Pricing in Public Utilities/Transport/ Infrastructure

BIMSTEC Programme

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Introduction- Relationship b/w Transportation and Eco. Dev.

Transport Planning Process

Transport Demand Approach

Supply and Costs

Market Structure and Pricing- Market Structure Profile and Scope for Different Strategies

Pricing- Basic Pricing Principles

Pricing- Pricing of Different Modes

Introduction

- Standard Textbooks define Economic Development as the process of improving the quality of life through increasing per capita income, reducing poverty, raising standards of living and expanding economic and social choice, while ensuring distribution of income.
- Multiple outcomes
  - Jobs
  - Income
  - Quality of life
  - Environmental Preservation
  - Environmental Justice
  - Sustainable Development

Introduction….cont'd

- The linkage between Transportation and Economic Development is a highly contentious issue which has generated considerable debate and an abundant literature

- It is firmly believed (especially by politicians) that investment in transport infrastructure promotes eco. develop. and by extension employment

- But studies indicate that the impact is limited

The Relationship between Transportation and Economic Development

- Good transportation infrastructure and services are a necessary, but not sufficient condition for economic prosperity
  - Poor transportation can **hinder economic development** and hold down real personal income
  - However, investments in transportation alone or under the **wrong circumstances** will not lead to economic prosperity

Adequate, reliable and economic transport is essential, although not in itself sufficient, for the social and economic development of a country.

Role of Transportation

- Transportation is **a means** to a greater goal, not an end in itself
- The **greater goal** is economic and community development
- An **efficient and reliable transportation** system is key to successful economic development
- **Transportation investment** are one of the largest sources of economic development incentives

Direct Impact
(on production & consumption)

- Lowering of production cost
- Increasing producers prices
- Encouragement of investment
- Obtaining goods or services from other sources i.e. encourages competition
- Increase in market reach of business

Direct Impact
(on poverty and welfare)

- Health impacts
- Impact on education
- Impact on employment
- Increased incomes

Economic Cost of Poor Transportation

- Leads to increase in user costs
  - Vehicle operating costs go up
  - Time costs
  - Inventory costs (capital, warehousing, depreciation, insurance, taxation, obsolescence, and shrinkage costs)
  - Safety related
- Leads to reduction in real incomes

Segments of the Transport Sector in India

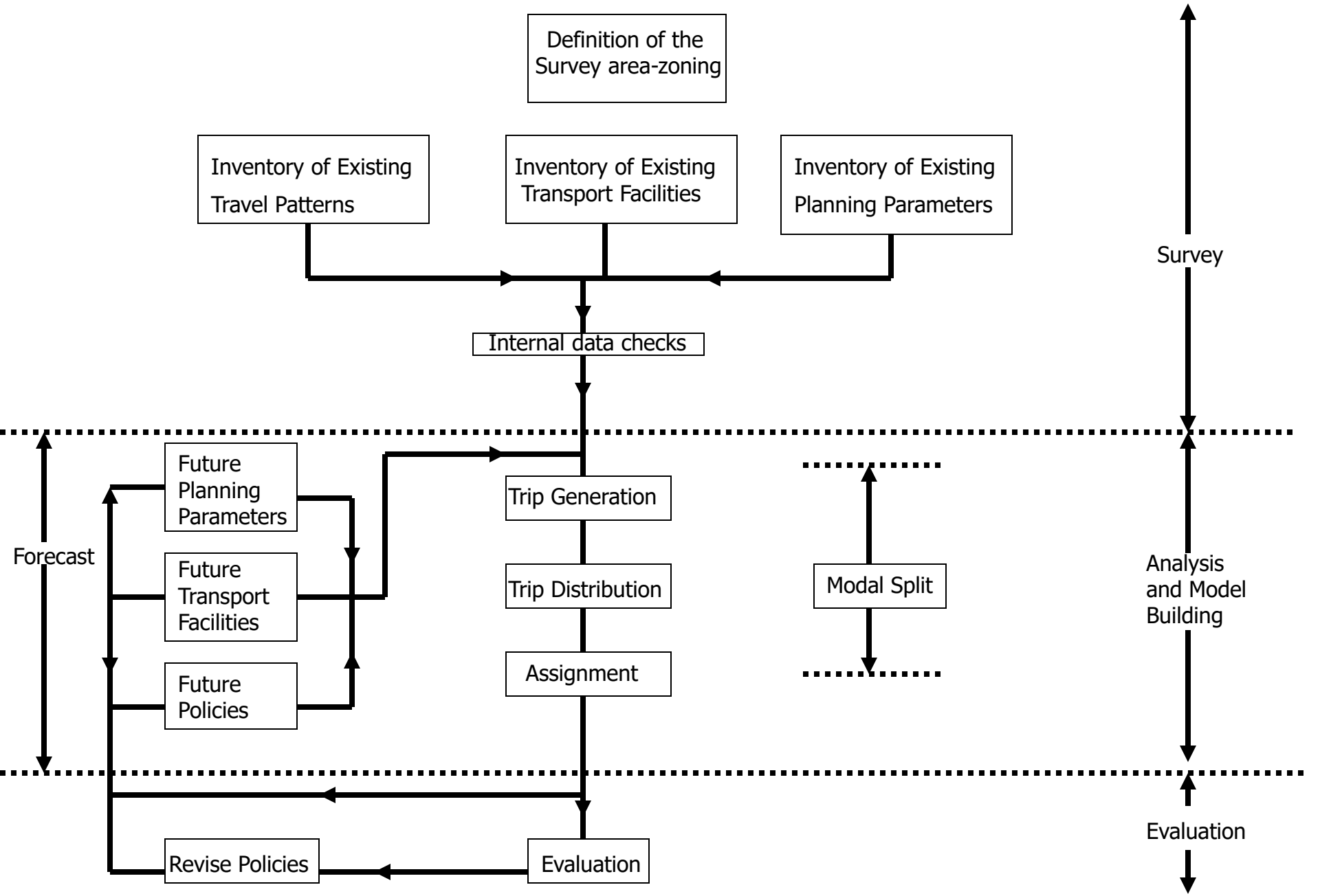
- We need to define the different segments in terms of modes (infrastructure and/or services) in the Indian context
- They are as follows:

  - ❑ Railways
  - ❑ Roads
  - ❑ Road transport
  - ❑ Ports and Shipping
  - ❑ Civil Aviation
  - ❑ Inland Water Transport
  - ❑ Urban Transport
  - ❑ Non-motorised

- Obviously, each mode differs in terms of **certain characteristics** and is **similar** in terms of others

- Also, one can associate with each mode (or some of them together) with differing levels in terms of **areas of operation**

Transport Planning Process



Transport Planning Process…..cont'd

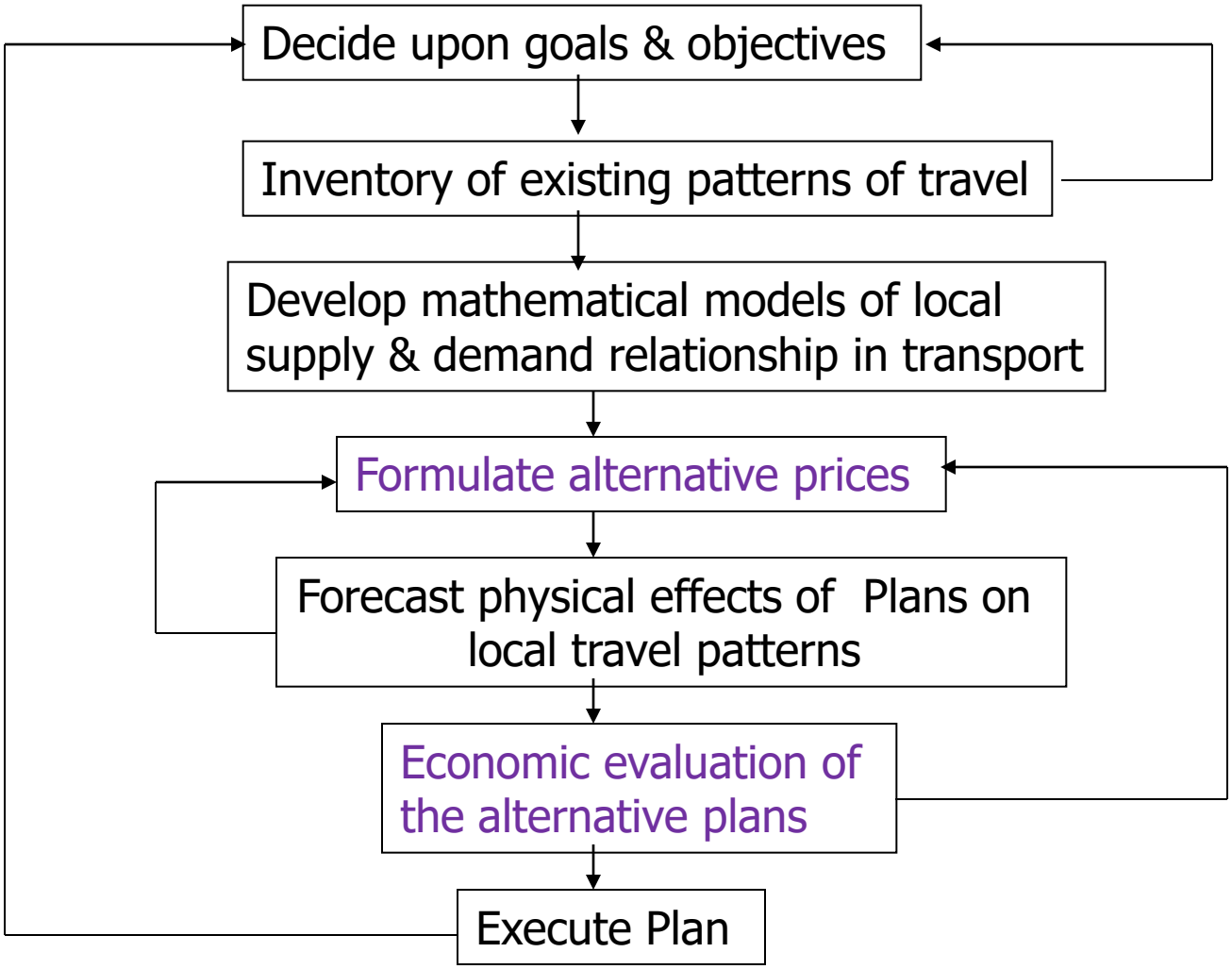
A common basic approach which can be applied to all forms of Transportation Planning consists of three distinct phases:

- **A survey, analysis and model building phase**
  - This stage attempts to answer two questions
    1. What is the existing travel demand?
    2. How is this demand satisfied on the existing transport facilities?

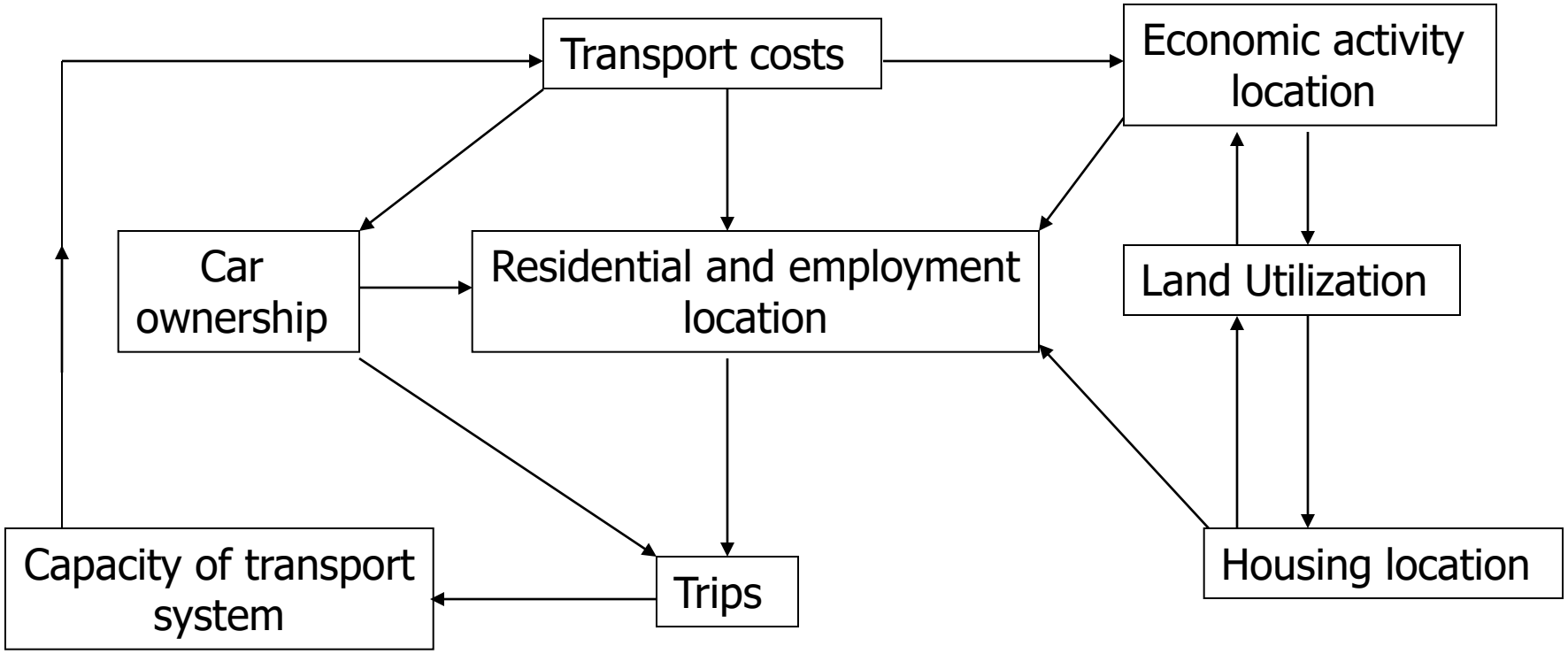
- **A forecasting Phase**
  - Here relationships established in the analysis and model building stage are used to make estimates of the future travel demand

- **Evaluation Phase**
  - This stage assesses the results of the two previous phases to see whether they satisfy defined social, economic and operational objectives

The Urban Planning Transport Process



Urban Land-use and Transport Interaction Model



TRANSPORT DEMAND APPROACH

DEMAND

- Transport as a derived demand (as opposed to direct demand for commodities)

- i.e. Transport as a means to an end

- Examples- demand for public transport, truck transport, airline services etc.

- Few instances of transport being an end in itself- passenger cruises etc

Transportation as a Derived Demand

- Two Major Types of derived transport demand:

  - Direct derived demand: movements that are directly the outcome of economic activities- work-related activities, movement from production and consumption

  - Indirect derived Demand:

Factors Determining Demand

- Physical Characteristics

-high cost, low volume – by air
*Electronic equipment, precious stones

-low value, high volume – minerals
*by ship, rail etc

-high value but bulk – surface movement
* oil, nuclear fuel etc.

Demand determinants (Contd.)

- Price- usual relationships

  *level of transport cost useful in fixing locations

- Relative prices charged by different modes

  *substitutes

- Passenger/Household Income

  *different situations- (to explain)

Demand determinants (Contd.)

- Speed of service

*Concorde, TGV, Express ways

-improvements resulting fall in costs, time etc. which could push prices down to encourage demand.

- Quality of service

*frequency, standard of service, comfort, reliability, safety etc

-these factors help stimulate demand

Demand determinants (Contd.)

- Additional issues

  *customers choice- between price and quality of service – business versus economy class, etc.

- Time comparison- customer may compare time and fare for different modes – rail, road etc. also there could be comparison with costs of moving by private vehicles

  (time valuation analysis – useful in investment analysis)

Demand factors not influenced by the operators

- Peak demand

  *time of day

  *time of week

  *seasonal peak
- Social habits- changes

  *leisure time

  *increase in car ownership
- Changes in population distribution

Some issues

- Why is the peak problem particularly bad in transport?

*product/service cannot be stored

*demand for transport depends on product demand
*cost implications

*indivisibility of supply

*examples of the peak problem-western railway, central railway- local train peaks.

Examples of the Peak

- Local services – WR, CR, etc.
- Bus Services- BEST

Reducing the peak – possible action by the operator

- Need not provide the additional facility – financially though not necessarily socially better result

- In freight operations- on a contract to move goods – price can reflect peak hour operations

- Pricing- off-peak discounts or peak hour surcharge

Peak travel- action by operator

- Provision of high occupancy vehicles lanes

- Use of depreciated buses at peak times thus eliminating financial burden of spare buses

Elasticity of Demand

- Price Elasticity

Ep = (prop.change in dd.)/(prop.change in price)

Short-run elasticity- low - (-0.1 to -0.4)

Long-run elasticity- higher- because of changes in jobs, housing, locations, etc.

Elasticity (cont'd)

- Examples:

  - suppose fare increase of 40%

    and price elasticity is -0.15

    Ep = (%change in q) / (% change in p)

    -0.15= (% change in q)/ (40)

    %change in q= (40)(-0.15)

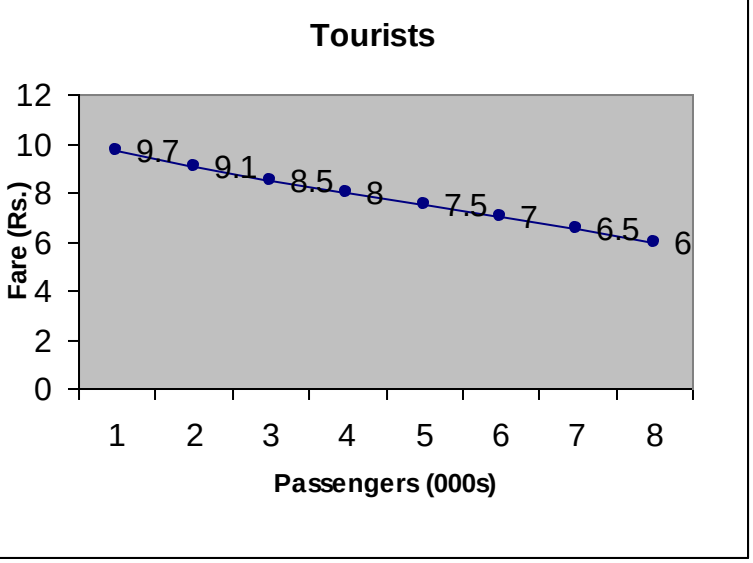
    = -6%

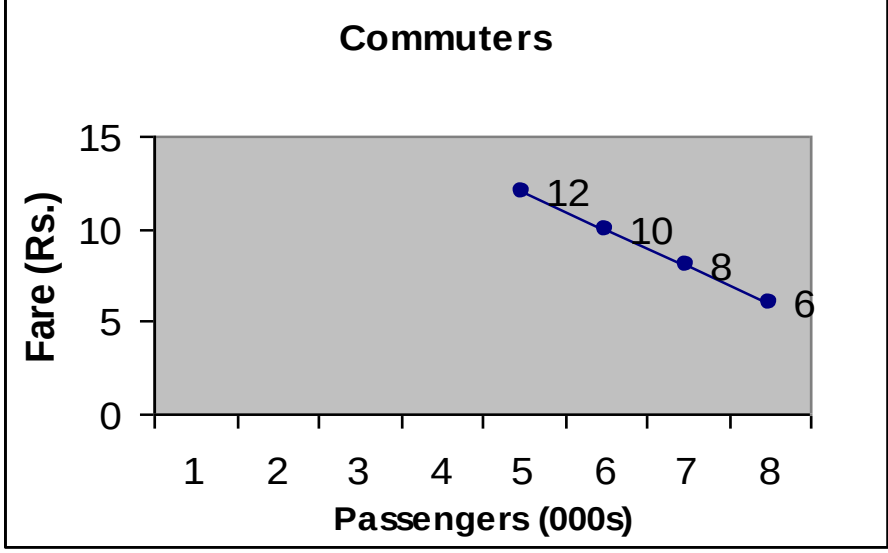
Elasticity(cont'd)

- Cross Elasticity :

  Ec= (%change in q of one service)/ (% change in price of a competitive service)

- In case of inelastic demand- prop.change in price is greater than prop.change in q.
- In case of elastic demand- prop.change in q is greater than prop.change in p





Fare increase Rs.6 to 8

% increase +33.3%

Passengers fall 8,000 to 4,000

% decrease 50.0%

Ep= -1.50

High elasticity

Less revenue generated

Revenue/fares increase effect

Before Rs.48,000

After Rs.32,000

Revenue loss (Rs.16,000)

Fare increase Rs.6 to 8

% increase +33.3%

Passengers fall 8,000 to 7,000

% decrease 12.6%

Ep= -0.38

Low elasticity (inelastic)

More revenue generated

Revenue/fares increase effect

Before Rs.48,000

After Rs.56,000

Revenue Gain (Rs.8,000)

Measurement Methods and Problems

- 1. Arc Elasticity –
- 2. Own elasticity-
- 3. Modal Split – cross elasticities
- 4. inflation – to be taken into account

Indian experience :

Railways, BEST, MSRTC

Other concepts- Income and Service Elasticities

Supply and Costs - Nature of Output and Costs

Supply of Transport- Preliminaries

- Difference in ease of provisioning in different types of transport- bus services, railways.
- Excess supply of transport
  -indivisibility of supply
  -technological progress results in supply which may prove difficult to fill soon.
- Elasticity of Supply:

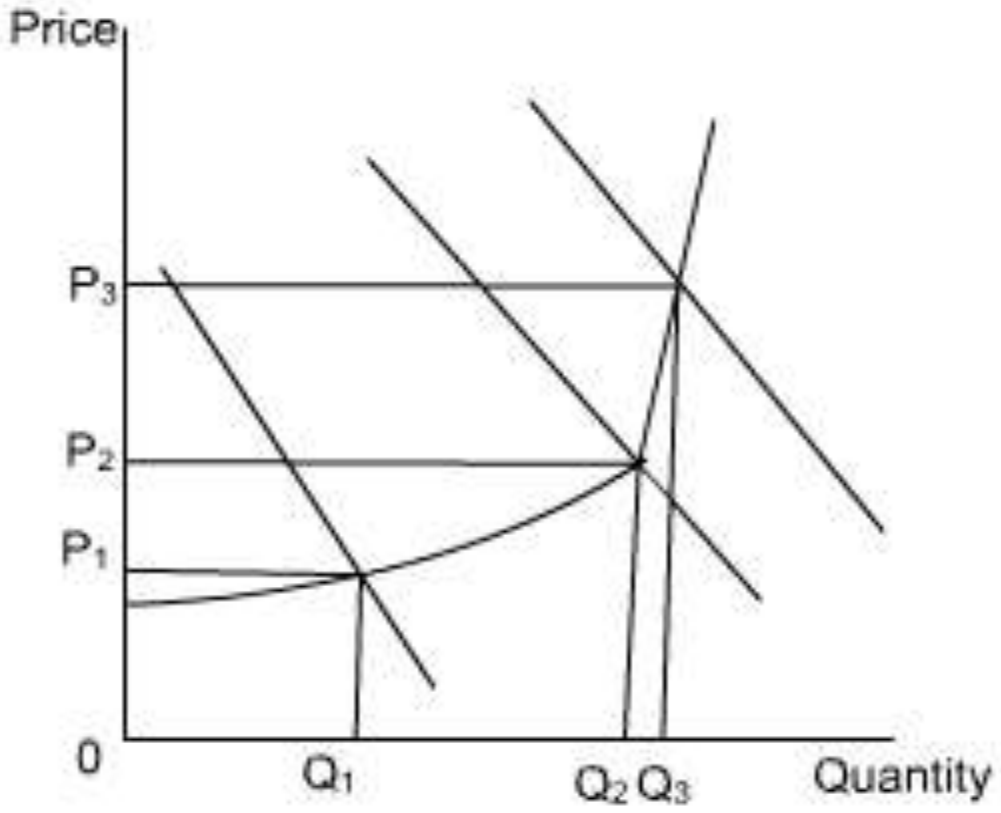
Es= (% change in q. supplied)/(% change in price)

•This depends on:

- Ease of entry into a market.
- conversion of facilities-for example conversion from passenger to freight use will be more elastic then when such transfers are difficult.

Supply of Transport- Preliminaries- an example

- Supply in chartered aircraft and shipping services



Supply……contd

- Supply function (curve) – specifies the relationship between price and output supplied in the market.

- In a competitive market, the supply curve is well defined.

- In imperfectly competitive markets – there is no one – to - one relation between P & Q. Each firm makes the quantity decision which maximizes profit, taking into account the nature of the competition.

- In transportation, the focus is on studying behavior of aggregate costs (in relation to output) and to develop the procedure for estimating costs for specific services (traffic).

- The former is known as aggregate costing and the later as disaggregate costing.

Some Cost definitions

Opportunity Costs

- The actual opportunities foregone as a consequence of doing one thing as opposed to another
- Opportunity costs represent true economic cost and must be used in all cases

Social Costs

- The costs society incurs when its resources are used to produce a given commodity
- Takes into account external costs and benefits

Private Costs

- Costs incurred by producers in getting resources used in production

Some Cost Concepts- general

- **Total Cost**

If TC= Total Cost, Q= level of output, then for a single output firm
Average Cost AC=TC/Q
Marginal Cost MC= dTC/dQ – change in costs associated with a specific change in output

- **Fixed Costs**

Costs which do not vary with output.
Sunk costs (explain)

- **Variable Costs**

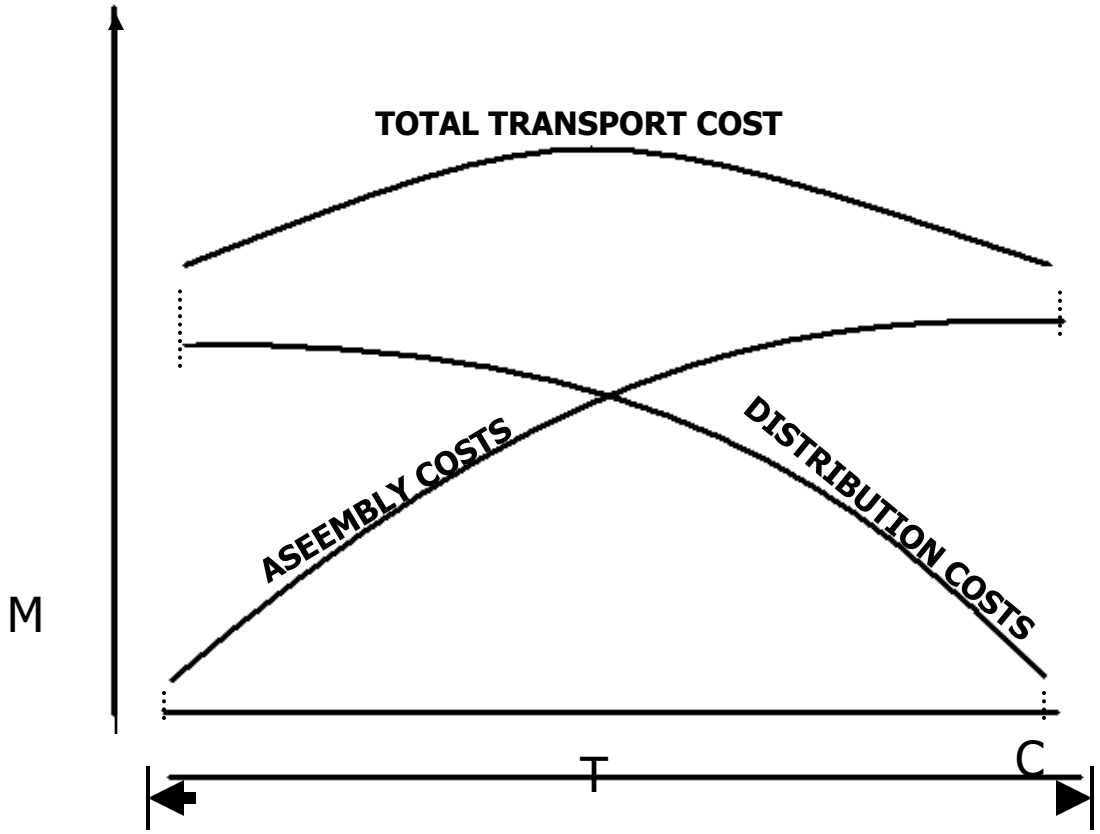
Costs which change as output levels are changed.

(The classification of costs as variable or fixed is a function of both the length of the time horizon and the extent of indivisibility over the range of output considered)

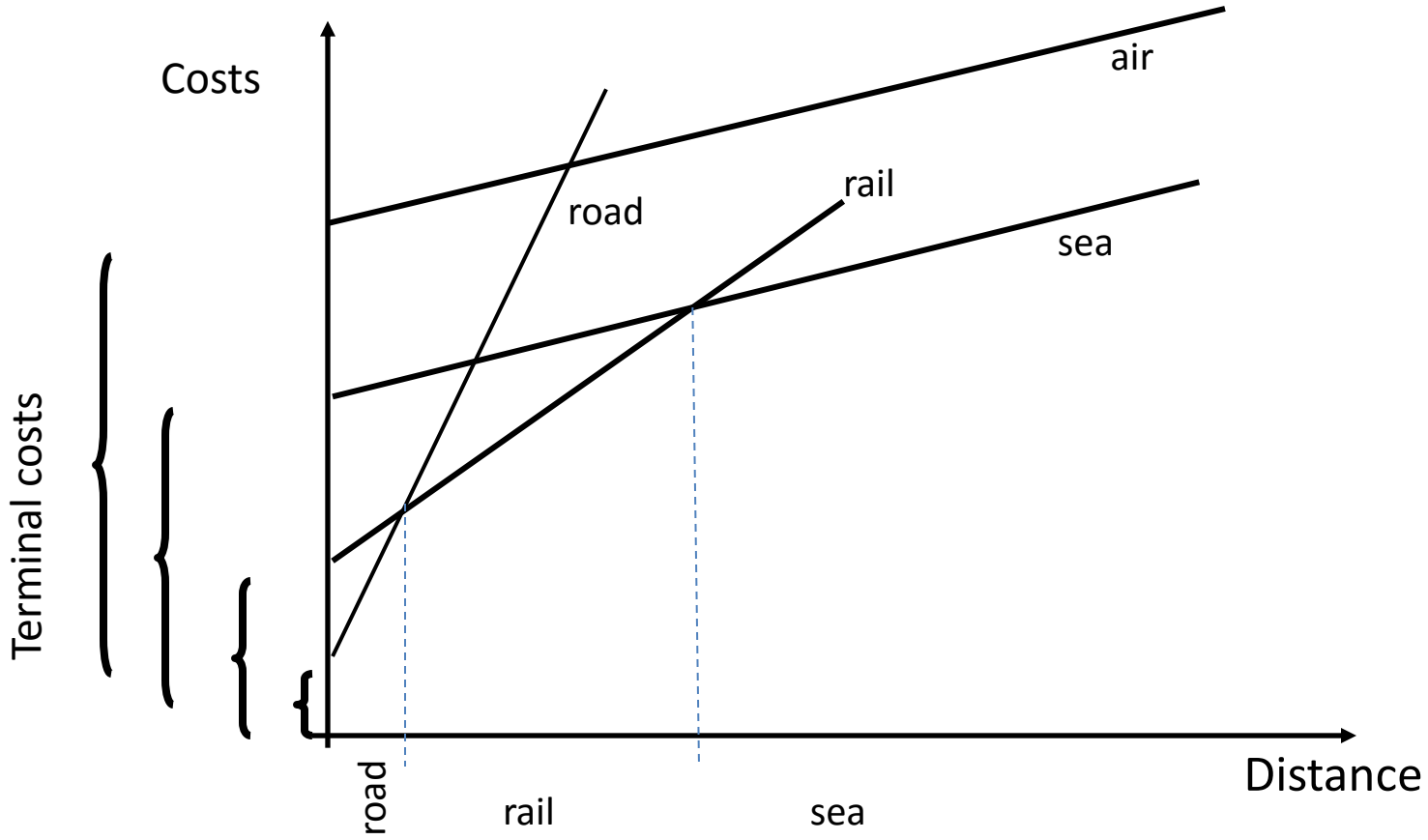
Some Cost Concepts-specific

- Specific Costs
- Common Costs
- Joint Costs
- User Costs
- Generalised costs
- Peak Costs

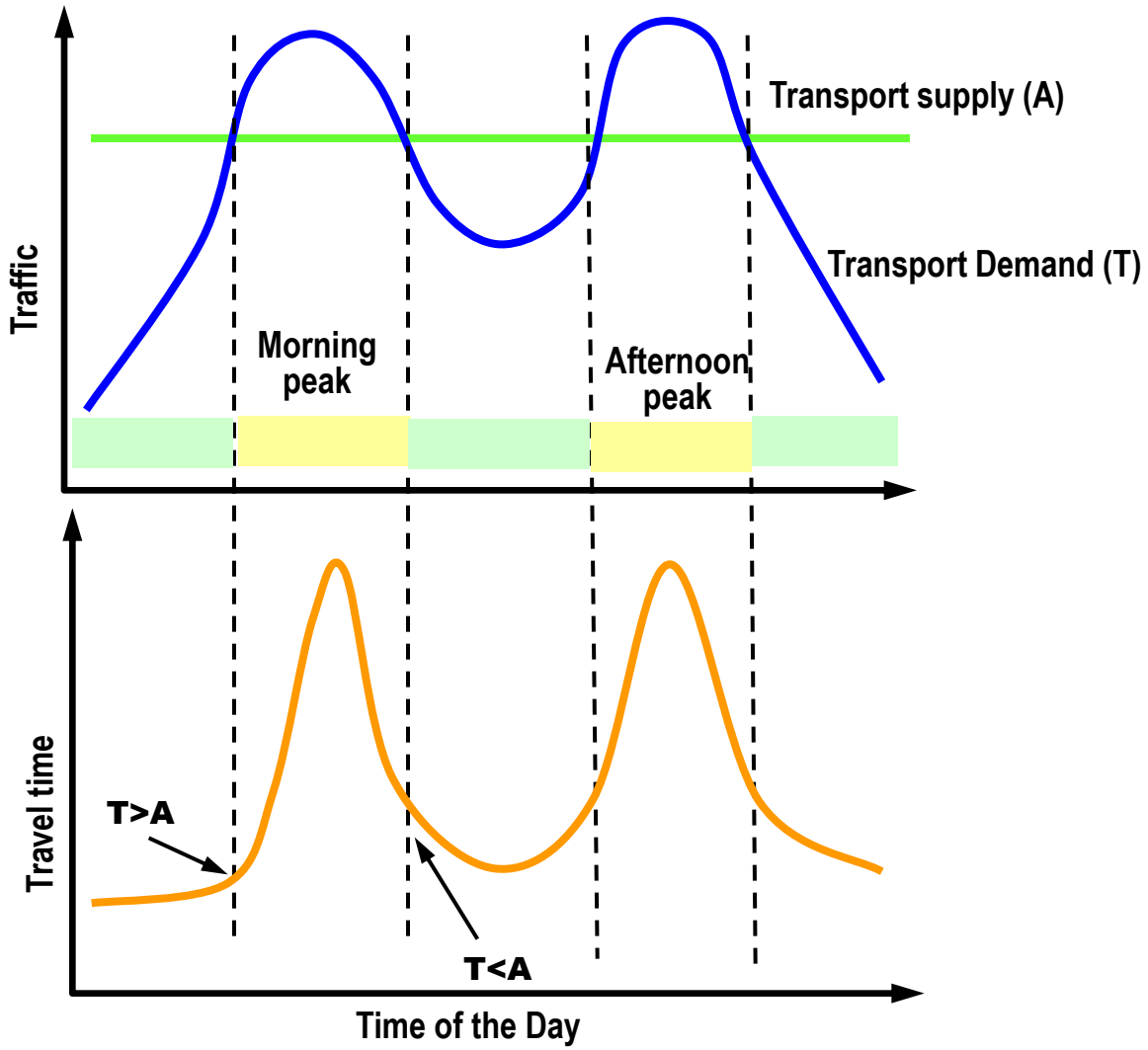
Structure of Transport Costs



Structure of Transport Costs



Transport Supply, Demand and Travel Time



Cost Characteristics of Transportation

- All modes experience economies of vehicle size up to a certain point
- Increasing returns in provision of way and track capacity
- Economies of longer distance travelled
- For all modes, the average cost rises rapidly with increased speed
- For all modes, energy consumption increases exponentially with speed
- Indivisibilities and heterogeneity of output make it difficult to identify costs associated with particular traffic
- Indivisibilities cause declining unit costs over a range of output
    - E.g. the backhaul problem- increase in traffic on the backhaul will reduce the average costs of the roundtrip operation
    - Indivisibilities in production give rise to kinked average cost curves and discontinuous marginal costs

Characteristics of Transport Production

- **Multidimensionality (heterogeneity) of outputs**
  - Unit of output involves both weight and distance
    - tonne kilometers
    - passenger kilometers
  - Spatial dimension- Origin – destination and direction
  - Quality of service – speed, reliability, etc

Characteristics: Inputs and Outputs

- Output is service rather than product
  - Not storable – economics of peak/ off peak
  - Users participate in the production (passenger)

- Inputs supplied by carriers, users and public
  - Carriers: terminal activities, line haul activities, etc
  - Users: value of time, etc
  - Public: infrastructure

Lumpiness and Jointness

- Investments are often lumpy and sunk;
  - Indivisibilities of investments – complex costing and pricing
  - Sunk investments – can constitute an entry barrier

- Presence of joint or common production
  - Joint production – unavoidable to produce multiple output in fixed proportion-
    e.g. front haul- back haul problem –joint cost allocation problem
  - Common production- multiple outputs of varying proportion are produced
    using the same facilities of equipment

Which Costs?

• Economic theory suggests that costs are a function of at least factor prices and outputs . In practice, calculating costs, prices or outputs can be tricky. For e.g., **how should capital costs be determined?**

- Capital costs may occur over one year but it is likely to be used over a long period of time. So we should use the opportunity costs which include depreciation and interest cost. The capital stock of a firm will vary from year to year.

- Accountants tend to use historical costs which do not account for inflation

Market Structure and Pricing- Market Structure Profile and Scope for different strategies

Dynamics of the Transport Market

- A dynamic transport market is complex and volatile. It must accommodate frequent changes in incomes, tastes, fashions and prices.
- A transport manager must take into account these factors in decision making for two main reasons:

Dynamics of the Transport Market (cont'd)

1. The transport product is complex. It is not merely a question of moving goods/people, but must be done safely and on time. The service is a mixed product with intermodal connections. Variations in customer requirements in terms of time, route, mode are such that it is not possible to fit these aspects into a simple price/product relationship.

Dynamics of the transport market (cont'd)

2. Since the demand for transport is derived, transport operators/producers need to know about the basic demand underlying **transport demand and if these can be forecast**, demand for transport can be forecasted more easily.

Market Structure

- Having understood that the factors that **determine demand for and supply** of transport, we go further in attempting some crucial questions:
  *What determines the level at which a transport firm actually does produce?
  *Do revenue tonne miles (Kms.) vary from year to year-is there some reason why firms produce a large amount in one year and considerably less in another year?
  *What factors determine the extent to which passenger/freight movements increase or decrease?
  *What is a basis for pricing of output?
  … and so on
- Answers to these questions depend at least partly on whether firms operate in a perfectly or imperfectly competitive market structure
- We will now examine the implications that alternative market structures have for a **firms pricing and output decisions**
- Our interest will primarily focus on two related but distinct market structures that have played, and continue to play, an important role in transportation: **monopolies and oligopolies-** and to some extent fairly **competitive markets**.

Market Structure (contd.)

- Let us look around at the transport sector in terms of its market structure
- Firstly, we need to define the different **segments in terms of modes** (infrastructure and/or services)
- They are as follows:
  *Railways
  *Roads
  *Road Transport
  *Seaports
  *Shipping
  *Airports
  *Airlines
  *Inland Water Transport
- Obviously, each mode differs in terms of certain characteristics and is similar in terms of others
- Also, one can associate with each mode (or some of them together) with differing levels in terms of areas of operation

Market Structure (contd.)

- While it is useful to recollect that the derived nature of the demand for transport underlies all economics of transport, it is useful to point out certain aspects of supply which are entirely peculiar to transport and have a bearing on market structure characteristics.

- Part of the transport plant is mobile and by definition is entirely different in its characteristics to the fixed plant.

  *the **fixed component** is usually extremely long lived and expensive to replace and a good part of it has few alternative uses. This component is normally subjected to economies of scale (there is a minimum practical size below which provision of transport infrastructure is uneconomical.

  ***most mobile plant is relatively short lived** and replacement usually occurs with physical obsolescence rather than technical obsolescence. This component is subjected to minimal scale economies.

- These features of the fixed and mobile components have influenced the present institutional arrangements in the sector.

  ***high cost of provision, longevity and scale economies** associated with the fixed component create tendencies towards monopoly control.

  *the **ease of entry, flexibility and lack of scale** effects tend to stimulate competition in the mobile sector.

Market Structure (contd.)

1. RAILWAYS

- Traditionally, all over the world, railways (rail roads) have been developed by the private sector-building and operation of services.
- Given the tendency for monopoly practices, they have either been regulated or taken over by the govt. or nationalized.
- Even today railways in India are almost exclusively controlled by the govt. (except for emerging urban rail transport system)
- They operate under the framework of the railways act (as amended in 1989)
- They are subject to parliament scrutiny

Market Structure (contd.)

2. ROADS

- Considered a **public good** (rather a quasi public good), roads have been traditionally provided by governments (at various levels).

  (though long back roads were essentially private ventures at the village level-operated for the local community without a fee and then operated commercially for a toll when long distance movements began to take place. Further over a period of time, a huge network of small private roads emerged with resultant problems of improper connections, coordination, upkeep, investment, etc. thus governments were forced to take over).

- In recent decades, private provision of roads (toll roads) have emerged in a small way in partnership with the public sector.

- Most parts of the network still funded by govt. from budgets with revenues based on registration fees, license fees, excise duty/sales tax on fuel etc.

Market Structure (contd.)

3. ROAD TRANSPORT

- Consists of two segments: passenger and freight.
- **Freight** almost exclusively handled by the private sector (case study on trucking industry to be taken up). Competition Issues in the Road Goods Transport Industry in India Aug., 2006.
- **Passenger:** Organized services nationalized in many states such as Maharashtra, Andhra Pradesh Gujarat etc. while in many other states they are partly nationalized and partly privatized. Thus on an all India basis services **handled by both public (60%) and private sector (40%).**
- **Public passenger services** offered by state transport undertakings or municipal undertakings. (MSRTC)/(LB)
- Private handled by private operators under regulations of the state transport authorities.

Market Structure (contd.)

4.SHIPPING

- International: open to international competition though subject to some UNCTAD provisions.
- Coastal: traditionally being open to domestic shipping companies but is being liberalized of late

5. AIRLINES

- International: traditionally open to public sector and foreign airlines of late open to domestic airlines.
- Domestic: traditionally open to public sector only but of late opening up to more domestic private companies

Market Structure (contd.)

6. SEAPORTS

- Traditionally and even now majors ports controlled by the governments. However, there has been emergence of private ports (developing of minor ports into bigger ones). Almost every coastal state has plans for two or three such ports - many of which are yet to materialize while some in Gujarat and in Andhra Pradesh are in operation.

7. AIRPORTS

- Traditionally handled by the public sector, a few private sector airports have already begun operations and a few public sector airports have been privatized

Spectrum of Market Structures

- In the real world, many of the perfectly competitive market assumptions are at most only weakly satisfied

  *firms produce heterogeneous rather than homogenous products

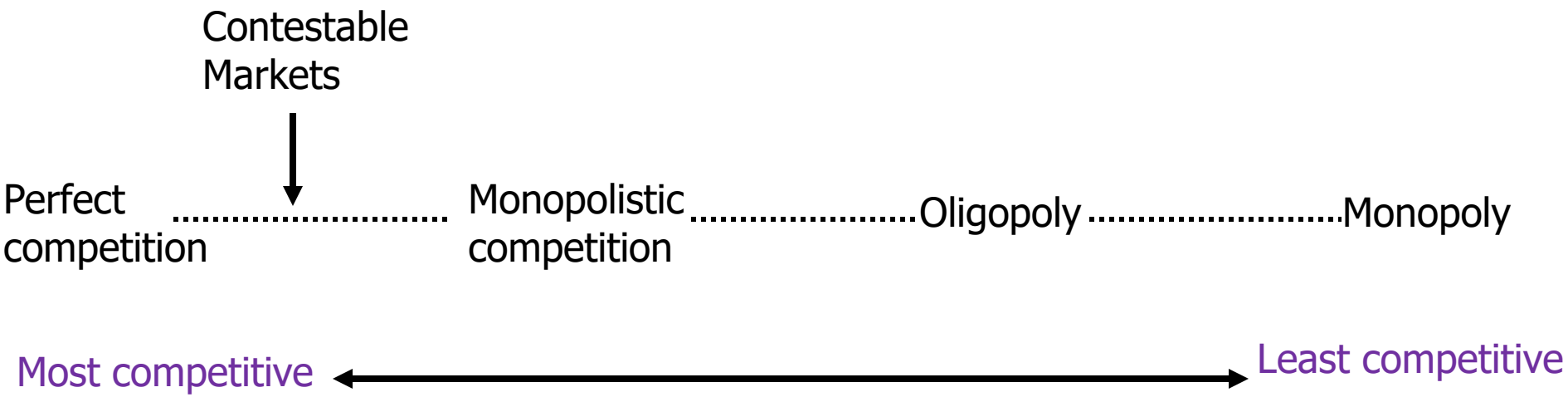
  *they differentiate the products

  *resources are mobile but not perfectly

  *information flows may take place but one may not have the relevant information

- Notwithstanding these weaknesses, the perfectly competitive market structure plays an important role by providing a context or a frame of reference that is used to assess resources allocations in alternative market structures that are less competitive

Spectra of Market Structures



- Under perfect competition the level of actual competition disciplines pricing behaviour.
- Under contestability the threat of entry disciplines incumbent's pricing behaviour. Contestable markets are primarily concerned with potential competitors rather than actual competitors.
- Monopolistically competitive market, oligopolies and monopolies and imperfect market structures that face downward sloping demand curves- which implies that each of these market structure has (varying degrees market power i.e. an ability to raise price above marginal cost without losing all of its market share).

Market Structure and Pricing- Basic Pricing Principles

Principles of Pricing

- Pricing is a method of resource allocation
- There is no such thing as the right price
- Rather there are optimal pricing strategies which permit specified goals to be obtained

  - for e.g., the optimal price to achieve profit maximization may differ from that needed to maximize welfare or ensure the highest sales revenue

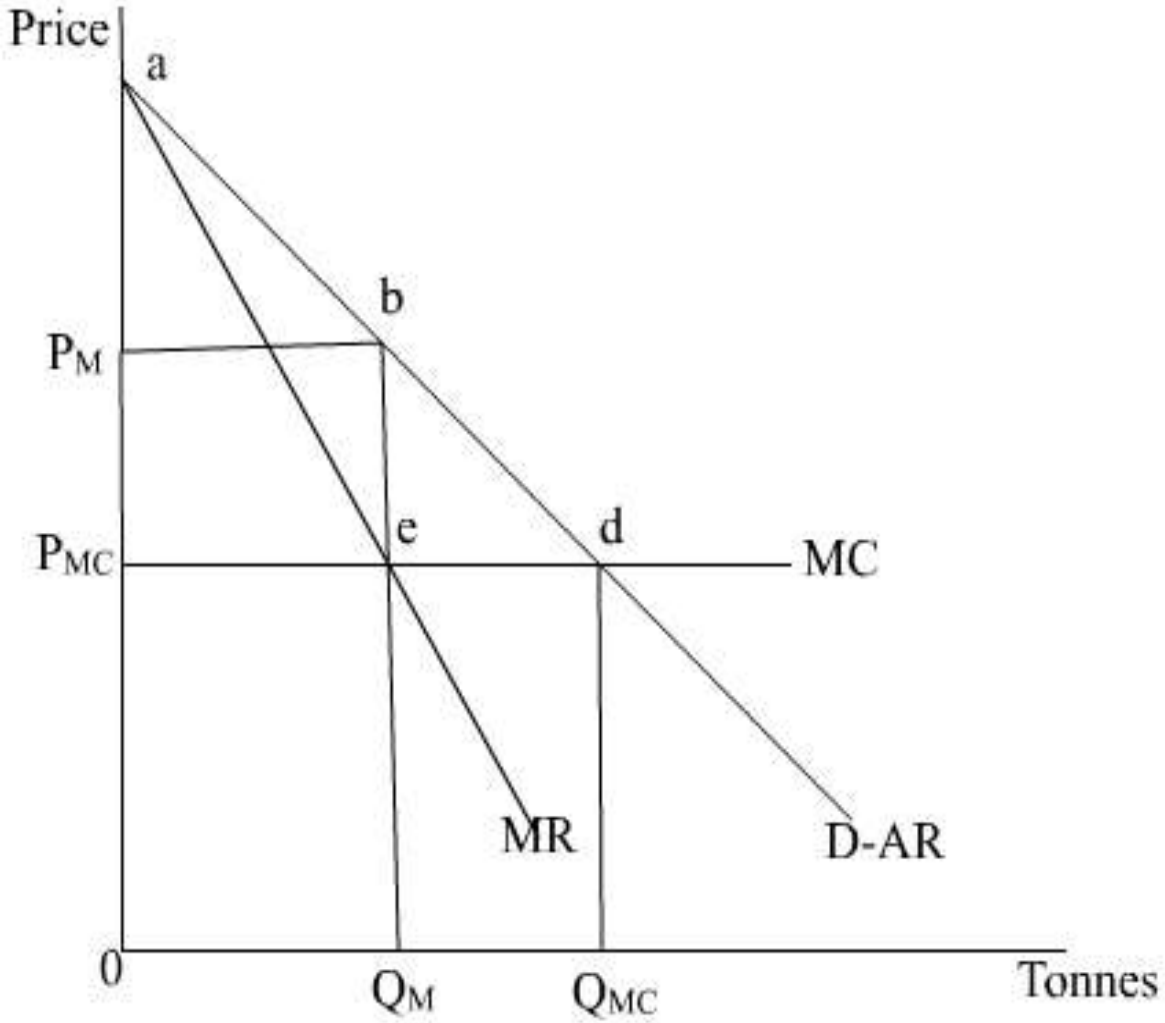
  - profit maximization is the traditional motivation of private enterprise under-taking

  - in a perfectly competitive environment elementary economics tells us that in the long run will be equated with the marginal (and average) costs of each supplier (LR=MC)

  - in contrast a true monopoly supplier has no fear of new entrance and has the freedom either to set the price or to stipulate the level of service he is prepared to offer. In the absence of competition a profit maximizing price will be above marginal and average cost

- This simple description however hides certain peculiarities which may arise in some transport markets. Accordingly some modifications have been made to clear it to captur the reality as far as possible

Some Theoretical Constructs
-Marginal Cost Pricing



1. Welfare economics takes a rather wider view of pricing as a method of resource allocation which maximizes social Welfare.

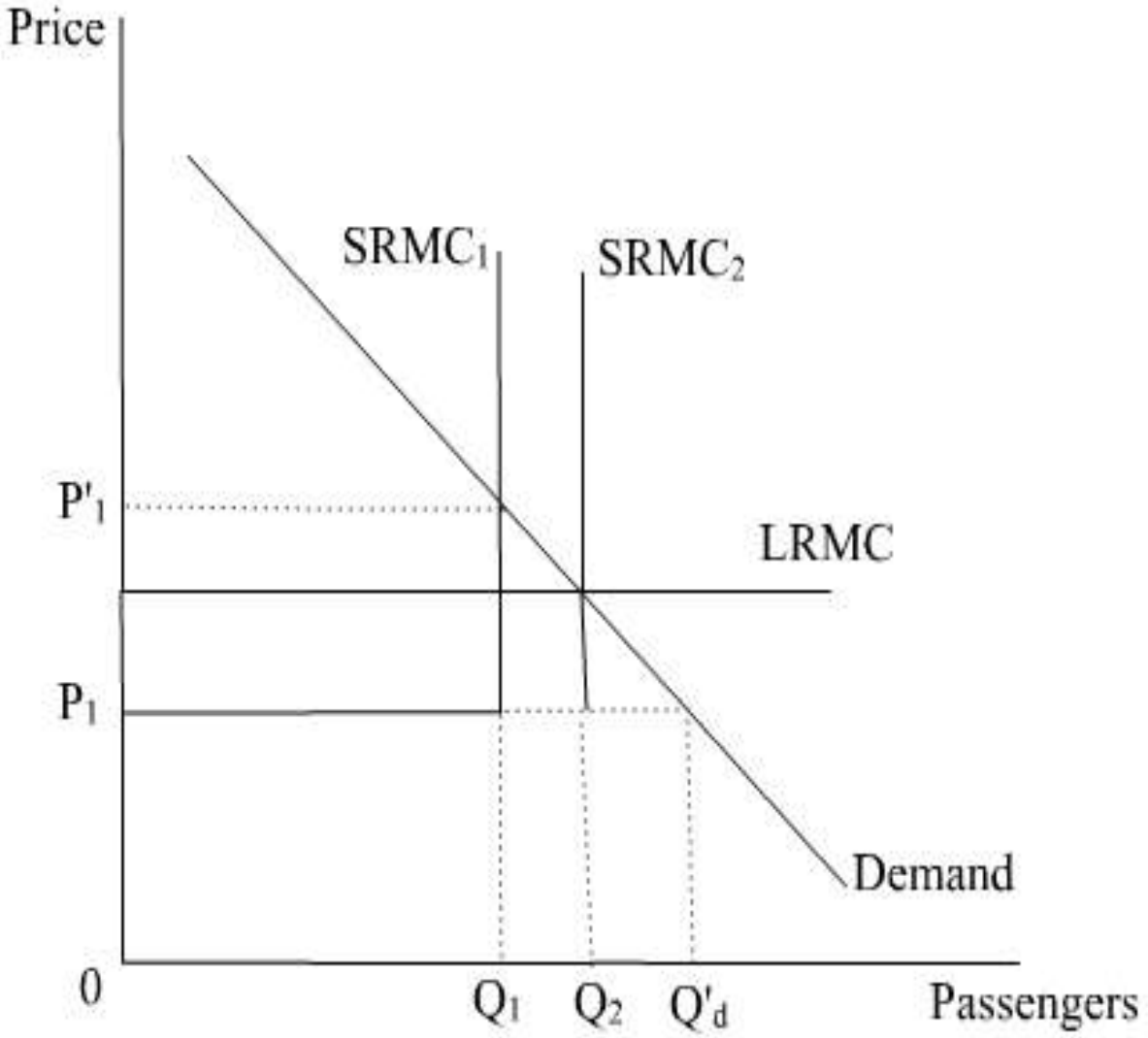
2.Thus the objective of public policy is maximization of:
SW=TR+CS-TC
where TR=total Revenue, CS=Consumer surplus, TC=Total cost.
(Explain figure)
3.There are questions concerning use of LRMC/SRMC

Some theoretical constructs
-Short Run and Long Run

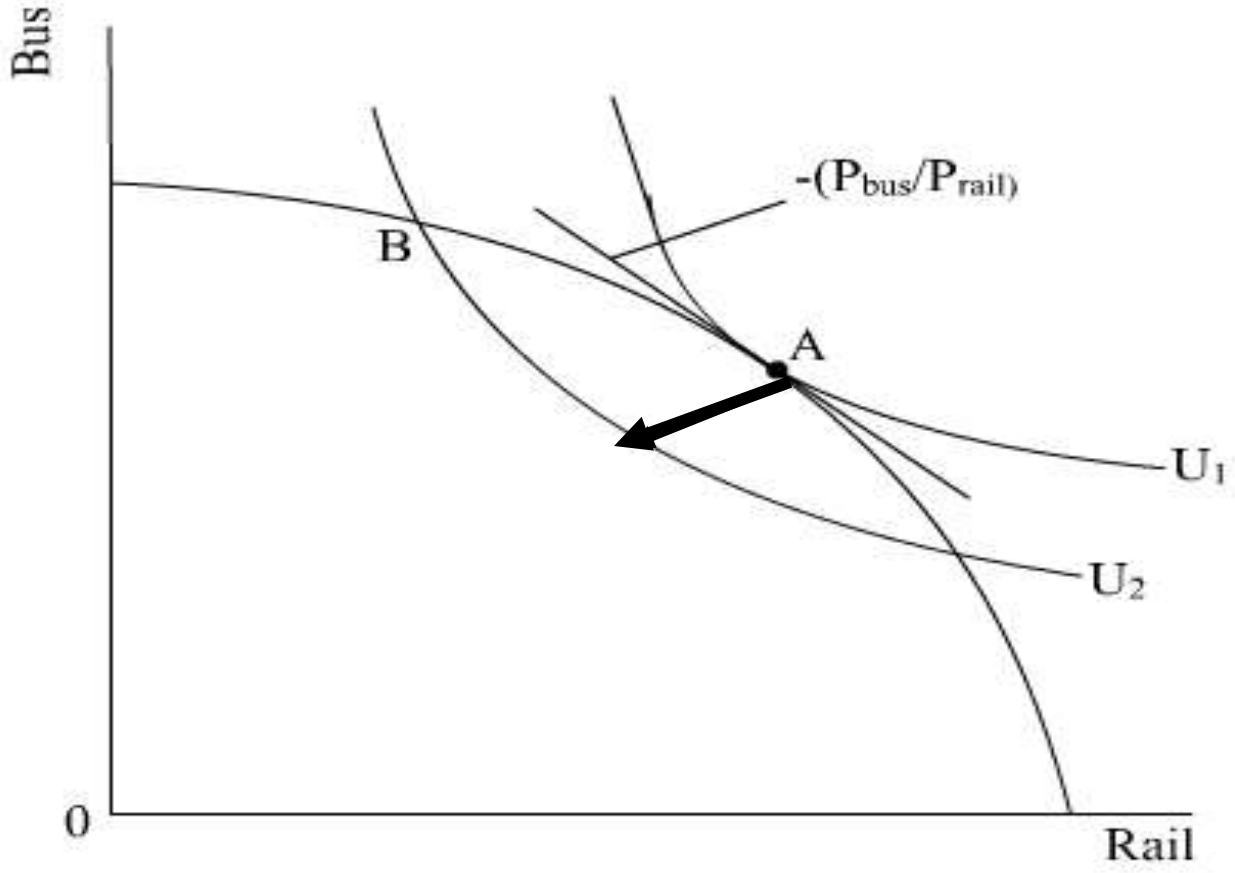
1.At P_1, demand exceeds capacity -a mark-up can be used to ration capacity. The extra revenue in excess of LRMC indicates need for expansion which can be up to Q_2 which will optimal scale of service.

2.We see that long run optimum is where **P=LRMC=SRMC**

3. In most cases, indivisibilities may make it impossible to provide exactly the optimal capacity Q_2 in which case a choice is made between a sub-optimal small/large systems.



Second Best Pricing

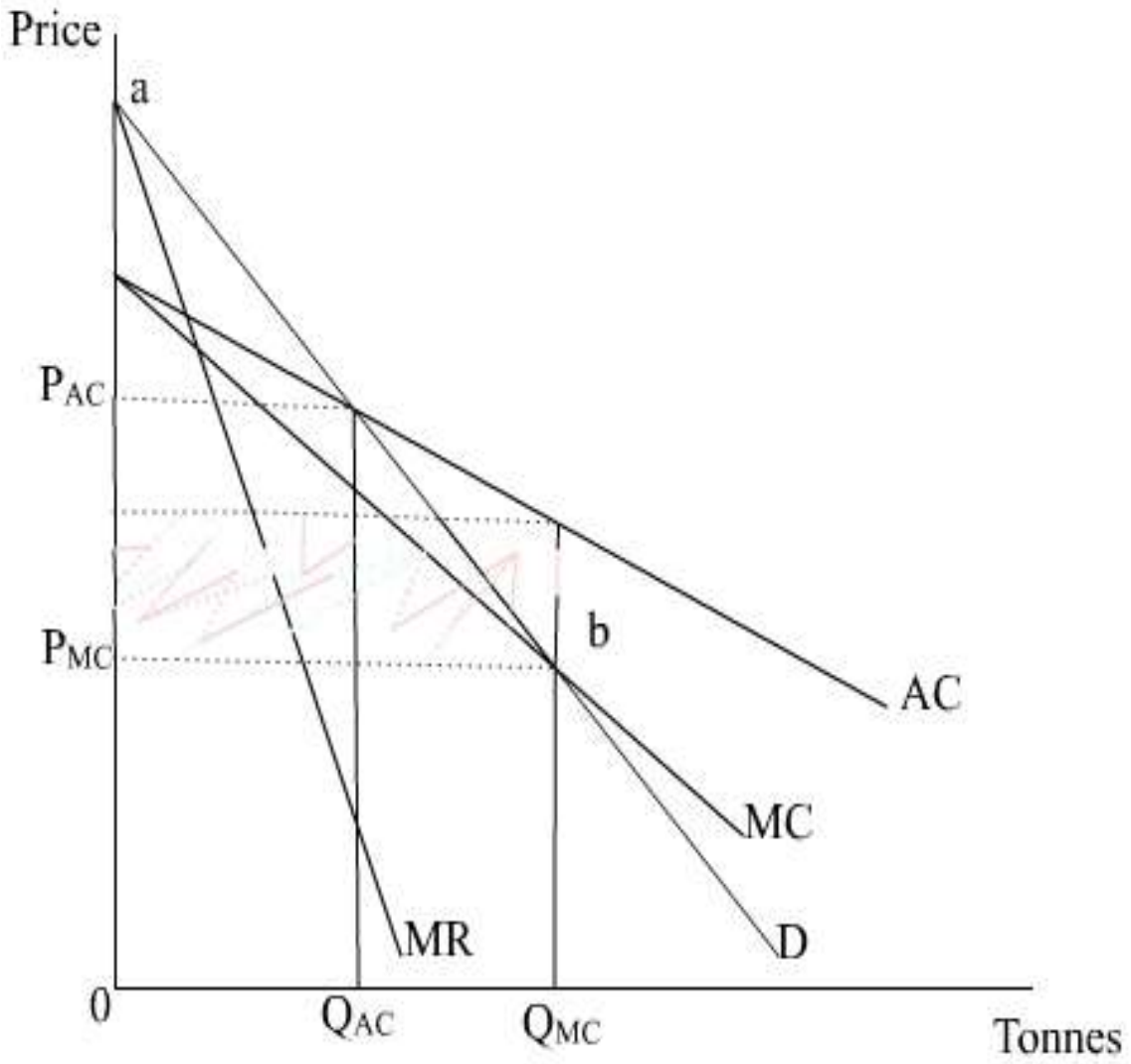


1. An implicit assumption in MC pricing is that all other prices are also set equal to MC
2. This is very often not the case. In such a situation the second best approach is to be taken in which case fares should deviate in the same proportion as in other modes and in other sectors of the economy.

Second Best Pricing

1.Incase of a decreasing cost Industry (for e.g. railways) the adoption of MC pricing will result in a loss shown by the shaded area.

2.A break even situation is attained by AC pricing-but Q_{MC}-Q_{AC} potential travelers are priced off.



Price Discrimination

- In a typical transport market which is more often of the monopoly type, the monopolist in this setting is often referred to as a single price setting monopolist.

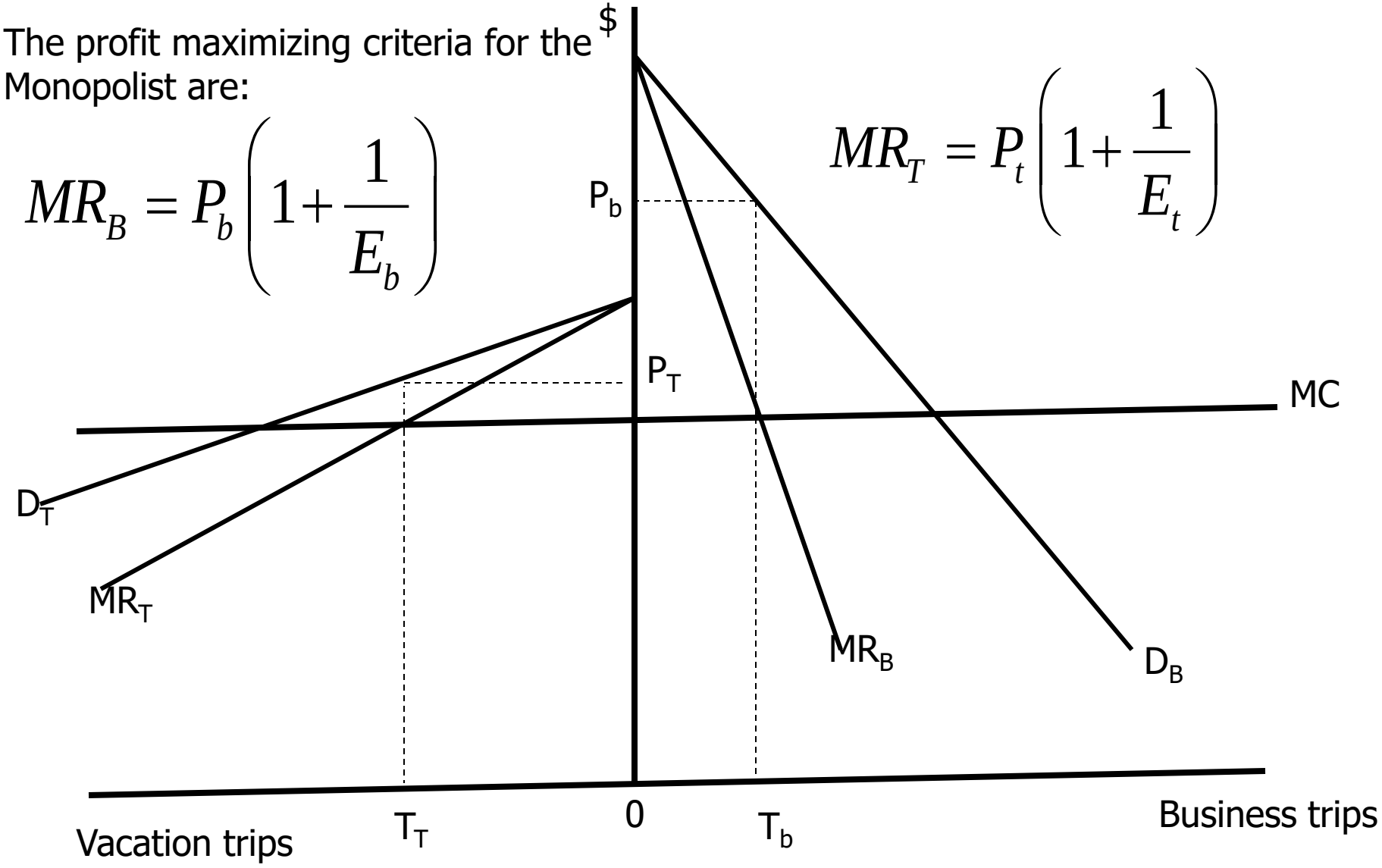
- It is invariably the case that the monopolist has the option to price discriminate that is to sell its output to different groups of consumers at different prices. Though the difference may not be based on differences in the cost of production.

Price Discrimination

The profit maximizing criteria for the Monopolist are:

$$MR_B = P_b\left(1+\frac{1}{E_b}\right)$$

$$MR_T = P_t\left(1+\frac{1}{E_t}\right)$$



Price Discrimination (contd.)

- Profits are maximized when:

$$P_b\left(1+\frac{1}{E_b}\right) = P_t\left(1+\frac{1}{E_t}\right)$$

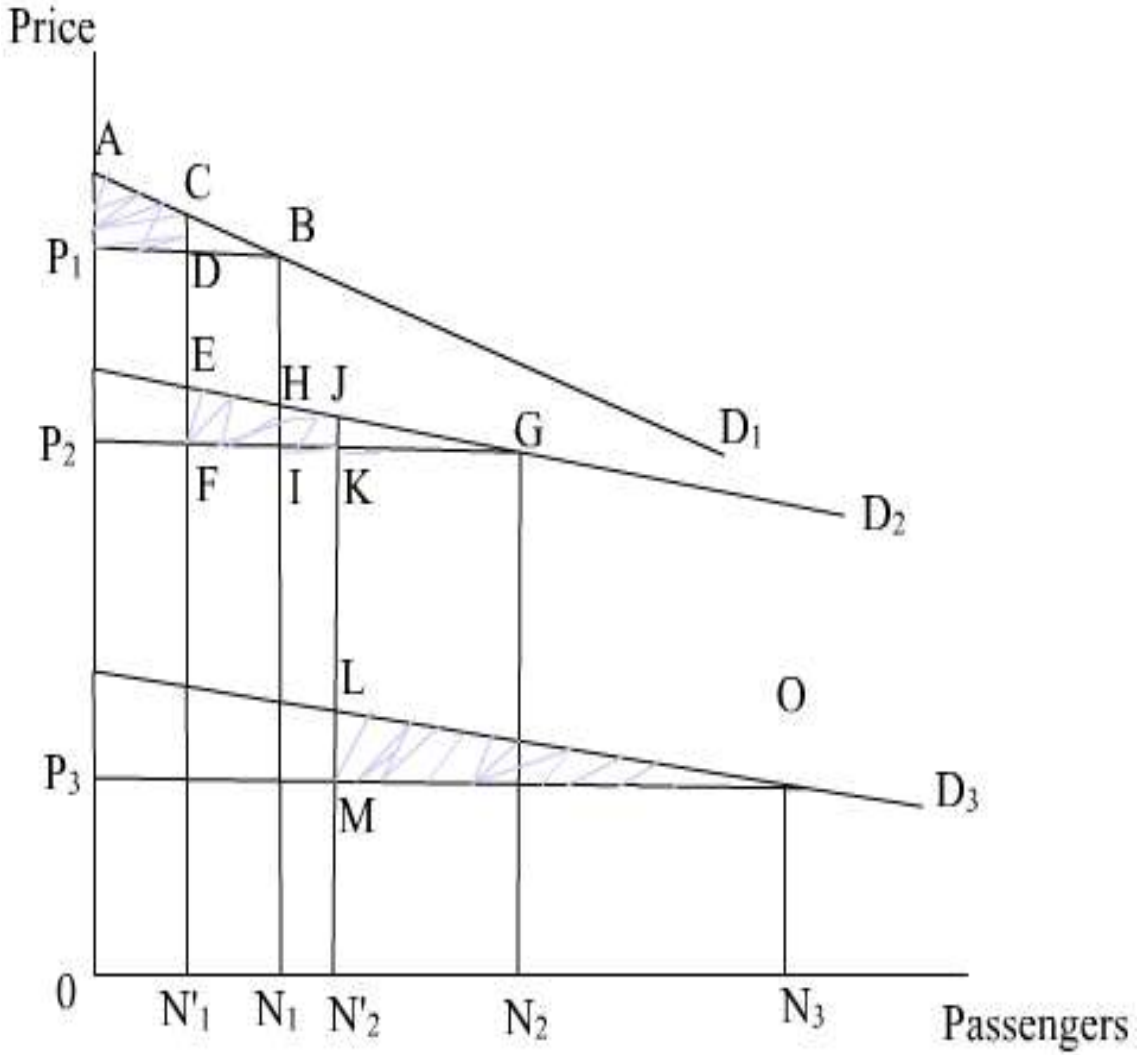
- Given $P_b > P_t$ then it must be true that $\left(1+\frac{1}{E_b}\right) < \left(1+\frac{1}{E_t}\right)$

This implies that $E_t > E_b$
i.e. monopolist sets a higher price in the market which has more inelastic demand

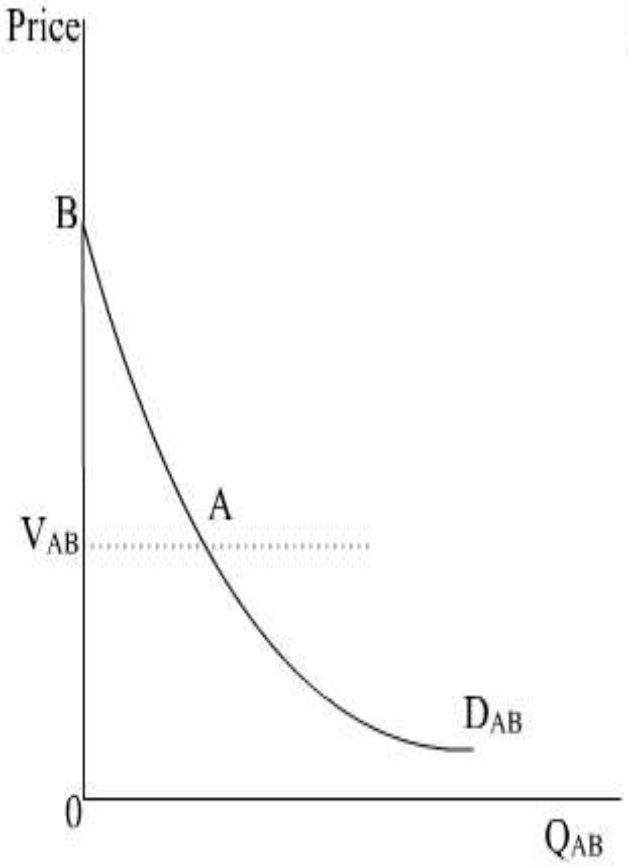
Price Discrimination (contd.)

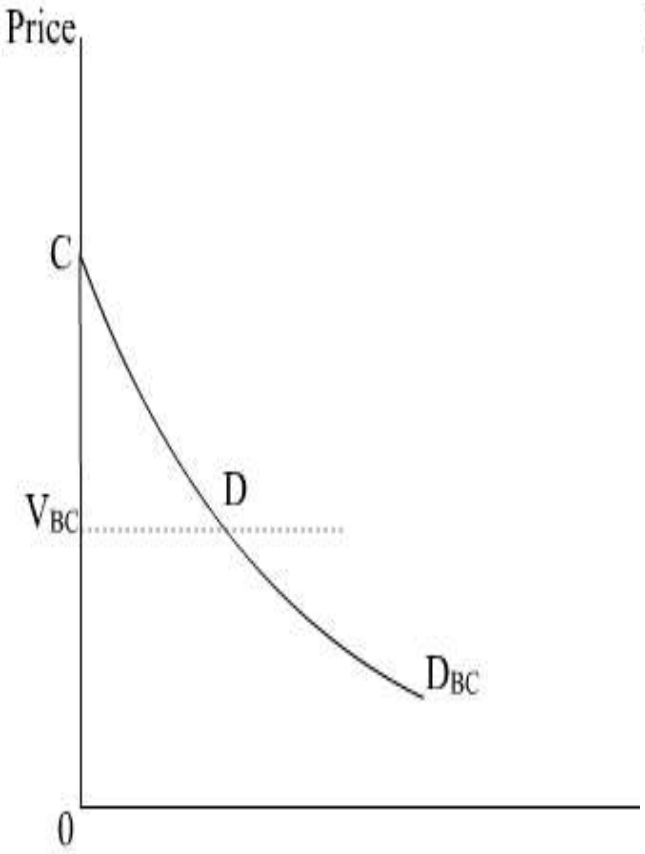
- In this figure there are three different group of potential travelers with demand curves D_1, D_2 and D_3-with prices P_1,P_2 and P_3 charged

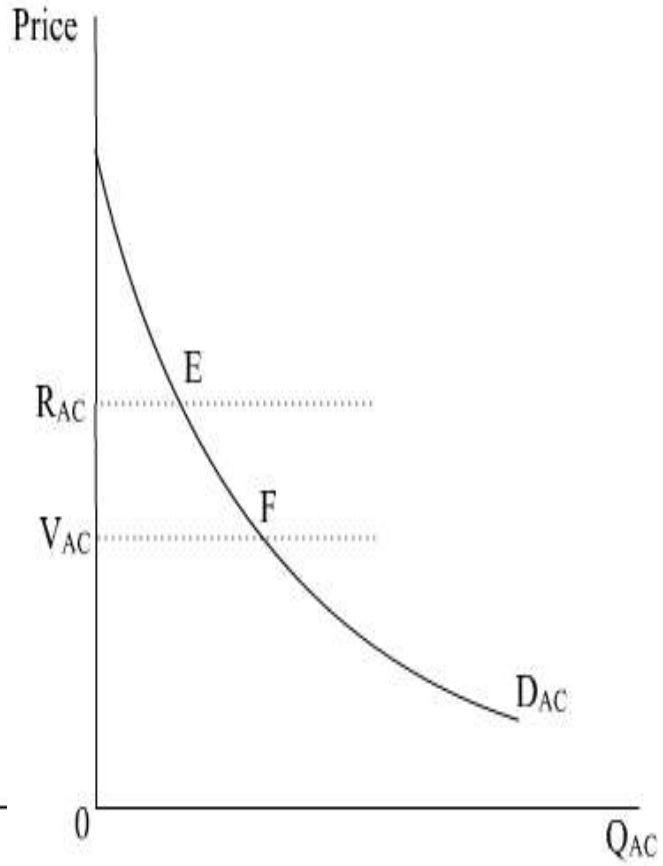
- Each group will reap a certain amount of consumer surplus-which increases with a fall in fares.



Price Discrimination (contd.)







- Identical goods with identical demand for transport could be charged more per Km for a short haul than for a long haul

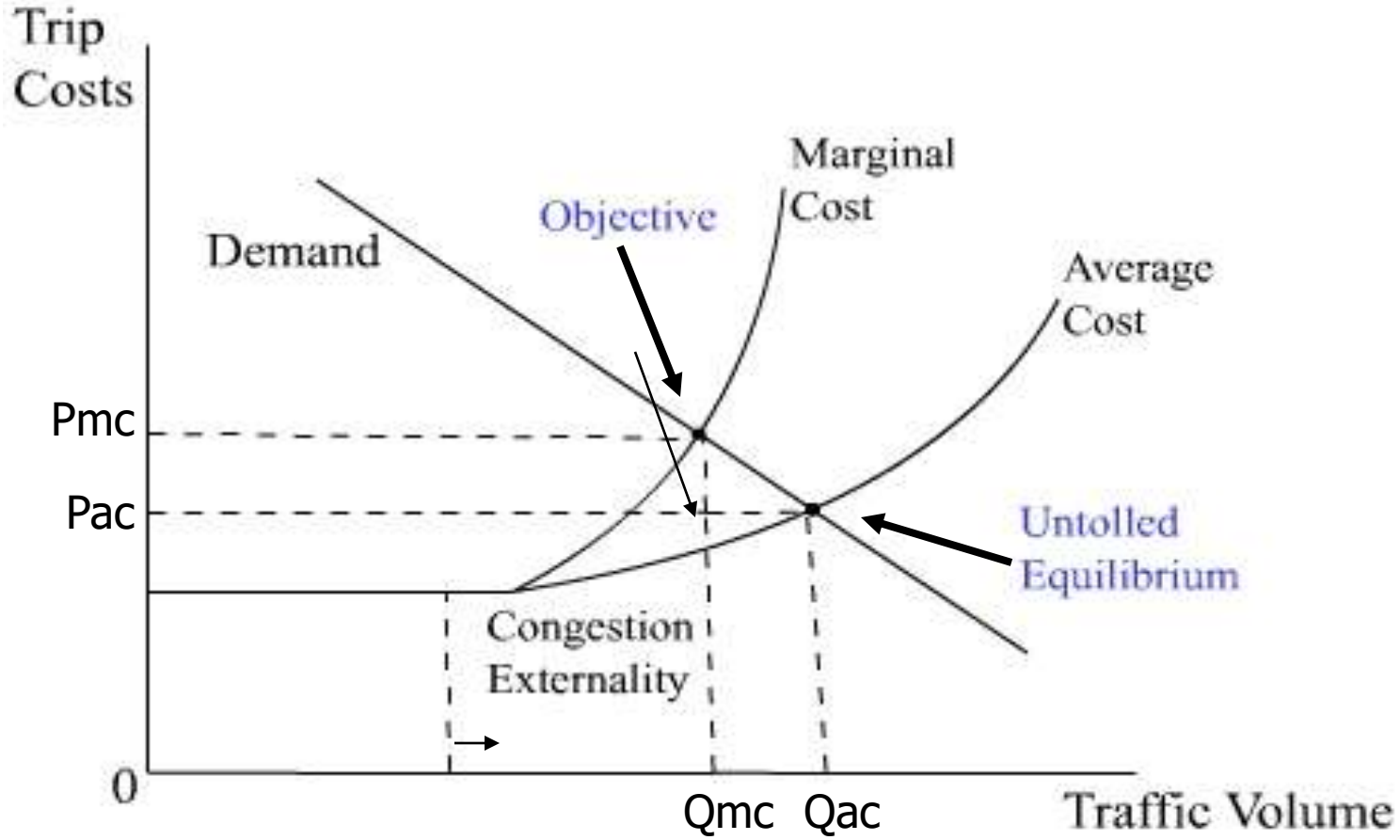
Pricing with Stochastic Demand

- Traditionally pricing models have assumed perfect knowledge of the demand situation even when regularly known peaks in demand

- When knowledge of demand fluctuations is less precise, the approach should be to structure fares so that on an average a certain percentage of seats remain empty.

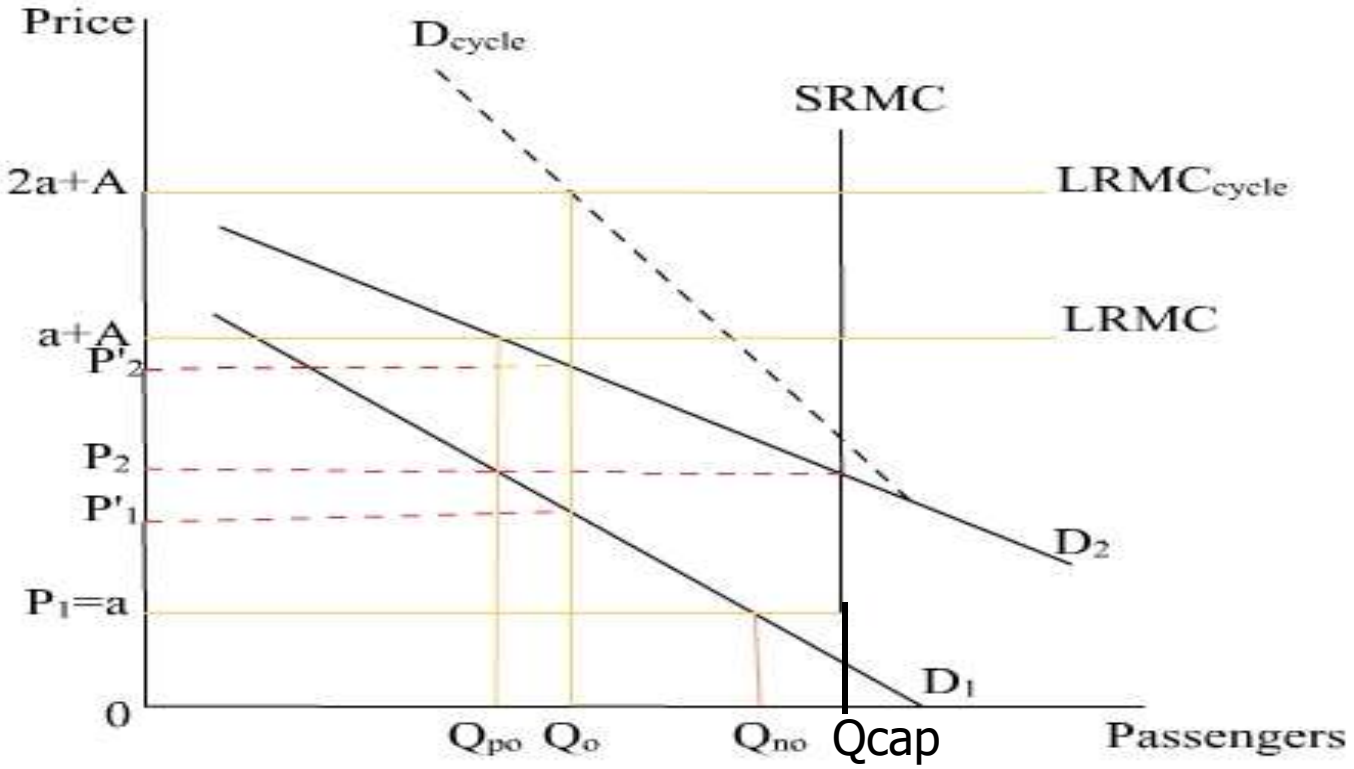
- Fares can be determined by simply dividing cost of service by the passenger carried by certain level of utilization. Additional revenue may be gained on an ad hoc basis by raising fares for those people whose willingness to pay exceeds the cost based fares.

Theory: Congestion Pricing with non-optimal Capacity



- At Qac – untolled equilibrium, the perceived cost is Pac
- At that volume, the social cost (as given by the mc curve) is much higher since the volume is much higher than the capacity at which the congestion externality begins to operate.
- Accordingly, a toll (Pmc-Pac) could have the impact of reducing the volume to Qmc

Theory: Congestion Pricing with Optimal Capacity



- D_1 is the low peak demand situation and D_2 is the peak level
- Oa is given as the short-run marginal cost of operation until the capacity
- P_1 and P_2 are the off-peak prices
- Long-run capacity costs are treated as constant at level A
- Since capacity is joint to both off-peak and peak periods, changes in the capacity should be determined by the combined demand given by Dcycle
- Similarly addition of short-run costs and capacity costs (a+A) gives LRMC
- Additional short-run costs involving "a" operating costs implies LRMC = 2a+A= LRMCcycle
- Off-peak travellers pay P'1 and peak travellers pay P'2

Congestion Pricing (contd.)

- Congestion pricing generates alternative financing while offering demand management
- The delayer pays principle- with compensation- can lead to efficient outcomes
- Remedying the congestion externality is tenable without making other measures worse for drivers
- Diverse policy objectives can be met simultaneously, including delay, welfare, and equity

- The price in transport markets (imperfect) normally depends upon **demand and cost related factors** and the regulatory environment.

- To reduce **market power and lower prices**, it is important to introduce changes in the regulatory environment that can have pro-competitive effect on the sector. This has been borne out in empirical models where, regulatory changes have resulted in a more competitive environment.

Market Structure and Pricing- Pricing of different modes

Some Basics

- We have seen that in theory a number of models of pricing have been postulated - each under different objectives.

- However, when it comes to actual application of these models, it is found to be difficult. Accordingly, in practice, models of pricing have been appropriately modified to take care of a variety of circumstances including the availability of the relevant data.

- One framework of pricing that has been used in practice (still so) and has suited a variety of objectives has been the so called **two part tariff** which has been adopted for pricing of almost all infrastructure services such as **power, water, transport, telecommunication, etc**. We now consider in some detail this application to the transport sector.

Some Basics (contd.)

- **Two Part Tariff**
  - We are aware that costs of services are of two types- **fixed and variable**-though finer distinctions can be made.
  - Basically both the above components of costs are allocated on the basis of **unit outputs**. In some cases where **price discrimination** is possible, the fixed cost component per unit of output may be fixed very high where the ability to pay is high (**to capture consumer surplus**). Invariably, the variable cost are recovered in full- since it is based on some measure of use- metering, road use, etc.

Examples (IPT)

- In the case of **Taxis and the Auto Rickshaws** –
  - Payment is based on **meter reading**
  - A fixed charge is levied for a minimum distance – this charge includes the cost allocated for fixed costs per kilometer based on a certain distance moved on an average plus the user charge for the minimum distance traveled.
  - Further movements are priced on the basis of distance slabs with or with out fixed costs per kilometer involved.

Example (Road Pricing)

- Strictly speaking there is no pricing system for road use in India except for some of the toll roads that have been built in the past decades. Instead road users pay fees and taxes as a condition of using roads and the roads themselves have been traditionally provided and maintained by Governments.

- The rate of taxes are not set with any pricing principle in mind nor is the expenditure related to income from road user taxation.

- However, these taxes can be regarded as a surrogate pricing system.

- Road user fees and taxes fall into different groups – fuel taxes, vehicle taxes, registration fees and license fees.

- Let us consider these in **detail**

Example (Road Pricing)

- Every vehicle owner has to pay a registration fee at the time of purchase of vehicle and also a license fee to procure a driving license. These two fees are expected to cover the fixed costs of road provision – since these payments are to be made whether one uses the vehicle or not. It is not quite sure whether all the fixed costs at different (Govt.) levels are covered by these fees or exceed the revenue from these fees. But the principle is identified.

- Once a vehicle is used, it uses fuel for which a variety of taxes such as excise duties, sales taxes, etc are levied. These are in the nature of user taxes – paid only when use of the vehicle is made not otherwise.

- Thus the principle is identified in terms of a **two part tariff**.

- Invariably, revenues from all the users taxes have far exceeded the expenditure on roads (taken as a whole) and with the inclusion of the above mentioned fees, the deviation is greater. However, the so called user taxes have strictly not being considered as being user taxes and have been traditionally looked upon as revenue for the general budget and also to some extent to serve as moderating influence on fuel consumption.

Example (Public Passenger Transport)

- In India, public passenger transport is provided to a significant extent by the public sector and to a lesser extent by the private sector.

- Traditionally, the practice is to have a single scale of fares chosen in such a way so as to ensure that the total revenue for the whole undertaking equals total accounting costs. **(Break Even)**

- Fares charged for individual passengers vary with distance but it is unusual for different fare scales to be applied on different routes.

- Basically the fares scales are represented by a fare per trip and a fare per unit distance travelled – **a two part tariff**.
  - This reflects the structure of the costs for carrying individual passengers because some costs vary with rout lengths and others are invariant to number of passengers carried.
  -

- For example, let us consider a case of BEST Mumbai –relatively minor alterations would be needed in the fares to conform to this to the principle.

Examples (Railway Pricing)

- Traditionally based on what is known as **"value of service"** pricing principle which is based on the theory of price discrimination (third degree) developed in the literature.

- Basically, it involves applications of the **two part tariff** with attempts to allocate fixed costs differently on different streams of traffic based on what the "traffic will bear".

  – Here the consideration is the significance of fixed costs in the total. Railways have a high proportion of fixed costs. Accordingly, it is always been found useful to spread these costs over as many movements across commodities as possible – with minimum allocation to those streams which can not bear the charges and maximum to those which can bear them.

  – The principle involved is to separate the markets based on different elasticities of demand – low value items such as coal, etc cannot withstand high charges since high charges would mean that transport charges would form a substantial portion of the final delivered price. On the other hand, in the case of high value item high charges would only be a small portion of the final price.

Examples (Railway Pricing)..cont'd

- Indian railways continue to follow this principle even today though there are compelling reasons to adopt a more rational pricing strategy given the changes in the market structure.

  - Basically, at a time when road transport was not effective, railways could easily pursue the **value of service pricing principle**. However, the emergence of the road mode over a period of time in an effective way has resulted in high value items moving to roads and the railways being saddled with losses resulting from movement of low value items only. As a result, cross subsidization – a traditional practice – has been severely hit.