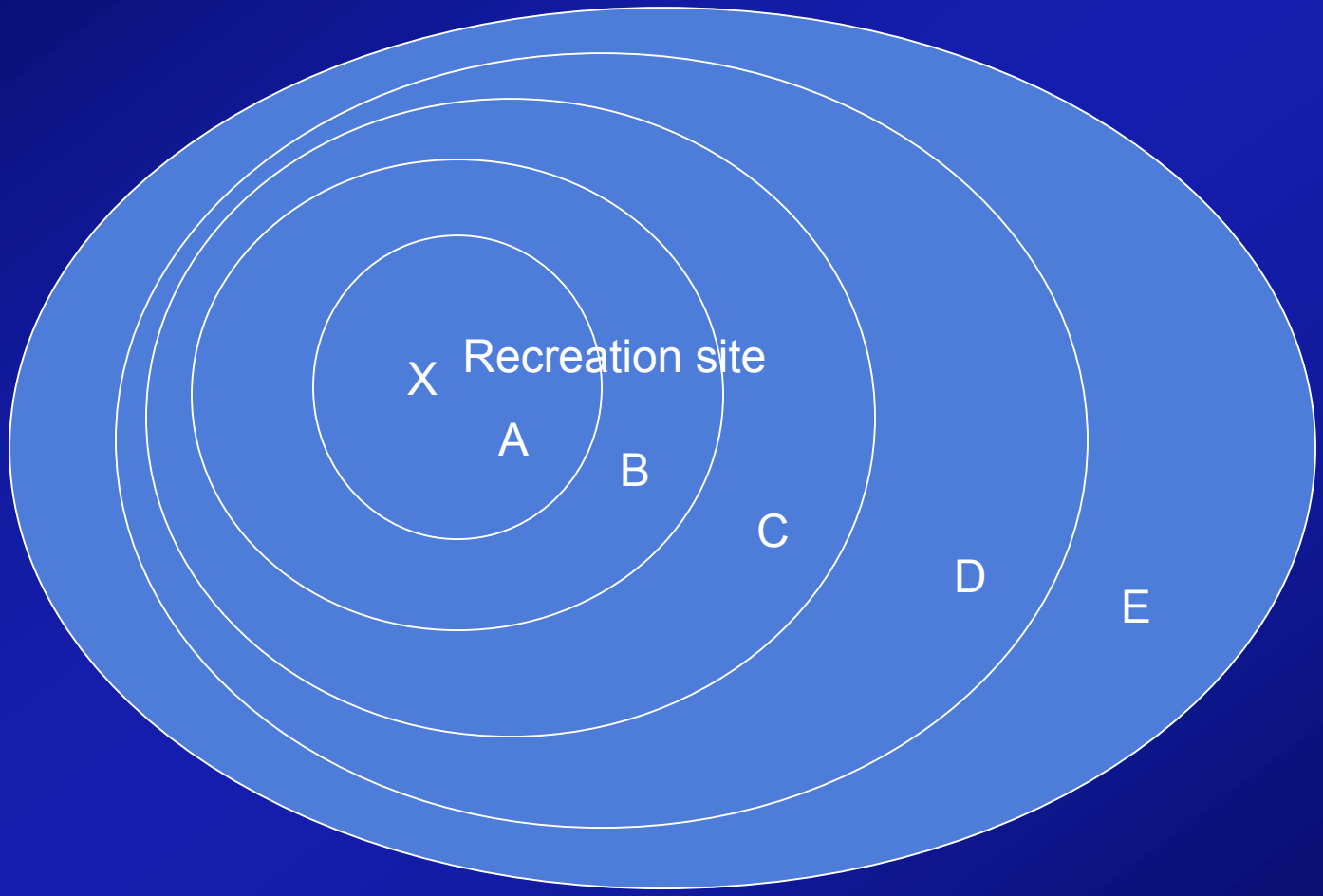
Intermediate Goods

- In this simple example, assume constant marginal product of water.
  - Do not measure the incremental profit from each additional unit of water available
  - Reasonable assumption for small projects, possible less reasonable for large projects

Travel Cost

- Often used to measure the value of recreational sites
  - Users must travel to get to site
  - This travel is part of the “price” of using the site
  - Different users have different travel costs, and so pay different “prices”
  - Assume all consumers (users) have same preferences,
  - Then differences in the observed use levels (visits) can be associated with different “prices” to estimate WTP of the “representative” consumer

Travel Cost



Travel Cost

Zone	Popula-tion	Travel cost / person	# visits / person	CS / person	CS / zone (‘000)	# trips / zone (’000)
A	10,000	20	15	525	5,250	150
B	10,000	30	13	390	3,900	130
C	20,000	65	6	75	1,500	120
D	10,000	80	3	15	150	30
E	10,000	90	1	0	0	10
Total	60,000				10,800	440

Travel Cost

- From this information can derive market “demand” curve
- *Spreadsheet*

Travel Cost

- At price of 95, demand is zero
- Now suppose a user fee of $10 is implemented
- Costs in all zones increase by 10:
  - 13 visits/person zone A
  - 11 visits/person zone B
  - 4 visits/person zone C
  - 1 visit/person zone D
  - 0 visits/person zone E

Travel Cost

Zone	Popula-tion	Travel cost / person	# visits / person	CS / person	CS / zone (‘000)	# trips / zone (’000)
A	10,000	20	15	525	5,250	150
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C	20,000	65	6	75	1,500	120
D	10,000	80	3	15	150	30
E	10,000	90	1	0	0	10
Total	60,000				10,800	440

Travel Cost

With Use Charge of $10/person

Zone	Popula-tion	Travel cost / person	# visits / person	CS / person	CS / zone (‘000)	# trips / zone (’000)
A	10,000	30	13	390	3,900	130
B	10,000	40	11	275	2,750	110
C	20,000	75	4	30	600	80
D	10,000	90	1	0	0	0
E	10,000	100	0	0	0	0
Total	60,000				7,250	320

Travel Cost

- Consumer surplus without user charge:
  10,800,000
- Consumer surplus with user charge:
  7,250,000
- Change in Consumer Surplus:
  -3,550,000
- Revenues from user fee:
  320,000*$10 =
  +3,200,0000