TRANSPORT COSTS AND PRICING

PRAMOD UNIYAL
DEPUTY DIRECTOR GENERAL

BIMSTEC COURSE

FINANCIAL MANAGEMENT AND RESOURCE MOBILISATION

TRANSPORT COSTS

COSTS

- What are costs?
- C=f(Q)
- Their relevance
- Accountant
- Engineer
- Economist
- Organisation

RELEVANCE

- **ACCOUNTANT**
- i) classification
- ii) normalisation

- **ENGINEER**
- i) causality
- ii) modelling, regressional analysis, cross-sectional data, time series data, diagnostic testing

Contd.

- **ECONOMIST**
- i) resource cost
- ii) externalities

- **ORGANISATION**
- i) profitability
- ii) firm size

ECONOMIES/DISECONOMIES

- Production maybe characterised by a non-linear relationship between input and output at various levels.
- These are either the economies or diseconomies of production
- Mainly three types
- i) scale
- ii) scope
- iii) density

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- **SCALE**
- i) the average cost reduces/increases with the output.
- ii) natural monopolies like rail, inland waterways exhibit economies of scale in unsaturated conditions; beyond saturation large diseconomies, are evident
- iii) road and air operators do not exhibit such phenomenon

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- **SCOPE**
- i) transport has a multiproduct nature
- ii) output mix exhibits economies/diseconomies
- iii) hub and spoke concept
- iv) trainload versus piecemeal operations

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- **DENSITY**
- i) increased use of infrastructure does result in economies
- ii) maintenance costs upto a certain limit do not affect

TYPES

- **TOTAL**
- **AVERAGE**
- **FIXED and VARIABLE**
- i) that part which does not vary with output is called fixed
- ii) variability with output
- iii) dependence on time frame---- thus for rail initially infrastructure costs may be fixed with fuel and running allowances of crew being variable; with time rolling stock, then signals, overhead equipments, rail and finally trackbed may assume variability

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- **MARGINAL**
- the first derivative of the cost function, assuming its continuity over a specified range with respect to the output measures the unit cost at the margin of production
- **INCREMENTAL**
- the change in variable cost for producing an extra unit of output
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- **SHORT RUN MARGINAL COST**
- The size of total output remaining fixed the cost function will have a invariable nature
- **LONG RUN MARGINAL COST**
- With the variation in size of the total output there is no fixed element in the total cost function and therefore the long run marginal cost is truly reflective of the resource cost to the economy

NATURE OF COSTS

- **DIRECT**
- can be assigned uniquely and may have both components of invariability and variability
- **INDIRECT**
- i) cannot be assigned uniquely because of multiproduct nature and therefore characterised by jointness and commonality

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- **JOINTNESS**
- i) associated uniquely with production of output
- ii) concept of empty return ratio
- iii) optimisation--- concessional backhaul rates; problem of dedicated rolling stock

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- **COMMONALITY**
- i) sharing with different output, the variability of allocation ratios with change in nature and mix of output
- ii) concept of avoidable costs

CLASSIFICATION

- OPERATORS
- USERS
- SOCIAL

OPERATORS

- ALLOCATION
- joint/common
- INDIVISIBILITIES
- long/short term
- ECONOMIES

USERS

- **GENERALISED COST**
- C=F + vT, where F is the monetary value and T, the time spent converted to monetary value by the factor v, the value of time

SOCIAL COSTS

- **RESOURCE COST**
- opportunity costs
- allocative efficiency
- **EXTERNAL COSTS**
- congestion
- pollution
- safety

OBJECTIVES OF TRAFFIC COSTING

- Determine standard rates and fares
- Determine competitive rates
- Appraise financial viability of projects
- For inter railway financial adjustments
- Economics of commodity flows for determination of subsidies
- Financial appraisal of branch lines

TRAFFIC COSTING

- **History**
- Simple models using output as explanatory variable
- C=A+B(tonnesKm)
- Examining the nature of economies by use of output, originating tonnage and size of network as explanatory variables
- C=K+A(tonnesKm.)+B(tonnes)+C(route Km)
- Translog models incorporating effects on quality

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- Simple models using output as explanatory variable and calibrated through regressional analysis using cross sectional data by J M Clark in USA indicated existence of significant fixed costs in the railway industry

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- Further refinement introduced by Dr. M K Edwards resulting in the U S A's Inter State Commerce Commission costing formula
- In U K systematic study of traffic costing and cost analysis was initiated only after the Transport Act 1947 came into existence

Contd.

- Till 1969 the British Rail used the full cost allocation method
- Subsequently it graduated to the profit planning and cost center analysis
- Next step was the avoidable cost method; the analysis which sought to ascertain whether any cost element in the structure varied in relation to change in output of any individual sector or service and what costs would be avoided if any particular sector or activity ceased

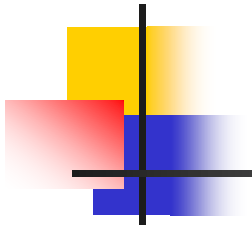
Contd.

- France and other European countries adopted the system of continuous allocation of expenses to various services until all costs were allocated.
- Canadian Railway study of costs in 1978 and 1979 brought out two basic principles
- i) different costs are relevant for different purposes
- ii) objective of cost analysis is to trace an expense to its cause

CHALLENGES

- Prospective pricing
- Dynamic pricing
- Disaggregation

CONCEPTS OF PRICING



- CONGESTION AND LONG LINES(SIGNS OF SHORTAGES) MEAN THAT THE COMMODITY OR SERVICE IN DEMAND IS BEING UNDERPRICED; IT IS AS SIMPLE AS THAT.

- ALFERD E KAHN
- CHAIRMAN CIVIL AERONAUTICS BOARD. USA

IMPORTANCE OF PRICING STRUCTURE

(1)Outlines significant characteristics of the industry as affects volumes and therefore revenue, key decision factors in a free market economy

(2) Assists in public policy formation eg. Energy, safety, environment

TYPES OF MARKET

- Competitive
- Free access of information to all buyers/ sellers

- Contestable----- competitive with all suppliers having access to the production state of the art of the technology , with no sunk cost

TYPES OF MARKET

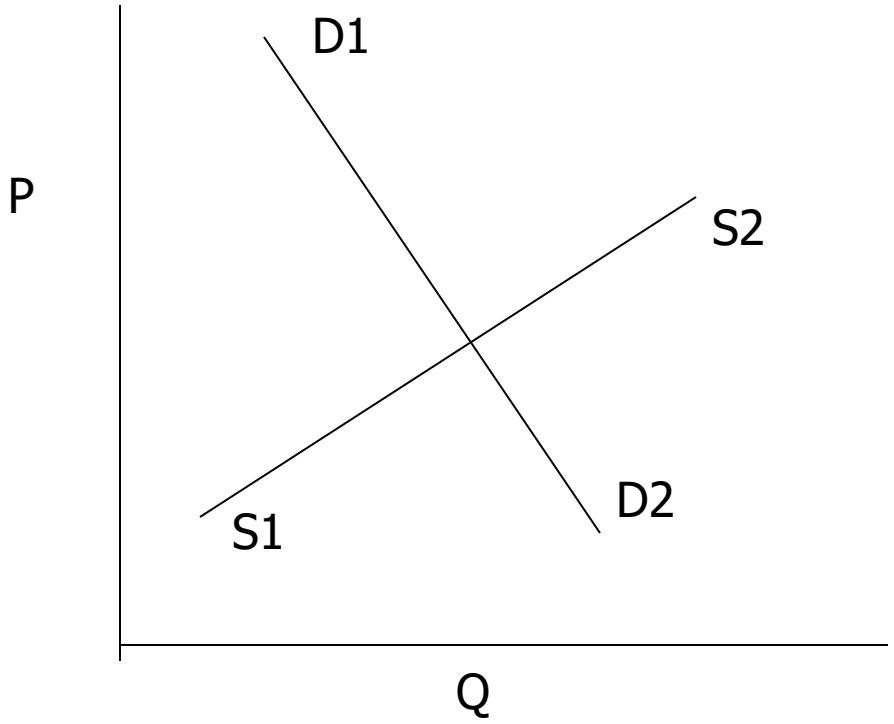
- Monopoly --- high fixed to marginal cost ratio and significant sunk costs
- Duopoly---- two suppliers
- Oligopoly----- limited number of suppliers, cartelisation

PRICING STRUCTURE

- Should reflect allocative efficiency that is consumption of society scarce resources of production is at its most efficient
  - Efficient prices

- Determination of prices in the market---- the intersection of the downward sloping demand curve and the upward sloping supply curve

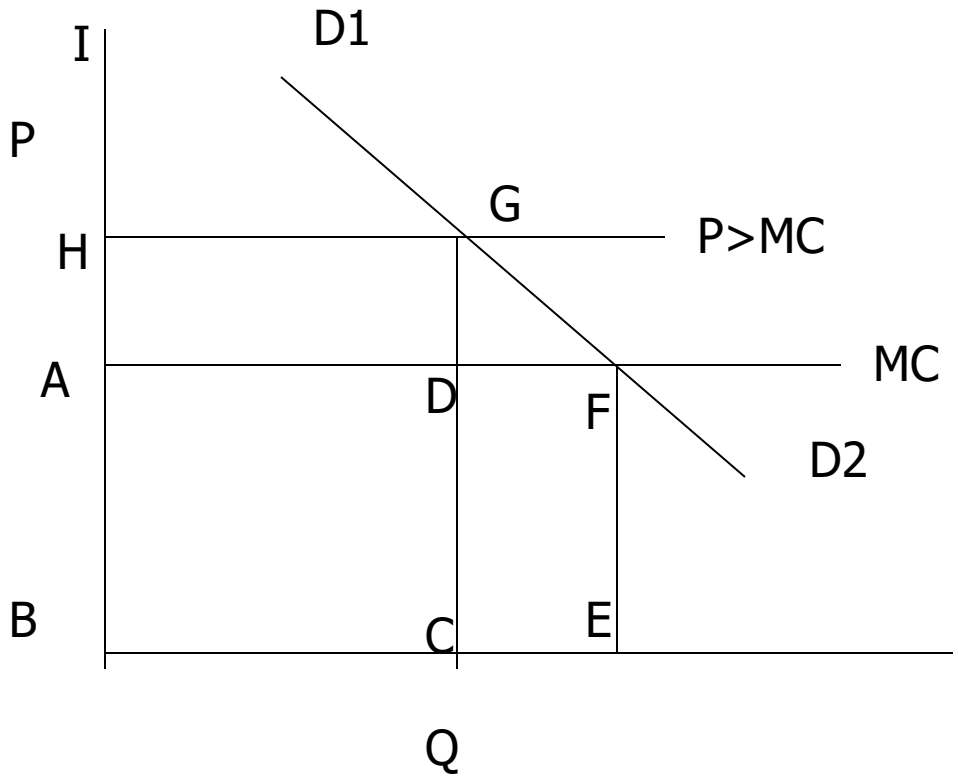
DETERMINATION OF PRICE



EFFICIENT PRICES

- Welfare maximising prices
- Concept of consumer and producer surplus and the deadweight loss
- Marginal cost price the most efficient prices in competitive markets

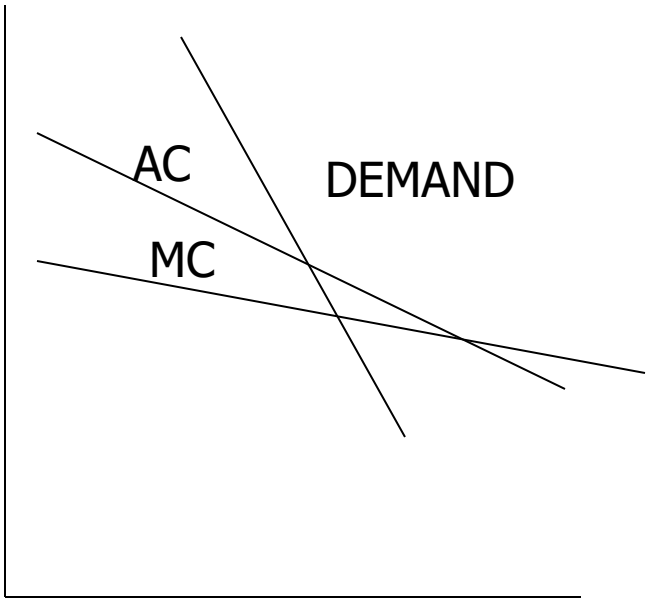
DEADWEIGHT LOSS



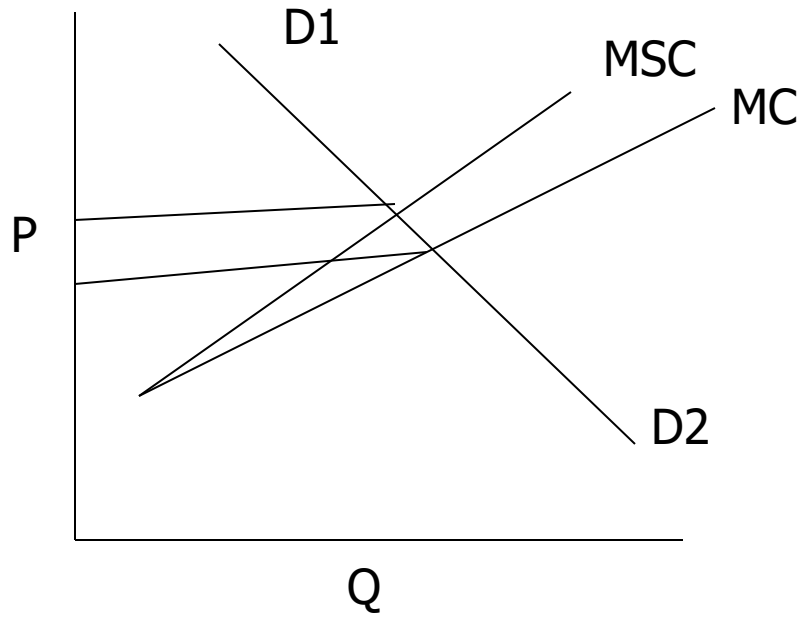
PROBLEMS IN SETTING EFFICIENT PRICES

- Natural monopoly economies of scale
- Marginal cost<average cost
- Externalities ---- concept of marginal social cost
- Considerations of equity---private versus public transport
- Congestion pricing

INCREASING RETURNS TO SCALE



MARGINAL SOCIAL COST PRICING



DEVIATIONS FROM EFFICIENT PRICING

- Losses leading to subsidy
- Second best pricing----rationale
- Two part tariffs, a common tariff plus a variable
- part---- problems of discrimination
- Ramsey pricing, markup over the marginal cost
- Inversely proportional to the price elasticity
- Of the market----problems of segmentation and equity

MAXIMISATION OF REVENUE

•Concept of elasticity-----percentage change in demand corresponding to percentage change in prices, income, quality,etc.,

Value of service

Peak/Off Peak Pricing

Branding

•Hedonic pricing----segmentation USP

•Yield/Revenue Masnagement

COMPETITIVE PRICING

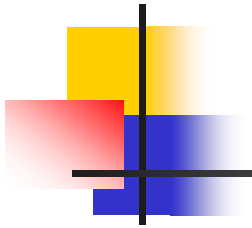
- Route specific
- Volume discounts
- Contractual rates

REGULATION

- Intervention by government in imperfect market to prevent exploitation as well as bring about allocative efficiency
- "Rolling back of the frontiers of the State"-----Margaret Thatcher
- Deregulation and restructuring of the transport Industry

REGULATION OF PRICES

- Ensure level playing field---destructive pricing
- Fixed rate of return pricing----problems of padded up costs capture of the regulator and consequent inefficiency
- Distance equalization of prices----inefficient in both the short run and long run response of the industry
- Deregulation of prices and entry but regulation of quality



THANK YOU