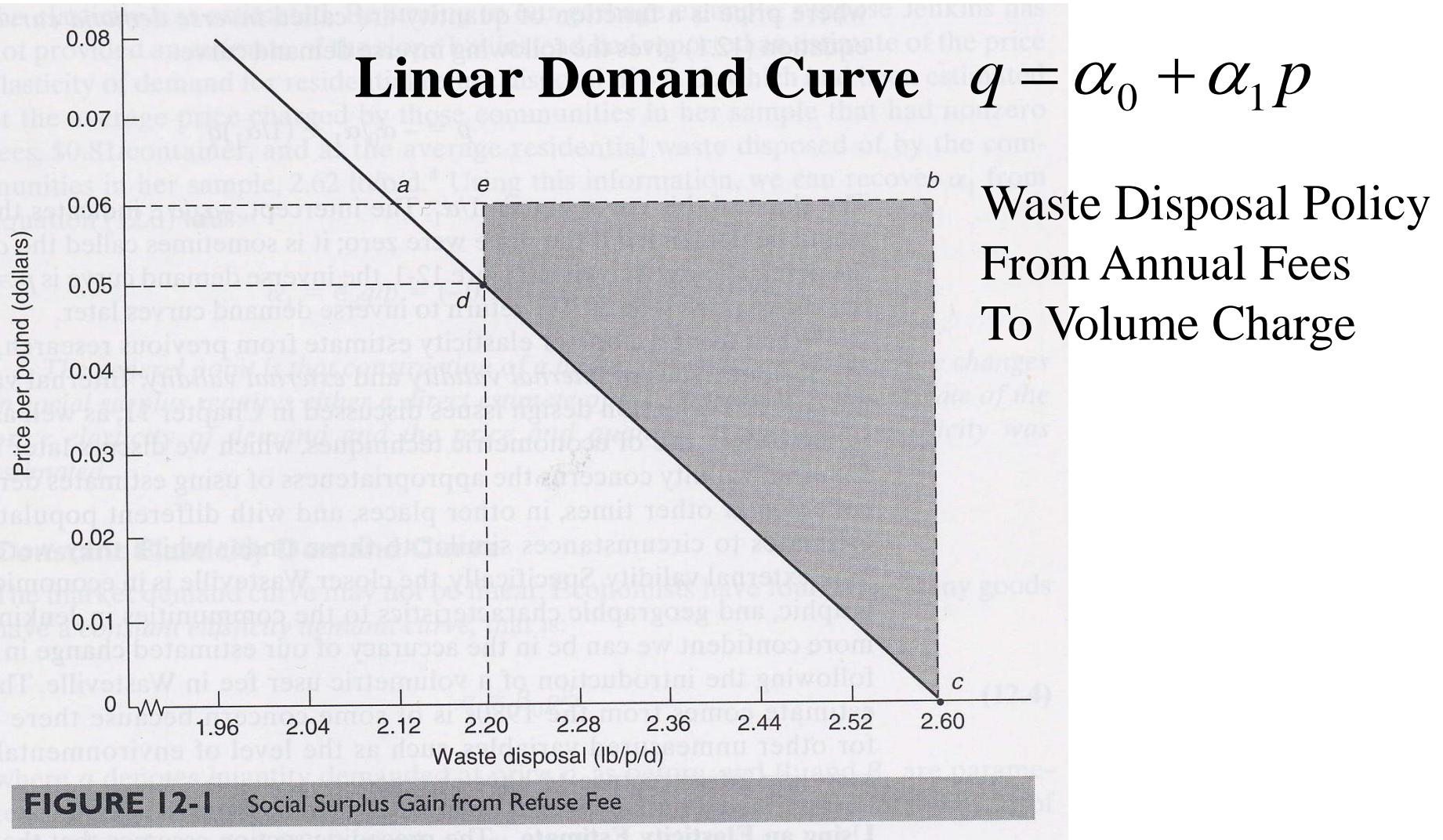
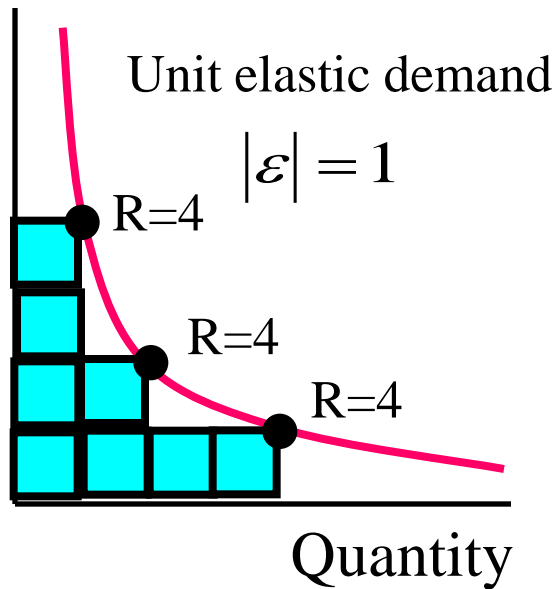


Chapter 12 Valuing Impacts from Observed Behavior: Direct Estimation of Demand Curves



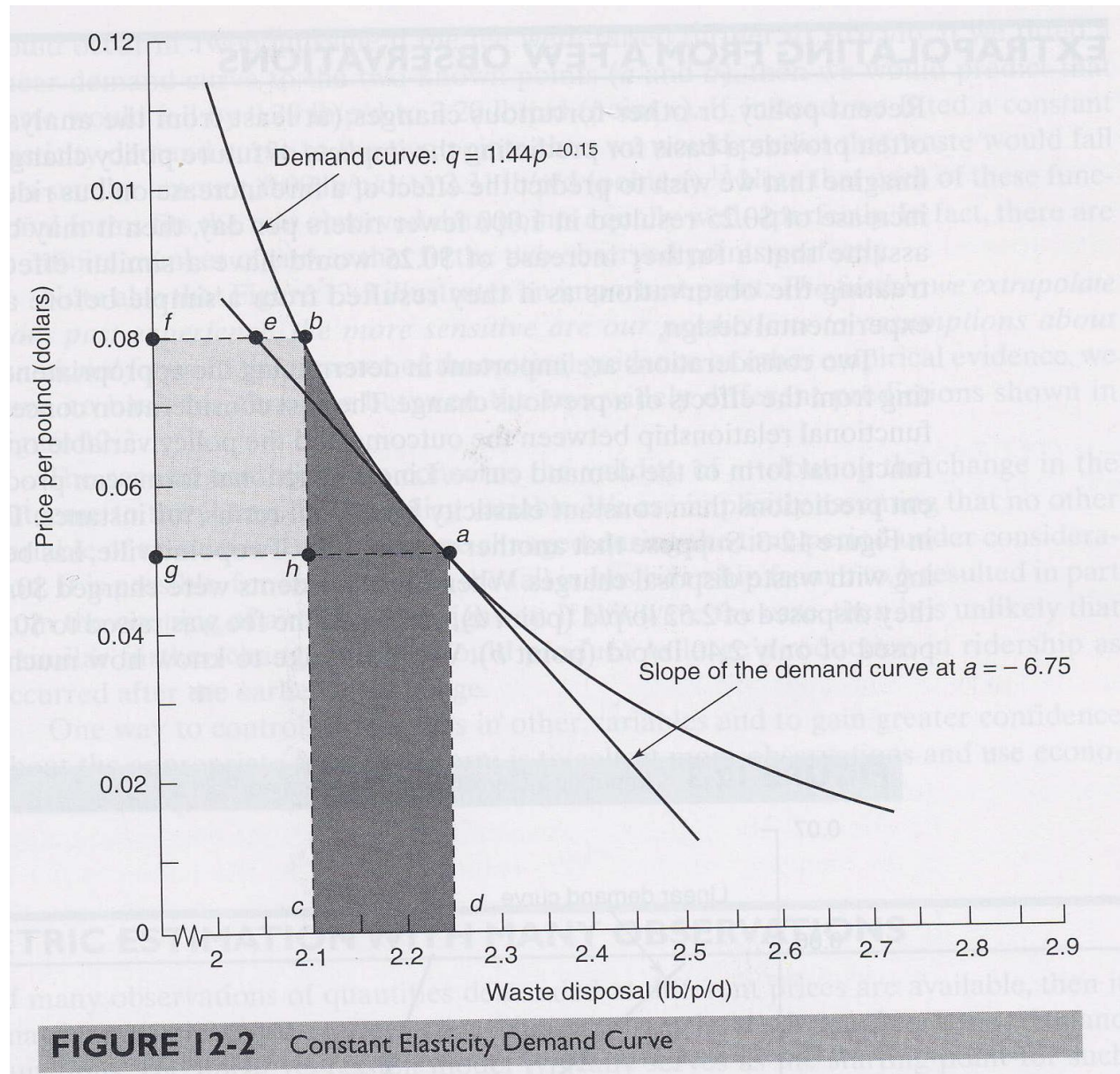
Constant Elasticity Demand Curve

Price



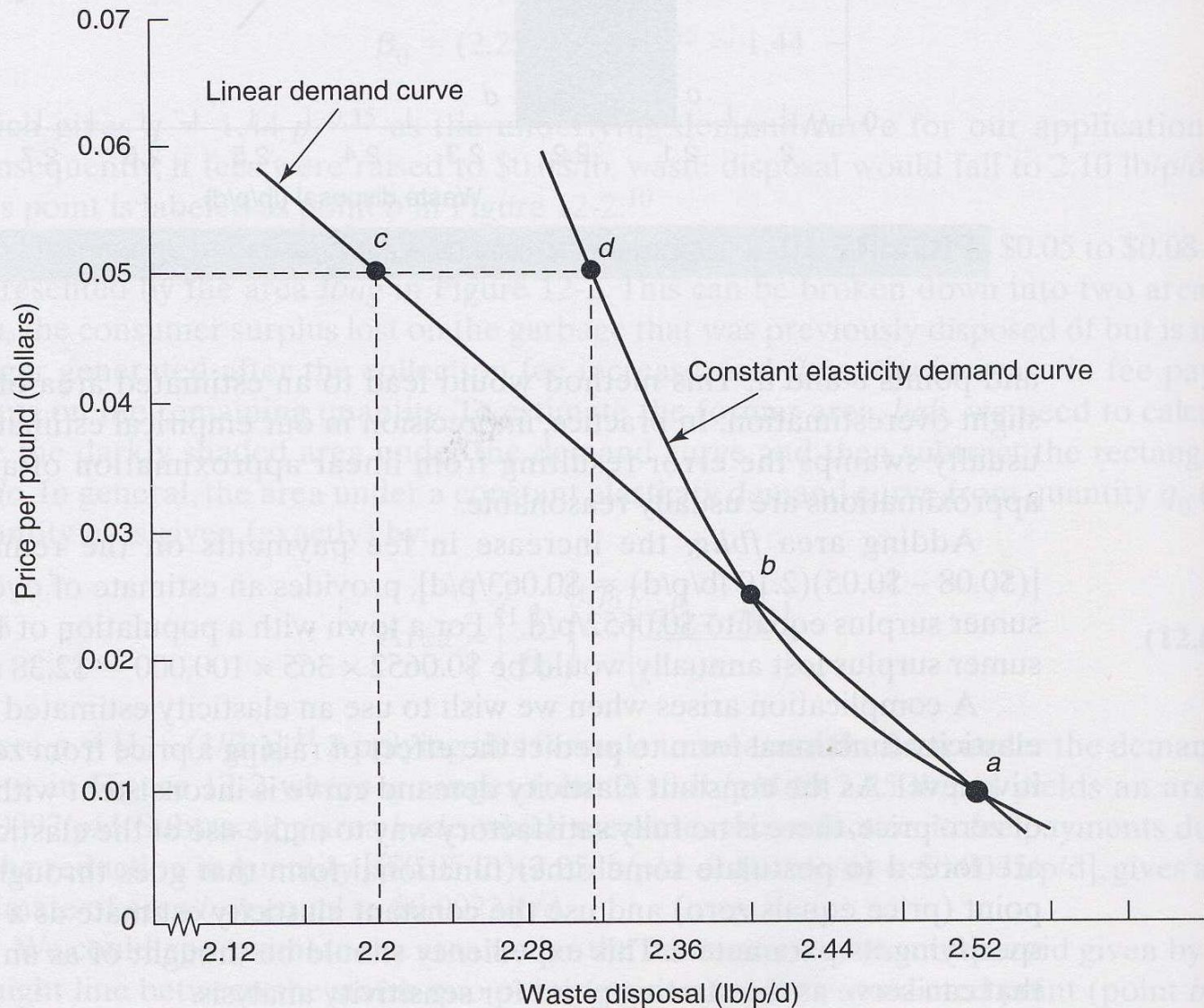
$$q = \beta_0 p^{\beta_1}$$

Useful for
sensitivity
analysis



Extrapolating from Observations

FIGURE 12-3 Imputing a Demand Curve from Two Points



Chapter 13 Valuing Impacts from Observed Behavior: Indirect Market Methods

Observed Behavior = Revealed Preference \longleftrightarrow Stated Preference

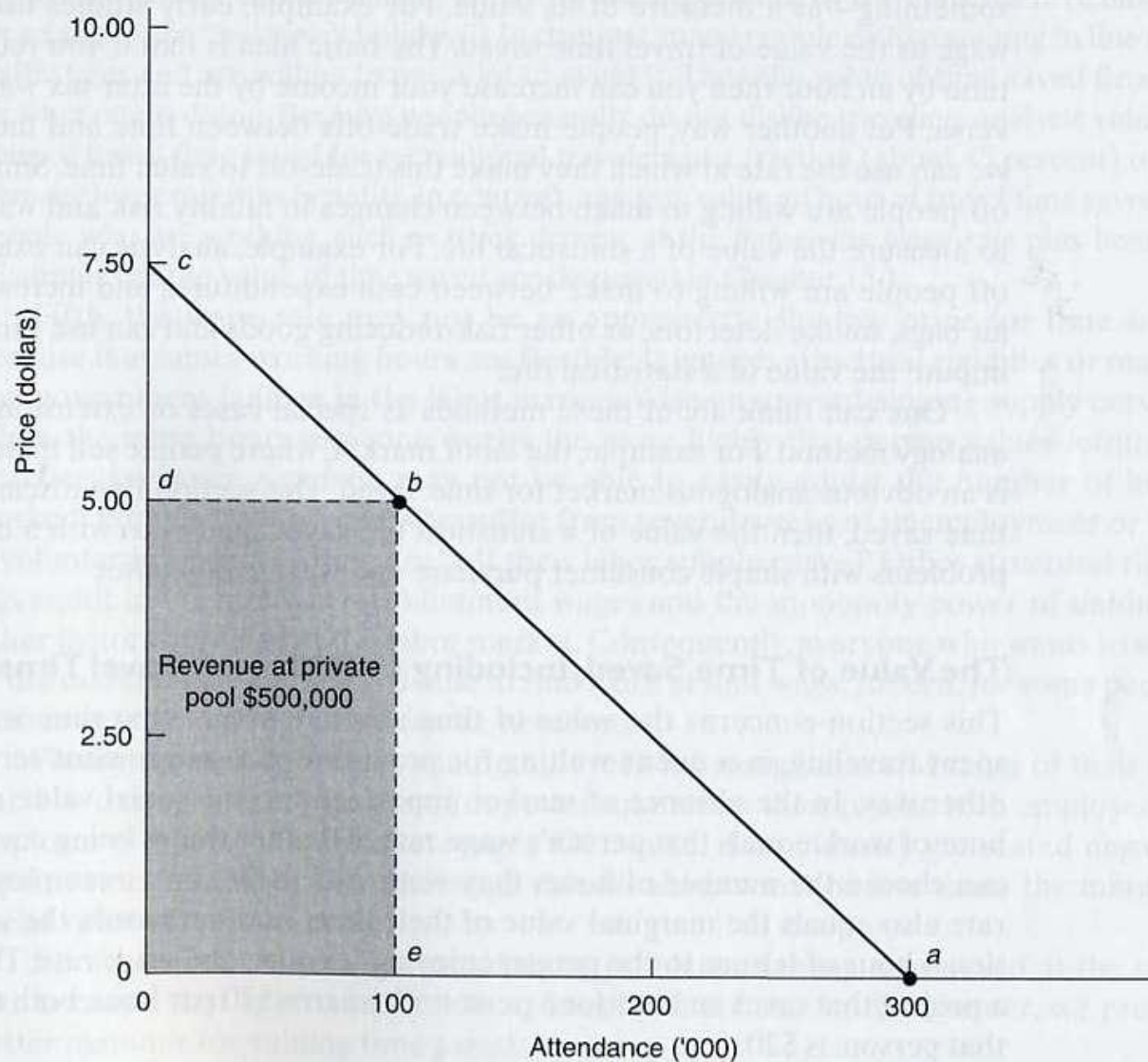
1. Market Analogy Method (Trade-off Method)
2. Intermediate Good Method
3. Asset Valuation Method
4. Hedonic Pricing Method
5. Travel Cost Method
6. Defensive Expenditure Method

Market Analogy Method

1. Using the market price of or expenditure on an Analogous Good. *“Using the market price would be an appropriate estimate of the value of the publicly provided good if it equals the average amount that users of the publicly provided good would be willing to pay”*.
2. Using information about an Analogous Private-Sector Good to estimate the demand curve for a publicly provided good.
3. The Value of Time Saved (as one of **Trade-Off Method** to use Opportunity Cost: The value of what one gives up to get something) $>$ Wage Rate, (but problems exist).
4. The Value of a Statistical Life (Forgone Earnings Method, Simple Consumer Purchase Studies, Simple Labor Market Studies)

Analogous Good

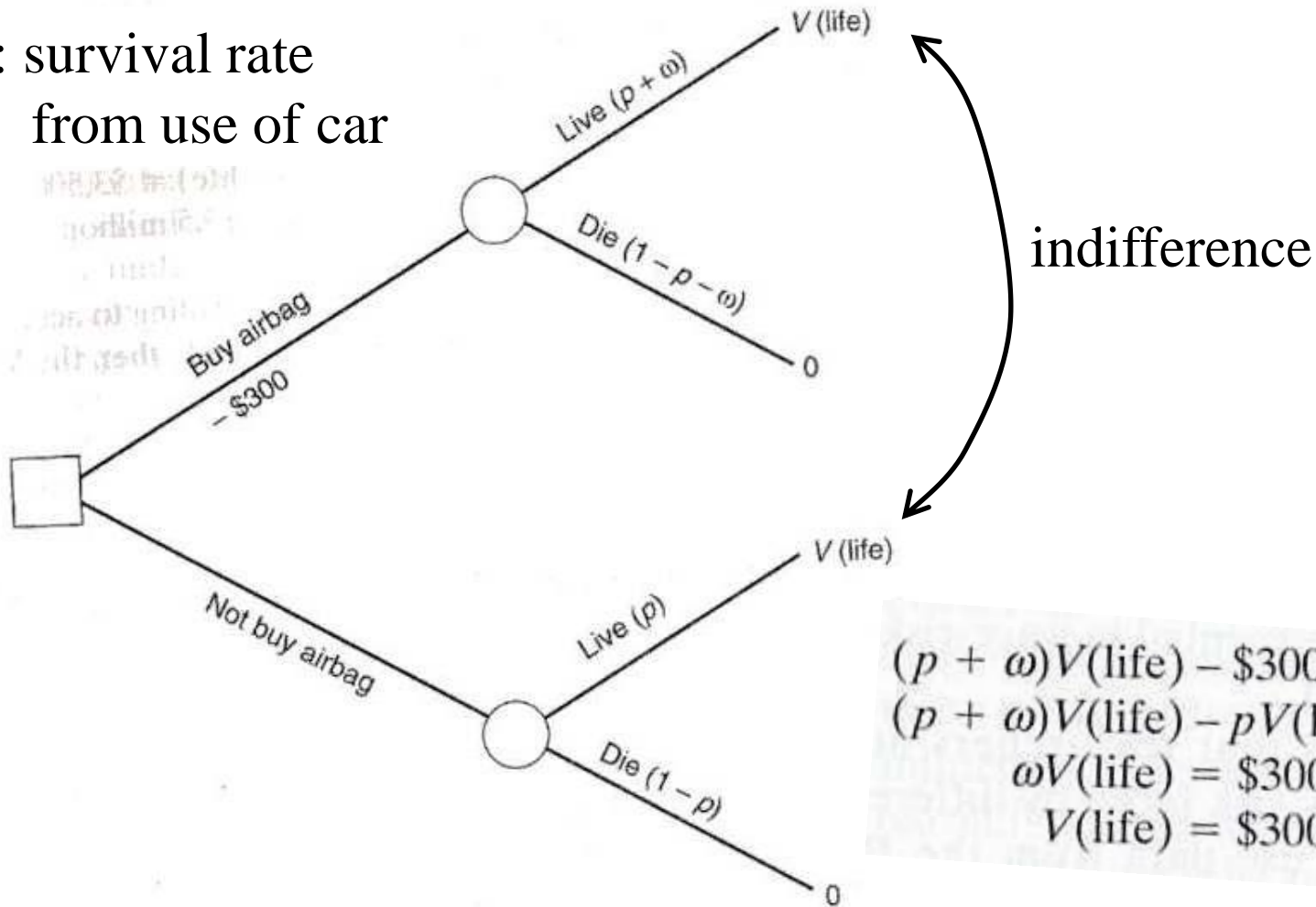
FIGURE 13-1 Demand Curve for Visits to a Municipal Swimming Pool



The Value of a Statistical Life

- Simple Consumer Purchase Studies -

p, w : survival rate
from use of car



$$\begin{aligned}
 (p + w)V(\text{life}) - \$300 &= pV(\text{life}) \\
 (p + w)V(\text{life}) - pV(\text{life}) &= \$300 \\
 wV(\text{life}) &= \$300 \\
 V(\text{life}) &= \$300/w
 \end{aligned}$$

FIGURE 13-2 Decision Tree for Airbag Purchase

The Value of a Statistical Life

- **Forgone Earnings Method**

The value of a life saved = Persons discount future earnings

Used by the courts. However, many problems exist.

e.g. It ignores individual's WTP to reduce the risk of their deaths

- **Simple Labor Market Studies**

Two indifferent supposition for job fatality risk

$(1/1,000) V(\text{life}) = \$3,500.$ Then, $V(\text{life}) = \$ 3.5 \text{ million}$

Greater chance
of fatal injury

Riskier job
offers

* People overestimate the occurrence of low-probability *bad* event: e.g. swine influenza, radiation contamination.

Intermediate Good Method

To value “education and training programs” as *human capital*.

Annual Benefit = Income (with project) – Income (without project)

Asset Valuation Method

Project affect the prices of assets (e.g. land, housing, stocks, etc). The impacts are said to be *capitalized* into the market value of the assets. Observed increase (or decrease) in asset values can be used to estimate the benefits (costs or disbenefits) of projects.

Hedonic Pricing Method

Problems with Simple Valuation Methods

1. Omitted Variable Problem
2. Self-Selection Bias

> Hedonic Pricing Method overcome these two problems.


Hedonic Pricing Method = Hedonic Regression Method

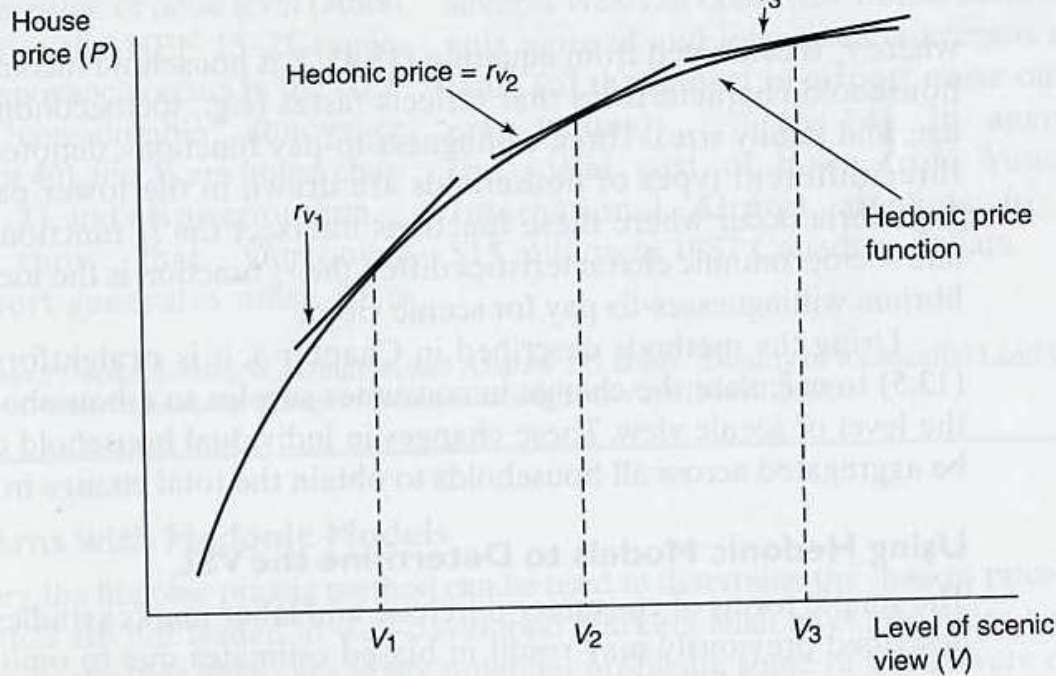
Hedonic Price Function $P = f(CBD, SIZE, VIEW, NBHD)$



(marginal) hedonic price, implicit price,
rent differential of the attribute

$$P = \beta_0 CBD^{\beta_1} SIZE^{\beta_2} VIEW^{\beta_3} NBHD^{\beta_4} e^{\varepsilon}$$

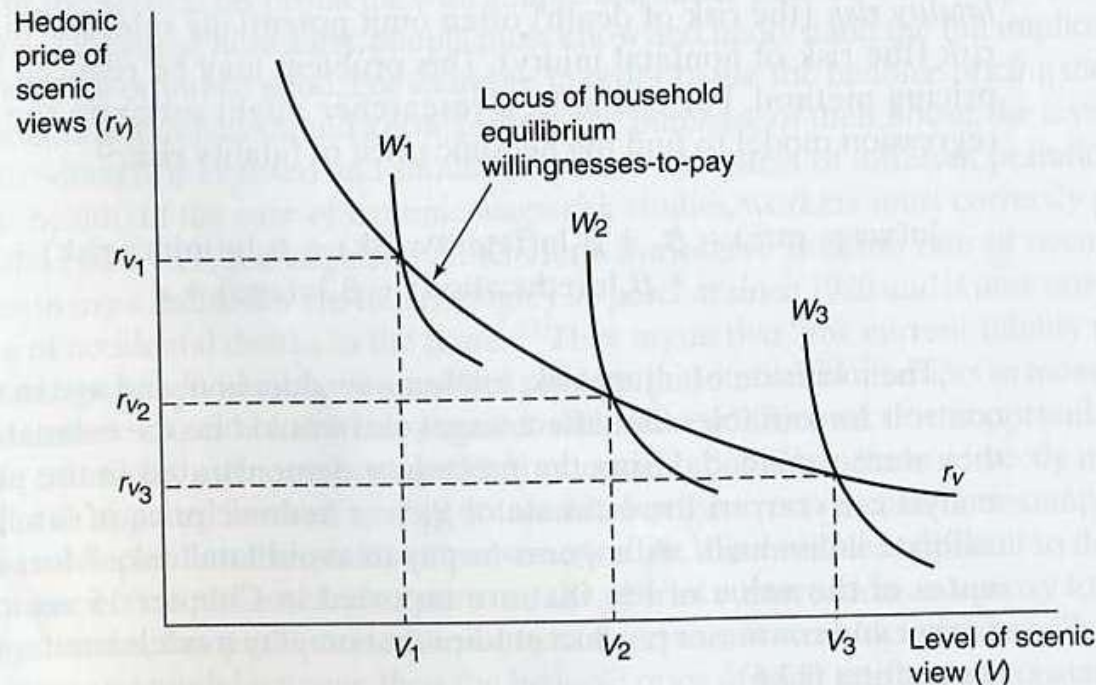

$$\ln(P) = \ln \beta_0 + \beta_1 \ln(CBD) + \beta_2 \ln(SIZE) + \beta_3 \ln(VIEW) + \beta_4 \ln(NBHD) + \varepsilon$$



Hedonic price of scenic views: Slope

$$r_v = \beta_3 \frac{P}{VIEW}$$

Decreases as the level of the scenic view increases



$$r_v = W(VIEW, Y, Z)$$

Y : household income

Z : household characteristics

Value of Statistical Life

Nonlinear Regression Model

$$\begin{aligned}\ln(wagerate) = & \beta_0 + \beta_1 \ln(fatality\ risk) \\ & + \beta_2 \ln(injury\ risk) \\ & + \beta_3 \ln(job\ tenure) \\ & + \beta_4 \ln(education) \\ & + \beta_5 \ln(age) + \varepsilon\end{aligned}$$

Travel Cost Method

To value “Recreational Sites”

Zone Travel Cost Methods

$$\ln\left(\frac{V}{POP}\right) = \beta_0 + \beta_1 \ln \bar{p} + \beta_2 \ln \bar{p}_s + \beta_3 \ln \bar{Y} + \beta_4 \ln \bar{Z} + \varepsilon$$

TABLE 13-1 Illustration of the Travel Cost Method

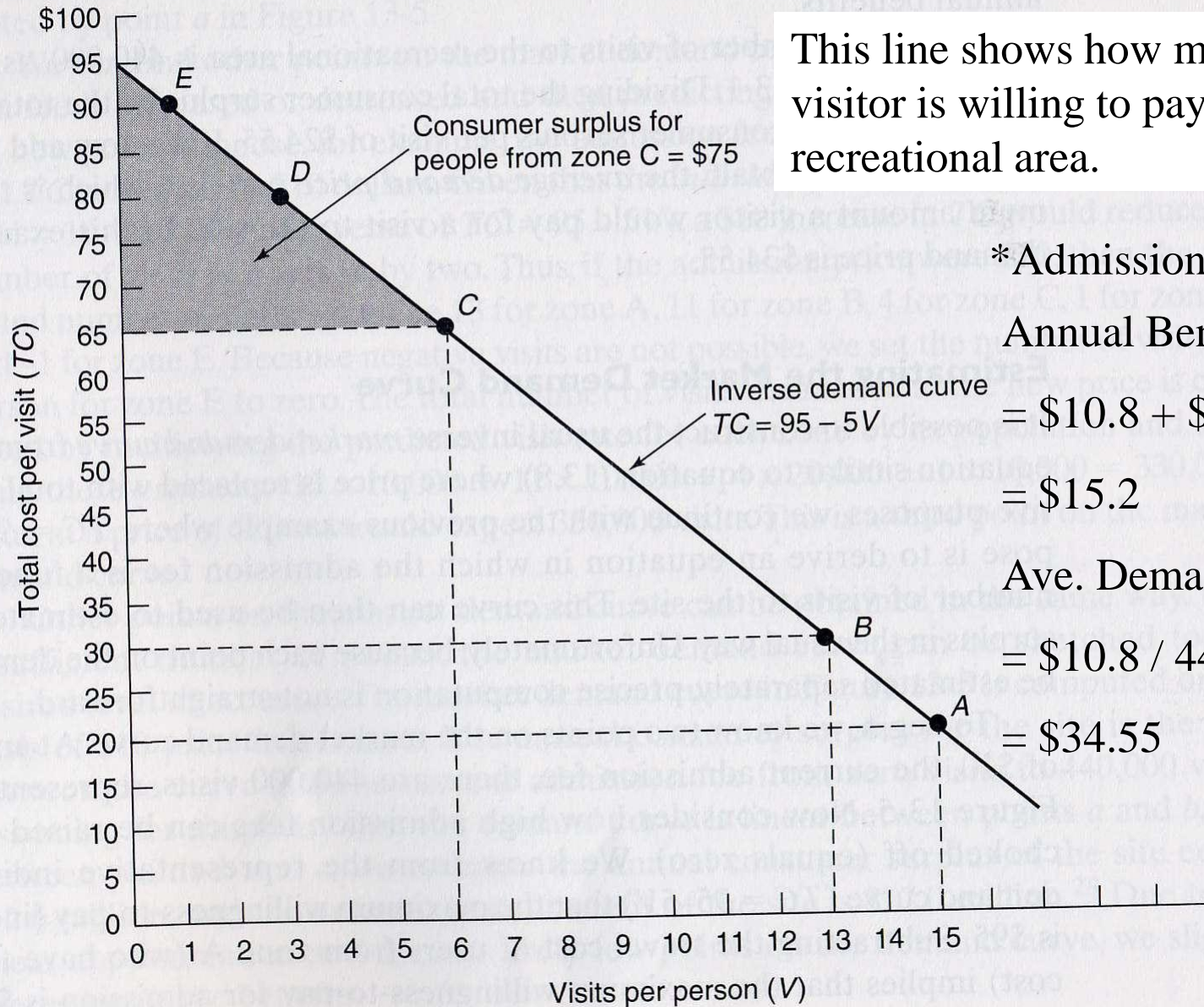
Zone	Travel Time (hours)	Travel Distance (km)	Average Total Cost per Person (\$)	Average Number of Visits per Person	Consumer Surplus per Person	Consumer Surplus per Zone (\$ thousands)	Trips per Zone (thousands)
A	0.5	2	20	15	525	5,250	150
B	1.0	30	30	13	390	3,900	130
C	2.0	90	65	6	75	1,500	120
D	3.0	140	80	3	15	150	30
E	3.5	150	90	1	0	0	10
Total						10,800	440

Different value of time for estimating average total cost:

A for \$9.40/hr, B for \$5.50/hr, C for \$10.35/hr, D and E for \$8/hr (as wage rate)

Total cost is generally composed of driving, parking, walking and loading and unloading vehicles. Zone E needs customs and immigration crossing the border.

FIGURE 13-4 "Representative" Individual's Inverse Demand Curve for Visits to a Recreational Area



This line shows how much a typical visitor is willing to pay for a visit to the recreational area.

*Admission Fee \$10

Annual Benefit [mil.]

$= \$10.8 + \$4.4 (= 0.44 \text{ trips} * 10)$

$= \$15.2$

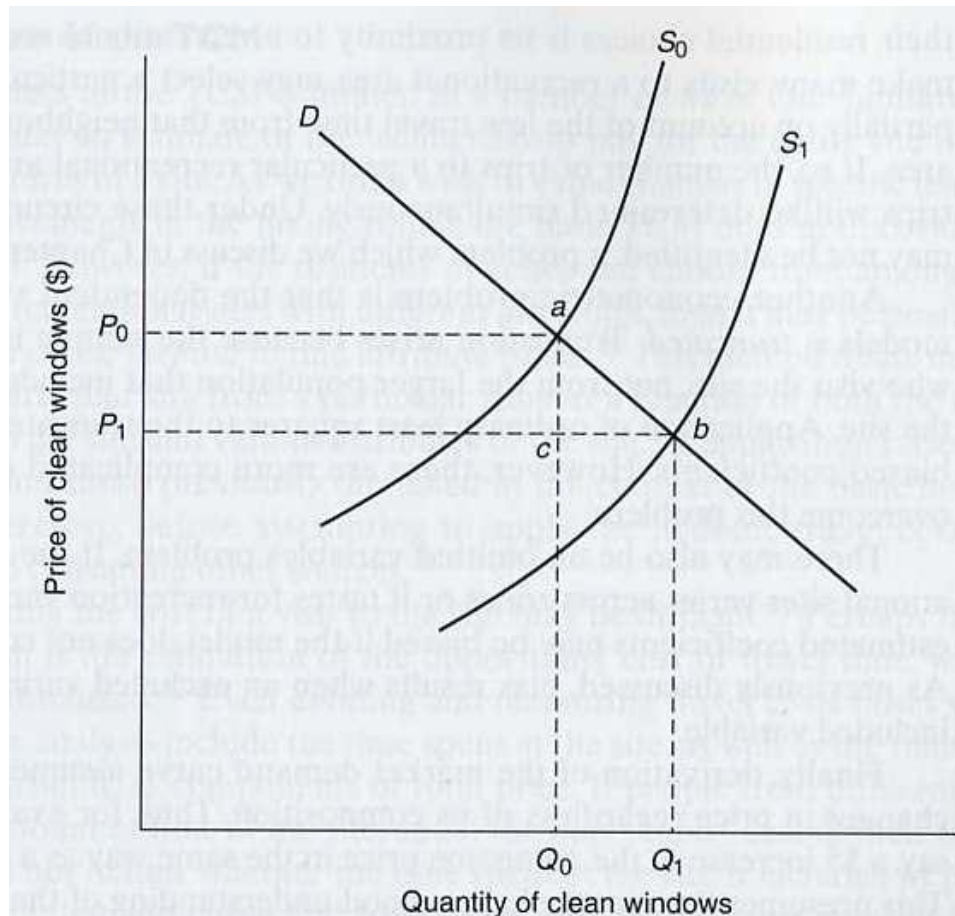
Ave. Demand Price per visit

$= \$10.8 / 440000 + \10

$= \$34.55$

Defensive Expenditures Method

The amount to spend to mitigate or eliminate the effect of a negative externality.



Before and after
Ordinance

FIGURE 13-6 The Effect of an Ordinance Reducing Smog on Expenditures for Window Cleaning

Presentation & Report

1. Select one method of Valuing Market or Non-Market Goods from Chapter 9, 12, 13 and 14.
2. Find one paper from “**international**” scientific journals from any research fields to use your selected method.
3. Explain the selected paper by powerpoint.

English presentation (7 mins) and discussion (3 mins) for each.

Report Submission

Deadline: **6 August 2012, 17:00**

Summarize 3 to 4 pages report and submit me by email.

(hanaoka@ide.titech.ac.jp):

- 1) Reasons to select this paper.
- 2) Advantages and disadvantages of your selected method in the context of the selected topic. Discuss whether other methods are possible to apply for the selected topic.
- 3) Respond some questions by me if you need.
- 4) Impression (comments, requests, etc) of this course.