Pricing

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PREFACE

This Pricing chapter of the Transit Marketing Management Handbook was prepared as a result of a study performed under contract to the U.S. Department of Transportation, Urban Mass Transportation Administration, Office of Transit Management. The work was performed by Grey Advertising, Inc. in conjunction with Chase, Rosen & Wallace, Inc.

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PART I—INTRODUCTION

Purpose and Scope

This chapter of the Transit Marketing Management Handbook discusses the use of pricing strategy as one component of the process of marketing transit services. Transit pricing strategy essentially involves the determination of fare levels, fare structure, and fare collection techniques. In combination, these elements make up a transit pricing policy. Pricing strategy refers to the establishment of specific pricing policies in order to foster the attainment of the transit system's goals.

Part I of this chapter presents a discussion of the role of pricing in a marketing program, a brief history of transit pricing and a summary of pricing policy trends. Subsequent parts present:

Part II - Elasticity - a discussion of the impact of fare levels through the concept of demand (ridership) elasticity relative to price;

Part III - Fare Structure and Fare Collection - discussions of some of the more common and promising practices other than the adjustment of fare levels; and

Part IV - Case Histories - discussions of some actual pricing changes that have been implemented and the generalizations that can be drawn from these experiences.

The Marketing Role of Pricing Strategy

Transit pricing strategy has become a very important part of most transit marketing programs. It differs from most of the other marketing components in that it can be employed in three ways:

1. It can be used to directly attract increased ridership; e.g. through lower fares.
2. It can be used indirectly to attract increased ridership; e.g. through increased fares additional revenues should be produced which could be used to finance other components capable of attracting new ridership (more than might be lost due to the fare increase).
3. It can be used independently of any marketing program; e.g. to reduce the transit system's deficit.

However, to insure the desired effects of a pricing policy, it is important that the pricing strategy be part of a comprehensive marketing program, tailored to specific markets, with well-defined, measurable goals. Such a program should also encompass the functions of market research, service planning and development, promotion, information aids, and sales communication. Thus the negative effects of fare increases (e.g. reduced ridership) may be offset by simultaneously improving service and/or equipment and initiating a sales communications campaign. The negative effects of fare decreases (e.g. reduced revenues) might be offset by adopting a fare structure that discriminates among market segments, for example, reducing fares (or employing promotional fares) only on under-utilized routes and/or only during off-peak periods, or among certain groups of people.

Fare level change is not the only element in pricing policy that can have both positive and negative effects. Many changes in fare structure will be viewed adversely by some riders or potential riders, even though the changes are designed to benefit most transit riders; for example, changing zone definitions to produce zones of more equal size may cause the fares for some trips to increase. Also, changes in fare collection techniques designed to speed up service and reduce the risk of robbery may result in greater rider inconvenience (e.g. the need for exact fares) and greater operating costs (e.g. adoption of special equipment, printing and distribution of tickets, tokens or passes, etc.).

Background

Traditionally, pricing was the means by which a transit system levied a charge on each rider commensurate with the cost of the service provided. This approach was most appropriate when transit systems were privately operated for profit. It also made sense in an era when public transit faced little competition from the auto and problems relating to auto overreliance did not plague American life.

The advent of the private automobile as a major means of intra-regional transportation created a syndrome that had a major impact on transit systems, their pricing policies and ultimately their pricing strategies. The automobile reduced the dependence of the population on the transit system. It permitted the population to disperse away from established transit lines. Ridership was being lost directly to the automobile due to the automobile's perceived convenience, low cost and/or prestige. As transit managers found they could not efficiently serve the dispersed potential riders, unprofitable routes were eliminated and fares were raised. This caused more people to perceive the automobile as being more convenient and less costly than transit, and additional ridership was lost.

In many localities the result was ridership consisting of individuals who used transit only during the peak periods for work purposes and individuals having no convenient alternative to transit--the old, the poor, the handicapped, children, those who did not know how to drive, those who could not afford a second (or third) car, etc. As profits turned to deficits, the private operators were taken over by public agencies, since it was felt that transit is an important service for the social and economic welfare of the community. Emphasis thus shifted from making a profit, to providing needed service at a reasonable price.

New public pricing strategies evolved which established pricing policies directed at considerations such as: keeping the difference between costs and fare-box revenues within manageable bounds; achieving greater utilization of existing services; making fares more equitable in terms of ability to pay or services received.

In more recent times, urban areas have been faced with many problems relating to the overreliance on automobiles, e.g. pollution, congestion, fuel shortage, etc. To ease such problems, efforts have been directed to significantly increase transit utilization. Marketing programs directed toward this end generally include pricing strategy as one component. The results of such programs have indicated that, while reduced fares, modified fare structures and improved fare collection techniques can help in achieving the goals, fare policy changes alone rarely produce the desired results. Even experiments which have eliminated all fares have produced only limited reductions in auto usage.

Market research studies in a number of cities have suggested that most people still perceive the cost of auto usage to be less expensive than the cost of transit usage. This might be partly explained by the absence of a cash outlay for individual auto trips. Other factors cannot be ignored, however. Many people still find auto trips to be more convenient, and many perceive a greater prestige in the use of autos rather than transit. Thus, for the newer pricing strategies to be effective, they generally have to be accompanied by service and equipment improvements which can be translated into greater rider convenience, and by promotions which help upgrade the prestige of transit ridership and/or educate the public as to actual auto usage costs.

In addition, the transit manager can improve the competitive position of transit versus the automobile by influencing the automobile pricing policy--cost of parking, parking space availability, vehicle transfer and gasoline taxes, bridge and road tolls, etc. The United States Department of Transportation's Joint Highway and Public Transit Planning regulations have given transit systems fullfledged membership in the urban transportation planning process. This process provides the transit manager with a forum for influencing the relative cost of an automobile trip in relationship to transit fares. Increases in auto costs can increase transit ridership in a manner similar to fare reductions, while avoiding the revenue loss normally accompaning fare reductions.

Policy Trends

A review of transit system statistics for most of the major urban areas in the period since 1958 indicates wide variations in pricing policies. Most of the fare level policies reviewed, however, fit into one of the following three categories:

(1) The first group of pricing policies involved continuously increasing fares, attempting to keep pace with increasing operating costs. This generally resulted in base fares being doubled in the period from about 1960 to 1974. These policies , as a general rule, tended to produce higher revenue-to-cost ratios (i.e. lower operating deficits) than the other policies. Base fares for this group in 1970-1972 were generally in the neighborhood of 50 cents.

(2) The second group of policies involved small, if any, increase in fares during the period from 1960 to 1974. These tended to produce lower revenue-to-cost ratios than did the others.

(3) The third group resembled the first group until about 1970-1971. At that point fares were either stabilized or else they were lowered to the levels more common to the second group, i.e. base fares in the range from 25 to 35 cents.

Limited data available for the last few years suggest that due to the continued increase in operating costs, many of the transit systems falling into groups 2 and 3, as defined above, are again raising fares. It further appears that such fare changes are being made part of a broader marketing plan in hopes of maintaining the increased ridership developed by the earlier policies. Some specific examples are presented later in the Case Histories section.

Of equal significance to the fare level changes have been the changes in fare structure and fare collection techniques. Two specific policies in these areas appear on their way to becoming standard nationwide. The first is the trend toward requiring exact change for fares. This policy provides faster service and reduces the risk of robbery; however, it can also increase rider inconvenience. Transit systems generally attempt to offset this inconvenience by selling tokens, tickets or passes that can be used in place of coins.

The second general fare structure trend applies only to those larger cities where transit service has been provided by more than one independent operator. Such localities are taking steps to create an integrated regional transit system. Sometimes this takes the form of consolidation under a single system or operating agency. In other instances it is brought about by establishing uniform fare policies, generally accompanied by easier and less costly means of inter-line transfer. The net result is greater rider convenience, hopefully followed by increased ridership.

Other pricing policy changes are being tried with varying success by a number of transit systems. Many of these are discussed later in the Fare Structure and Fare Collection section. No clear trends have yet emerged relative to such practices, except that more and more transit systems are experimenting with one or more of these as part of marketing programs.

PART II - ELASTICITY

Elasticity is a measure used to describe the sensitivity of one element with respect to another element. In the transit context, elasticity usually refers to the change in ridership (demand) relative to a change in price (fare) or service. Once the elasticity or "sensitivity" of a market is determined, it can be used to predict the effects (changes in ridership) of future changes in price or service.1/

This chapter is concerned primarily with pricing policies, thus all reference to elasticity should be understood to imply "relative to price" unless otherwise explicitly noted. Such elasticities can be estimated by noting the actual changes in ridership following fare increase or decrease, i.e.

$$\text{Elasticity} = \frac{\text{\% Change in Ridership}}{\text{\% Change in Fare Level}}$$

If ridership is found to drop by 10 percent following a 40 percent fare increase (and assuming that no other changes occurred which might have affected ridership), the elasticity would be approximately:

$$\frac{-10}{40} = -.25$$

where "-10" indicates that the 10 percent ridership change was a decrease. Similarly, if ridership is found to increase by 10 percent following a 50 percent fare decrease, the elasticity would be approximately:

$$\frac{10}{-50} = -.20$$

where "-50" indicates that the 50 percent fare change was a decrease.

Elasticities relative to price are generally negative; that is an increase in fare will cause a ridership decrease and, conversely, a decrease in fare will cause a ridership increase. Historical data indicates that on the average each 10 percent increase in fares caused a drop in ridership of approximately 3 percent. This implies an average elasticity

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1/ The discussion of elasticity presented here is intended to provide the reader with a general understanding of the concept. It is not intended to be totally complete from a technical viewpoint. (See Bibliography Reference 25, for a more technical discussion.)

of -.3. The combination of a 10 percent fare increase and a 3 percent ridership decrease yields a 6.7 percent increase in revenues. This fact has been used as a rule-of-thumb2/ by many transit managers in determining new fare levels, or in estimating the operating deficits expected from planned fare reductions.

Another way of looking at this elasticity is to define it as the "loss ratio factor". The percent loss in ridership can be estimated by multiplying elasticity (the loss ratio) by the percent change in fare. Thus, if the fare increase is 10 percent and the elasticity is -.2, then the expected ridership change would be:

$$-.2 \times 10\% = -2\%$$

i.e. a decrease of 2 percent. More generally:

% Ridership Loss = Elasticity (Loss Ratio) x % Fare Increase.

With a slight rewording, this concept can also be applied to fare decreases, i.e.:

% Ridership Gain = Elasticity (Gain Ratio) x % Fare Decrease.

In order to increase revenues and simultaneously maintain or increase ridership levels, it would be necessary to have a Loss Ratio that is close to 0.0 (or positive) or a large (negative) Gain Ratio. Few, if any, markets have demonstrated such elasticities. The -.3 average elasticity value indicates that, in general, ridership loss will follow fare increases and revenue loss will follow fare decreases. It is the function of marketing to use the knowledge of local elasticities to obtain an appropriate mix of ridership, revenue and service.

The impact of a -.3 elasticity is reflected by the following examples.

Consider a transit system with a base transit fare of 50 cents, and a current ridership of 100,000 trips in a given period of time. Revenues for that period are:

$$100{,}000 \times \$\ .50 = \$50{,}000$$

If the fare is now raised to 60 cents, then there is a fare level change of:

$$\frac{\$\ .60 - \$\ .50}{\$\ .50} = .2 \text{ or } 20\%$$

2/ Often referred to as "Curtin's Rule", reflecting findings by John Curtin (see Bibliography Reference 13).

Assuming a loss ratio of -.3, we would expect a ridership decrease of:

$$-.3 \times 20\% = -6\%$$

or 6% of 100,000 = 6,000 trips

This new ridership level would yield revenues of:

$$(100{,}000 - 6{,}000) \times \$ .60 = \$56{,}400$$

which represents a 12.8% increase in revenue.

It is important to note that the "average" elasticity value (-.3) is not applicable for all markets and all situations. More recent data suggest that fare level is becoming a less important consideration in the selection of transportation mode. This appears especially true in relation to fare level decreases, i.e. elasticity values closer to -.2 are being noted following fare reductions.

Table 1 presents a summary of values for elasticity relative to price estimated by the American Public Transit Association (APTA) from about 400 fare changes during the period from 1947 to 1967. These data indicate a relatively constant elasticity value of about -.35 over the 20-year period.

Despite the consistency, these data also reflect some interesting variations. In the larger cities (populations over 500,000) elasticities have decreased significantly from -.34 to -.22 over the 20 year period. In the intermediate cities (populations from 100,000 to 500,000) elasticities have remained relatively constant. In the smaller cities (populations less than 100,000) elasticities have increased significantly from -.33 to -.43.

The change in elasticity from -.34 to -.22 in the larger cities indicates that, as the fares have been increased, the number of riders who switched from transit to auto have decreased on a percentage basis. Early in the 20 year period, a 10 percent increase in fares would have resulted in a 3.4 percent decrease in ridership. The same relative increase later in the period would have resulted in only a 2.2 percent decrease. This suggests that, in the later period, fare level was becoming a less important consideration in selecting a transportation mode than such items as frequency, reliability, convenience, energy conservation, etc. On the other hand, the elasticity increase from -.33 to -.43 in the smaller cities indicates the dominance of fare itself among the concerns of transit users in these cities.

TABLE 1

EFFECT OF FARE CHANGES ON TRANSIT RIDERSHIP, EXPRESSED AS NEGATIVE ELASTICITIES, 1947-1967

	Elasticities (a)					
Population of Principal City Served	No. Cities	1947-1952(b)	No. Cities	1950-1961(c)	No. Cities	1961-1967(d)
More than 500,000	60(e)	-0.34(e)	51	-0.28	15	-0.22
100,000-500,000	91(f)	-0.36(f)	88	-0.33	35	-0.32
Less than 100,000	44	-0.33	68	-0.36	39	-0.43
Total	195	-0.35	207	-0.32	89	-0.35

(a) Calculated from three months immediately preceding and six months immediately following fare change. Expressed as percentage change in ridership per one percent fare change.

(b) Source: "Summary of 195 Observations on Estimated Loss in Passenger Traffic Resulting from Fare Increases on U.S. Transit Companies," ATA, dated April 16, 1953.

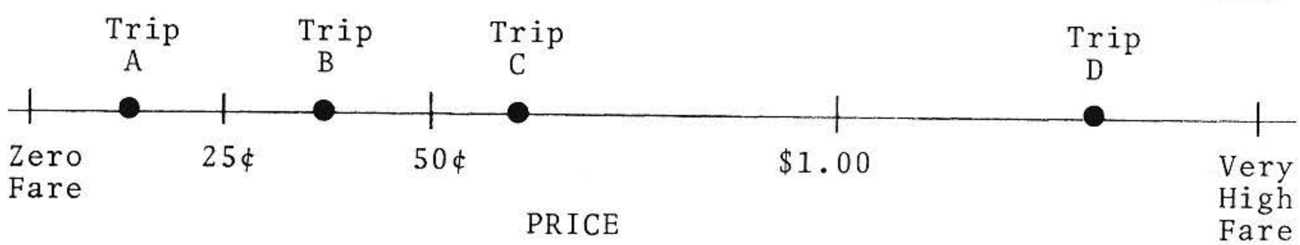
(c) Source: "Estimated Loss in Passenger Traffic Incident to Increases in Urban Transit Fares," ATA, dated November 24, 1961.

(d) Source: "Estimated Loss in Passenger Traffic Due to Increases in Fares (1961-1967)," ATA, dated February 9, 1968.

(e) Combined figures for cities 500,000-1,000,000 and over 1,000,000.

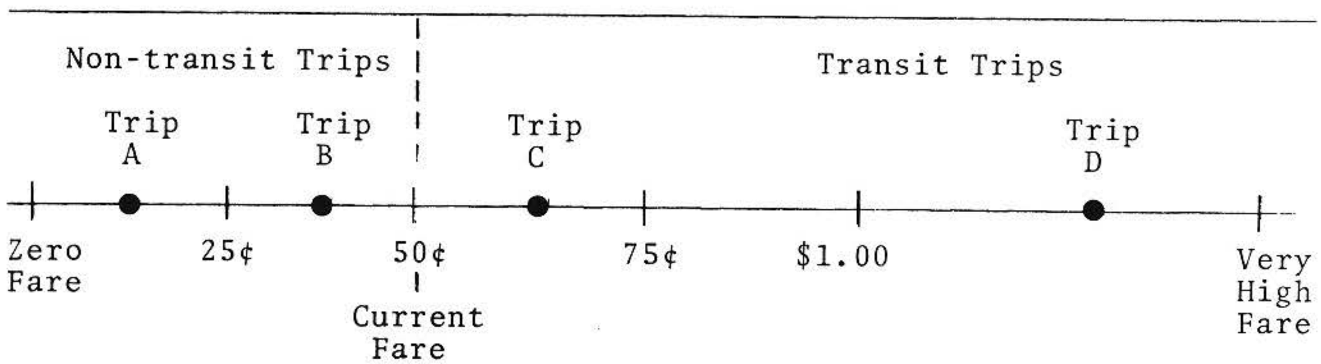
(f) Combined figures for cities 100,000-250,000 and 250,000-500,000.

To better visualize the concept of elasticity, it is useful to consider each current or potential transit trip in a market as having associated with it a price (transit fare level) at which its mode would change, i.e. from non-transit[3] to transit if fares decreased or from transit to non-transit if fares increased. These trips could be plotted along a scale such as:



The above diagram shows four trip categories plotted on the scale. (No attempt has been made to show relative numbers of trips or all trip categories in this illustration.) Trip A has a "price" close to zero. This indicates that the fare would have to be very low before it would be made by transit. Trip B would use transit if the fare were somewhat under 50 cents. Trip C would use transit if the fare were 50 cents, but would not be made by transit if it were significantly higher. Finally, Trip D has such a high "price", that it would probably be made using transit for any reasonable fare level.

If the current fare were marked on the scale, it would separate non-transit trips (to the left) from the transit trips (to the right). If the current fare were 50 cents, the above example would become:



3/ "Non-Transit" is used here to refer primarily to trips made by auto, bicycle or foot. It also includes trips which are not made at all, if not made by transit.

A change in fare would be equivalent to shifting this separator between non-transit and transit trips. Thus a 25 cent decrease in fare would make Trip B a transit trip, while a 25 cent increase in fare would make Trip C a non-transit trip. Small changes in fare would not affect Trips A and D; considerations other than fare level apparently dominate their mode selection.

Elasticity relative to price can be thought of as reflecting the relative number of trips added or subtracted from the transit side of such a scale when the current fare line is shifted. Thus a market with more trips clustered about the current fare separator will have a greater elasticity value than one with a more uniform distribution of trips over the scale. Further, if there is a greater clustering on one side of the separator than on the other, there can be a significant difference in elasticity value for fare increases and fare decreases. The effect of a fare reduction, therefore, need not be the mirror effect of an equal fare increase.

Implicit in the above representation was the condition that all factors other than transit fare remain unchanged. There are many events that may cause a non-transit user to change the price at which he would switch to transit, e.g. increased cost of gasoline, parking or tolls, shortage of gasoline, restrictions on the use of automobiles, etc. Such events would cause many trips to be shifted to higher scale values, and thus change the elasticity relative to transit fares.

As suggested by the above discussion, there is no reason to expect consistency in elasticity values from one city to another, or within the same city as fares continuously change. Transit planners should rely on locally determined values of elasticity, rather than the rule-of-thumb. For example, in Washington, D.C. it was predicted that peak hour suburban commuter trips had a lower loss ratio (elasticity) relative to fare increase than did most other types of trips. This reflects the limited downtown parking and the peak hour congestion on highways leading to the city. Thus in an attempt to raise revenues, bus fares were raised during the peak commuter periods for suburban riders only. This has produced increased revenues with minimal loss of ridership.

Recent experiences with fare decreases have provided other examples for the need to consider specific market elasticities. When Atlanta and San Diego introduced similar major fare reductions, San Diego obtained a significantly greater ridership increase than did Atlanta. Several factors may have caused this, including differences in services provided. One major factor suggesting itself was the fact that Atlanta had a significantly greater percentage of its potential ridership already using transit and hence had a lower elasticity (in terms of the diagrams shown earlier, there was a smaller proportion of trips to the left of the current fare line).

Data obtained from cities implementing fare decreases have further indicated that, on the average, values for elasticities relative to fare decreases tend to be closer to -.2 than -.3. Since only a relatively small number of cities have reduced fares, in comparison to the almost 400 cases on which Table 1 was based, the significance of this difference cannot yet be determined. Further, there is a possibility that this finding simply reflects the trend shown in Table 1 for the larger cities.

Efforts to estimate elasticity values for specific markets is generally not as simple as outlined earlier. An implicit assumption in the formula shown was that no other factors were causing ridership to change during the period of interest. This assumption seldom holds in real life. Varying gasoline prices, changes in transit service, seasons of the year, etc., can all lead to ridership level changes which can mask the effects of fare changes. Fortunately, statistical methods are available which allow the transit analyst to isolate effects attributable to specific causes when sufficient historical data are available.4/ The complex realistic cause/effect relationships help explain the fact that some cities achieve ridership increases following a fare increase, or achieve revenue increases following a fare decrease. A good transit marketing program takes advantage of these capabilities by integrating elements in such a way that the desirable effects are maximized and undesirable effects are minimized.

4/ See, for example, Kemp, "Some Evidence of Transit Demand Elasticities", (Bibliography Reference 25).

In summary, knowledge of the elasticity of a specific market relative to fare levels can suggest the limits of what can be achieved with fare level changes alone. Fare level changes will generally produce both positive and negative results. Thus, it will often be necessary to make a fare change part of a broader marketing program (e.g. including service changes, promotion campaigns, etc.) in order to meet the goals of the marketing program.

PART III—FARE STRUCTURE AND FARE COLLECTION

The raising or lowering of fare levels generally affects all transit riders. Such pricing policy changes are thus limited in their ability to meet restricted goals, for example, increase the utilization of transit service during the off-peak periods without significantly increasing the demand during the peak rush periods. As a result, transit systems are finding it desirable to adopt fare practices and fare collection techniques which affect only specific sub-groups of riders within the transit market.

Such fare practices are as varied as the localities in which they are employed. This section attempts to categorize such practices in order to provide a convenient reference to those systems looking for new means to meet specific goals. As with fare level changes, it should be remembered that the expected results from any one practice vary with the specific market and, further, can be offset by other elements of a broad marketing program.

Fourteen categories of fare practices involving changes in fare structures and/or fare collection techniques have been identified. These have been further grouped into four classes:

A. Distance-based Fares -- any fare structure by which a rider traveling a greater distance pays a higher total fare.

B. Bulk Purchase -- tickets, tokens, passes, etc., usable in lieu of cash fares, sometimes yielding the user a cost per ride that is less than the single ride fare.

C. Off-Peak Discounts -- any device through which rides on under-utilized routes or during off-peak periods cost less than the standard fare. Special fares for the elderly, handicapped and youth have been included in this class.

D. Free and Multi-stop Service -- any device permitting the user to obtain a series of interrupted rides without paying the full cost of the individual rides.

Distance—Based Fares

There are two basic types of transit fares in use in the United States today: flat fares and distance-based fares. The type of transit fare charged seems to be based on the particular history of transit operations in each area. Several cities have recently reviewed their approach to transit fares, however, and have changed from flat to distance-based fares or vice versa in order to better accomplish their goals.

A flat fare in its pure form is a single boarding fare and is charged without regard to distance traveled or the number of times a traveler transfers. Flat fares are simple for the transit system to implement and administer.

For service essentially involving short trips, for example, service within the Central Business District (CBD), a flat fare appears to be an equitable charge to the rider. However, if the service also includes longer trips between suburban areas and the CBD, a flat fare forces the riders who travel short distances to unduly bear the high costs attributable to the riders who travel the longer distances.

In general a distance fare structure is based on the specific number of miles traveled. As a rule, a minimum travel distance is assumed and a basic boarding fare (base fare) is charged; then fares incrementally increase per mile traveled.

There are two types of distance-based fares: stage and zone. Rapid transit facilities, such as BART in San Francisco and PATCO in Philadelphia have adopted the stage fare. This type fare requires the rider to pay according to the number of stops traveled. The stage fare is thus most often applied on those transit routes with only a few designated stop locations, such as on commuter rail lines. This fare structure is rarely applied to bus operations in urbanized areas because of obvious collection problems.

Zone fares constitute a simplification of the stage fare system. Zones (or service areas) about a common point, usually the CBD, are designated, and fares typically increase incrementally from the common point each time a zone line is crossed.

Concerted research and development efforts, including federally sponsored ones, are currently being directed toward developing automated fare collection systems capable of handling transactions for various types of fare structures. The new rail systems (BART and WMATA) have automatic collection equipment, and within a few years reliable automatic bus fare collection systems may be available at reasonable cost. Once automatic collection equipment is perfected for the bus environment, the opportunity to apply a stage fare structure, and thereby increase transit revenue will be broadened considerably.

Under both flat and distance-based fares, a rider can be required to pay an additional fee or an entire new fare for a transfer, particularly when two different modes are involved; for example, a fare is charged for the feeder bus to rapid transit and then the rider pays another fare for the rapid transit service. In all-bus systems, transfer fares may be charged whenever a rider changes vehicles to complete a specific trip. Historically, transfer fees have accounted for from 2 percent to 11 percent of total base fare revenues.

Various combinations of flat and distance-based fares are employed in cities which have a mixture of bus, rail, and/or commuter rail service. For example, for its bus operation, a city might have a flat fare, while the fares for its rail commuter service would generally be stage fares. One interesting variation of a mixed fare structure is the Short Route System. Such a system generally consists of a number of flat fare zones, each served by routes that do not leave the zone. Travel between zones is provided by express routes charging zone or stage fares.

The following tables summarize the four distance-based fare practices referred to above:

A1. Zone Fares

A2. Stage Fares

A3. Transfer Charges

A4. Short Route Systems.

A1. ZONE FARES

Implementation Considerations

Zone Definition

- Zone boundaries - rings, rings and sectors, municipal boundaries, distance-based zones with separate zones for each route.
- May be desirable to have zone boundary overlap to eliminate complaints about very short trips costing 2-zone fare.

System Operation

- Zone checks - Wide variety of zone check systems in use. Most common is outbound passenger paying multi-zone fare gets zone check on entering; returns check to driver on leaving bus. Inbound - zone checks issued to all passengers boarding in outer zone and paying multi-zone fare. Driver walks through bus to collect zone checks at zone boundary. This system is feasible only if most passengers ride in first or inner zone.
- Ticket printing registers - machine printed zone check issued to all passengers; collected except in first zone.
- Automatic fare collection systems - automatically checks entering and leaving passengers. Presently used only for rail systems.
- Enter/Exit fares - rider pays part of fare on entering and part on exiting. Most useful for system with only two zones. Example--outbound: 1 zone fare = 35¢, 2-zone fare = 50¢; in zone 1 pay 35¢ on entry, nothing on exit; in zone 2 pay 20¢ on entry, 15¢ on exit.
- Pay on Entry - rider announces destination and pays full fare on entry. Simplest form of zone fare, but difficult to control.

Pricing

- Rider always pays base fare, then pays an additional amount (usually less than base fare) for each additional zone. Example: Base fare 35¢, zone charge 15¢, total cost of 3-zone trip 65¢.
- In some systems with large zones, zone charge is equal to base fare.

Effects

Effects on Operation

- More complex to operate than flat fares; requires substantial additional work by driver.
- Reduces speed of operation; exit door of buses cannot be used where checking of exit passengers is required.
- On rail systems, may require additional personnel to sell and check tickets.

Effects on Usage

- Encourages shorter trips, due to reduced cost (relative to flat fares).
- Discourages longer trips, due to fare complexity and higher cost.
- Encourages greater use of system for local rides in outer zones where excess capacity usually exists.

Effects on Revenue

- Generally will increase revenue per user.

General Effects

- Fare system is more equitable, since fare level increases with service received.

A2. STAGE FARES

Implementation Factors

System Definition

- Each stop on a route has its own unique fare.
- Suitable only for services with few stops, such as rail routes and long distance suburban bus lines.

System Operation

- Requires entry/exit checks throughout.
- Unless number of stops is very small, the fare collection system should include automatic fare collection equipment, ticket printing registers, or preprinted tickets.
- Due to complex fare transactions, purchase of tickets at stations desirable for major boarding points.
- Wide variety of fares makes exact fare system impractical.

Pricing

- Pricing based on mileage table and rate per mile. Usually minimum fare or flat increment to mileage rate used to cover unit (per trip) cost of very short trips.
- Declining mileage rate with increasing distance possible in some cases. This more closely reflects costs of operation.

Effects

Effects on Operation

- More complex to operate than flat fares; requires substantial additional work by driver.
- May require additional personnel to sell and check tickets.

Effects on Usage

- Encourages shorter trips, due to reduced cost (relative to flat fares).
- Discourages longer trips, due to fare complexity and higher cost.
- Encourages greater use of system for local rides in outer zones where excess capacity usually exists.

Effects on Revenue

- Generally will increase revenue per user.

General Effects

- Fare system is more equitable, since fare level increases with service received.

A3. TRANSFER CHARGES

Implementation Factors

System Operation

- Very simple operation; merely sell transfers rather than issue free.

Pricing

- Transfer charge usually quite small (5¢ or 10¢).

Effects

Effects on Operation

- May produce pressure for through service that is otherwise not warranted, thus increasing costs.

Effects on Usage

- Discourages transfer trips, generally reduces usage.

Effects on Revenue

- Generally increases revenue.

General Effects

- Transfer charge generally justified by extended length of trips; but regular transfer passengers feel they are paying extra for inferior service.
- Produces irregular variations in trip cost depending on origin and destination, making fare system less equitable.
- Often regarded as "Nuisance charge" and may degrade image.
- Usually done as low impact measure to raise additional revenue.

A4. SHORT ROUTE SYSTEMS

Implementation Factors

System Definition

- Requires small number of large fare zones.
- Routes designed so that all local routes end at zone boundary.
- Express routes traverse zone boundaries, used by only multi-zone trips.
- Generally suited only to large systems.

System Operation

- Generally requires small number of high density trunk routes in inner zone. Several outer zone routes feed trunk route; high frequency trunk operation minimizes waiting time for multi-zone passengers transferring between routes.
- Particularly suited to rail feeder systems.

Pricing

- May use multi-zone fares with transfers as evidence of payment or may require separate payment on each vehicle. In latter case, multi-zone fare is equal to two base fares.

Effects

Effects on Operation

- Simplest form of zone system to administer.
- May increase operating cost on highly peaked systems, as more vehicles are needed to handle same number of passengers due to large number of routes. This effect generally minimal.

Effects on Usage

- Additional transfers required; may deter usage.
- Encourages short trips.

Effects on Revenue

- Generally increases revenue.

General Effects

- Fare system is more equitable.
- Improves access to points where transfer is made. If system is designed so that these points are at regional subcenters, a high level of service to such centers can be provided.

Bulk Purchase

Efficient, safe, and low cost methods of fare collection are of major concern to transit systems today. To discourage robbery of drivers, exact fares have been introduced in the overwhelming majority of urbanized areas. While the exact fare policy may be inconvenient to many riders, it has the advantage of speeding up boarding and reducing time spent at stops. This in turn results in faster trips and potential savings for the transit system, since the same vehicle and driver might be able to make more trips.

The inconvenience to riders introduced by exact fare policies has brought about a resurgence of practices involving the advance sale of tokens, books of tickets and passes for use in lieu of cash fares. Tokens and ticket sales practices address the exact fare problem directly. This approach has particular customer convenience value if the tickets and tokens are widely available for purchase in the community, such as through special arrangements with banks or other commercial establishments.

Sale of passes, while also easing the exact fare problem, is often employed to meet other goals. Since passes generally provide for unlimited numbers of rides during a specific period (e.g. one week, one month or one year), pass holders are encouraged to use the transit system on a regular basis. The Massachusetts Bay Transit Authority (MBTA) in Boston, for example, is selling passes in cooperation with major employers, using the payroll deduction mechanism to pay for the passes. This is expected to increase transit usage during the off-peak periods, make transit use more convenient, and reduce automobile usage during the daily rush periods. The concept of prepaid passes also improves cash flow for the transit system and simplifies the administration of fare collection.

Passes are generally priced so as to offer little, if any, cost advantage to the user; e.g. a weekly pass might cost the equivalent of 10 individual fares. Similarly, tickets and tokens are usually priced to directly reflect the fares for which they can be substituted. In localities where concern for revenues is subordinate to other objectives, e.g. reducing automobile usage, bulk purchases (tokens, tickets or passes) are often encouraged by setting the price at a lower level.

The following tables summarize bulk discount practices in two categories:

B1. Passes

B2. Tickets and Tokens

B1. PASSES

Implementation Factors

Form

- Plain card.
- Photo identification card.
- Magnetic-coded card (automatic fare collection systems).

Duration of Validity

- Weekly.
- Monthly.
- Annual.

Restrictions on User

- One individual (non-transferable)
- Bearer (transferable).
- All people traveling together (family pass).

Type of Use

- System-wide/No additional charge.
- First zone with additional charge for outer zones.
- Small charge for each use.
- Varying charge for each use, depending on number of fare zones.
- Multiple values of pass - - Good for one zone, 2 zones, etc.
- Route restrictions (extra charge for express buses, etc.).
- Valid only certain times of day.
- Valid only certain days of week.

Sales Locations

- Transit system's general offices.
- Transit system sales and information offices or at stations.
- At transit garages (where separate from general offices).
- Through banks.
- Through other sales outlets (department stores, drug stores, etc.).
- Through employers (payroll deduction, fringe benefits).
- On-board vehicles.
- By mail.

Type of Sales

- Cash only.
- Personal check.
- Credit cards.
- On account (mail order for regular buyers).

Price Level

- Equal to cost of 10 work trips per week pass is valid.
- Discount from above level.
- Where charge for transfer exists; pass may serve as discount for transfer passengers.

Effects

Effects on Operation

- Extra complication--passes to be printed--additional accounting item, etc.
- Reduce fare collection costs.
- Speed up bus operation.
- More difficult to count passengers.

Effects on Usage

- Increase peak patronage.
- Increase off-peak use by peak hour users.
- Encourages regular use--reduces daily variations.

Effects on Revenue

- Decrease revenue per passenger.
- Off-peak riders are free rides.
- Improves cash flow (prepaid transportation is source of working cash).
- Reduce cost of fare collection.

B2. TICKETS OR TOKENS

Implementation Factors

Form

- Book or strip of tickets.
- Ticket with tear-off or punch-out sections.
- Magnetic coded card (automatic fare collection systems).
- Tokens, possibly in holder.

Duration of Validity

- Good until used.
- Time limit as well as limit on number of uses.
- Number of rides varies from 5 to 50.

Restrictions on Users

- Bearer (transferable).
- All persons traveling together.

Type of Use

- System-wide; no additional charge
- First zone with additional charge. for outer zones.
- Multiple values of ticket--1 zone, 2 zones, etc.
- Route or service restrictions (additional charge for express buses, transfers, etc.).
- Valid only certain times of day.

Sales Locations

- Transit system's general offices.
- Transit system sales and information offices or at stations.
- At transit system's garages (when operated from general offices).
- Through banks.
- Through other sales outlets (department stores, drug stores, etc.).
- Through employers (payroll deduction, fringe benefit).
- On-board vehicles.
- By mail.

Type of Sales

- Cash only.
- Personal check.
- Credit card.
- On account (mail order for regular users).

Price Level

- Equal to cash rate (convenience ticket or token).
- Discounted from cash fare.
- Multiple ticket values available with greater discount for larger purchases. (For example, 35¢ cash--10 ride ticket for $3.25; 50 ride ticket for $15.00).

Effects

Effects on Operation

- Usually will speed up operation. Using punch or tear-off tickets requiring driver action may actually slow down operation.
- May require paper handling capability in fare system; may require ticket disposal system if it is possible to fraudulently reuse tickets.
- May produce extra complication--tickets to print, additional accounting item, etc. Tokens are less complicated; treated like coins.
- More difficult to count passengers, except with tokens.

Effects on Usage

- Increase peak patronage if discount offered.
- May increase off-peak usage if small quantity discount offered.
- Encourages regular usage; reduces daily variations.

Effects on Revenue

- May decrease revenue per passenger.
- Improves cash flow (prepaid transportation is source of working cash).

Off-Peak Discounts

There is a tremendous variation in demand for transit service in the course of a day and over the course of a week. In most urban areas the peak demand occurs on weekdays during the hours when workers are traveling to or from their jobs. The transit system generally establishes service levels, buys equipment and hires personnel to meet these peak demands. As a result, much equipment stands idle and vehicles travel almost empty during many hours of the weekday and nearly all of the weekend. Many additional riders could thus be serviced during these off-peak periods at very little additional cost to the transit system.

This fact has led transit systems to adopt two types of marketing strategies related to increasing off-peak ridership. The first is directed toward increasing revenues by encouraging more riders to use transit during the off-peak periods. The second type of strategy concerns itself more with putting the excess off-peak capacity to uses benefiting the community; for example, providing low cost (or free) transportation for special groups of needy individuals, or providing low cost transportation to shopping, recreational and cultural centers.

Pricing policy can play a role in both of these type strategies. However, pricing policy has been more effective in the latter (increasing the specialized ridership) than in the former (increasing revenues). The fare policies adopted for these purposes are varied. The most common include establishment of fare differentials between peak and off-peak periods and/or between heavily used routes and routes with excess capacity, provision of reduced fares for special groups of people (e.g. the aged, handicapped, youth, etc.), and the adoption of special promotional fares or services (e.g. Super Sunday passes, shopper passes, etc.). The latter group generally belongs to the Free or Multi-Stop service class discussed later.

The following tables summarize three off-peak discount practices:

C1. Off-Peak Fares
C2. Reduced Fares for Elderly, Youth and Handicapped Persons
C3. Coupons for New Service.

C1. OFF-PEAK FARES

Implementation Factors

Definition of Off-Peak

- May apply midday, evenings, Saturday and Sunday, or any combination of these.
- Peak definition usually quite broad to cover all peak trips. For example: 6-10 A.M. and 3-7 P.M.
- Fare may apply at time vehicle or station is entered or at time trip arrives or leaves designated point. First rule is applicable to urban systems, second rule generally used on radial suburban routes with central terminal.
- May be desirable to indicate on timetables those trips on which off peak fares are valid. Often done by shading areas of timetable.
- May be used for special promotions (bargain days), as well as on regular basis.

Fare Collection Methods

- Reduce cash fare during off-peak period.
- Sell round trip ticket, good during off-peak period only, return part of ticket. Commonly, good only on same day.

Pricing Levels

- Fare level generally set between 1/2 and 3/4 of base fare. 1/2 often used on urban systems.

Effects

Effects on Operation

- Ticket system may increase complexity and cost of fare collection if tickets not otherwise used.

Effects on Usage

- Generally will increase off-peak usage with little if any decline in peak usage.

Effects on Revenue

- May reduce revenue, but the revenue loss is usually small.

General Effects

- Simple low cost way of improving mobility of unemployed, handicapped, elderly or others who do not necessarily have to travel in peak hours.
- Can encourage shopping trips.

C2. REDUCED FARES FOR ELDERLY, YOUTH, AND HANDICAPPED PERSONS

Implementation Factors

Definition of eligibility

- Children below certain age.
- Students, usually through high school, sometimes college students.
- Elderly, above certain age.
- Handicapped persons.
- Occasionally, welfare recipients.

Fare Collection

- Tickets sold to qualified persons by transit agency.
- Tickets sold through schools, social service agencies, etc.
- Reduced cash fare with transit issued identification card.
- Reduced cash fare with Medicare card, etc.
- Pass sold to qualified persons by transit agency; unlimited number of uses.
- Pass sold through schools, social service agencies, etc.; unlimited number of uses.

Time and Route Validity

- Throughout day.
- Off-peak hours only.
- Usually valid on all routes; occasionally on local routes only.

Pricing Levels

- Usually 1/3 to 2/3 base fare.
- Occasionally nominal fare or free (common with pass system).

Effects

Effects on Operation

- Children and school riders responsible for most vandalism.
- Additional elderly and handicapped users may increase time at stops.
- Elderly and handicapped users may have problems on crowded vehicles during peak hours.

Effects on Usage

- Generally increased usage.
- Heavy school use may discourage adult usage on some trips.

Effects on Revenue

- Generally revenue loss; additional usage; rarely sufficient to make up for fare reduction.

General Effects

- These discounts are usually considered a community service rather than a promotional device.
- Increases mobility for transit dependent groups with low discretionary spending capability.

C3. COUPONS FOR NEW SERVICE

Implementation Factors

Definition of Practice

- Usually limited to residents of area with new or expanded services.
- Usually done on short term basis. Sometimes may be repeated several times.

Fare Collection

- Coupons valid for free ride mailed to residents of specified area.
- Usually valid for one round trip.
- Usually valid for short time period, commonly one week.
- Sometimes valid only during off-peak period.

Effects

Effects on Operation

- Additional cost of handling; usually minor.

Effects on Usage

- Usually results in additional users.

Effects on Revenue

- Generally get permanent revenue increase from new riders.

Free and Multi-Stop Service

This last class is in essence a catch-all for those fare practices not included in the other three. For the most part these practices attempt to attract riders to under-utilized routes, especially during off-peak periods. Often this is done to reduce auto traffic, increase retail business or simply provide a needed community service, rather than just to increase revenues.

Five, somewhat varied, practices in this class are summarized in the following tables.

D1. Free Zone

D2. Multiple Stop Fares

D3. Shoppers Fares and Coupons Issued by Merchants

D4. Multiple Ride Fares for Off-Peak Users

D5. Low Fare Routes for Short Trips.

D1. FREE ZONE

Implementation Factors

Zone Definition

- Usually applies in downtown or other major commercial area.
- Use well defined boundaries such as rivers, and major streets.
- Designate certain segments of streets as being in free zone. Example: Main Street between 1st and 9th, etc.

Fare Collection

- Requires use of pay-leave outbound and pay-enter inbound fare collection so that all fares collected outside of free zone.
- Through trips handled by use of transfer or fare check. Issued on boarding bus inbound collected outbound when leaving bus.

Effects

Effects on Operation

- Use of pay-enter inbound, pay-leave outbound system usually speeds up downtown loading.
- May require additional service on downtown portions of routes, particularly during midday lunch period.

Effects on Usage

- Substantial increase in usage in free zone.
- Generally some increase in usage on routes in and out of free zone, mostly during peak periods.

Effects on Revenue

- No consistent effect. Loss of local fares in free zone may be balanced by increased radial route revenue depending on individual circumstance.

General Effects

- Beneficial to most businesses in free zone.
- Reduces short auto trips in free zone.
- Improves mobility in the zone for both transit and auto users.

D2. MULTIPLE STOP FARES

Implementation Factors

Definition of Validity

- Establish time period (30 minutes, one hour are typical) that is permitted for each stopover.
- Number of stops permitted--usually unlimited, sometimes only one.
- Route eligibility generally unlimited except that reversing direction on a route not permitted or making an illegitimate transfer not permitted (for example: using a transfer to return to origin point by going in a circle)
- Area eligibility--usually systemwide but sometimes restricted to central area.

Fare Collection

- Same as normal transfer, simply make transfer valid for stopovers.

Pricing Level

- Usually no change if transfers are free.
- If transfer charge collected, usually same as transfer charge.

Effects

Effects on Operation

- May make transfer system more complex; requires means of indicating time of issue on transfers.

Effects on Usage

- Mostly used by people traveling from work in PM peak. Tends to increase peak riding.
- Basically convenience for current riders.

Effects on Revenue

- Generally small increase in revenue; usually very few people paid two fares for short stop.

D3. SHOPPERS FARES AND COUPONS ISSUED BY MERCHANTS

Implementation Factors

Fare collection

- Participating merchants give out token or ticket valid for free or reduced fare return trip.
- Passenger gets ticket on inbound trip, when stamped by participating merchant; valid for free or reduced fare on return trip, thus limiting inbound use to midday riders.
- Generally valid only on day of issue, except for tokens.
- Return trip may be limited to midday period.

Pricing Levels

- Effective fare is generally between 1/2 and 3/4 of base fare.

Effects

Effects on Operation

- Special tickets may increase complexity and cost of fare collection if tickets.

Effects on Usage

- Generally will increase usage during periods these fares are in effect.
- Will have little, if any, effect on peak usage.

Effects on Revenue

- Generally will cause slight revenue loss.
- Will cause slight increase in revenue, if subsidized by merchants.

General Effects

- Permits targeting of promotional fare to specific group with large growth potential, suitable for joint promotion with merchants.

D4. MULTIPLE RIDE FARES FOR OFF-PEAK USERS

Implementation Factors

Fare Collection Methods

- Pass good for unlimited rides during specified period (midday, evening, Saturday or Sunday)
- Usually valid for just one day, sometimes for Saturday and Sunday.
- Pass may be for bearer, or may be family pass.
- Some midday passes good for return trip in P.M. peak.
- Pass may be systemwide, valid in limited area such as downtown or valid on specific routes.

Pricing

- Generally slightly above two base fares, sometimes more if family pass or good for weekend.

Effects

Effects on Operations

- Introduces additional complexity, but may also reduce costs of fare collection due to reduction in number of transactions.
- Makes passenger counts more difficult.

Effects on Usage

- Generally increases usage.

Effects on Revenue

- Usually minor.

D5. LOW FARE ROUTES FOR SHORT TRIPS

Implementation Factors

Area Definition

- Usually applies in downtown or other major commercial area.

Fare Collection

- Separate short route in area with reduced cash fare.
- May be done with regular route that traverses low fare area but ends at one edge of area. Pay enter inbound and pay leave outbound is required to do this with one route. If all pay-enter system is used, then two overlapping routes are needed that end at opposite edges of low fare area. Each route has low fare zone in inbound direction only.

Pricing Levels

- Generally 1/3 to 2/3 of base fare; sometimes as low as 10¢.

Effects

Effects on Operation

- May require additional service in area that usually has adequate service capacity for local traffic.
- May be operated midday only, thus using surplus buses and drivers.

Effects on Usage

- Generally increase usage both locally and on radial routes.
- May have substantial benefit by distributing surburban bus and rail passengers from terminal to CBD.
- Increases internal mobility in combination with congestion reduction measures.

Effects on Revenue

- No consistent effect. Reduced fare in area may be balanced by new local riding and increases in revenue on radial routes.

General Effects

- Generally beneficial to businesses in reduced fare area.
- May reduce auto trips in reduced fare area.

PART IV—CASE HISTORIES

General

This chapter presents information on a number of transit fare practices that have been tried around the United States and in a few foreign cities. Review of these case histories indicates that specific fare practices can have differing effects when employed in different cities. Nevertheless, the information available does suggest some generalizations that should prove beneficial to those transit systems considering fare policy changes. Use of the generalizations should be tempered with knowledge of the specific market being considered, e.g. the local elasticities, simultaneous service improvements, local goals, etc.

Case histories are included at the end of this chapter for fourteen major transit systems, including two in foreign countries. Information on the U.S. systems was obtained by direct contact with the transit systems. Additional information on selected systems plus all information on the foreign systems were obtained from a study by the Urban Institute.5/

In the discussion below the results of the case histories are summarized in terms of four types of fare policy changes:

- o General Fare Reductions (Increase)
- o Bulk Discounts
- o Off-Peak Discounts
- o Free or Multi-stop Service

General Fare Reductions (Increase)

General fare changes include changes in the base fares and/or changes in zone or distance charges. Such changes may also be accompanied by changes in transfer fees. Table 2 has information on six cities, including one outside of the United States - Rome, Italy - which have implemented such changes. The first five cities illustrate fare decreases, while the sixth (Washington, D.C.) involves an increase. In general when fares are decreased, ridership goes up, but not enough to avoid a loss in revenue. For example, if you reduce fares by 20 percent, the ridership must go up by 25 percent just to maintain the same revenue; a 50 percent decrease in fares requires a 100 percent increase in ridership, and so forth.

5/ Kemp, M.A., "Reduced Fare and Fare-Free Urban Transit Services--Some Case Studies", The Urban Institute 1212-3, October 1973.

Table 2

GENERAL FARE REDUCTION (INCREASE)

CITY	ITEM	OLD	NEW
ATLANTA (March 1972)	Base Fare Zone Charges Transfer Fee	40¢ ? 5¢	15¢ 0 0
CINCINNATI (April 1973)	Base Fare Zone Charge Transfer Fee	55¢ 5¢ 10¢	25¢ 5¢ 0
ROME, ITALY (Jan. 1972 & May 1972)	Base Fare: Before 8 AM After 8 AM	 4½¢ 9¢	 0 0
LOS ANGELES (April 1974)	Base Fare Zone Charge Transfer Fee	30¢ * *	25¢ 0 10¢
SAN DIEGO (Sept. 1972)	Base Fare Zone Charge Transfer Fee	40¢ 10¢ 0	25¢ 0 0
WASHINGTON (Sept. 1975)	Base Fare Zone Charge Transfer Fee	40¢ 10¢ 0	50¢ 15¢ 0

* Old fare structure varied with transit operator.

In Atlanta the base fare was reduced slightly more than 60 percent. To break even, it would be necessary to increase ridership by more than 150 percent. It increased only 30%; however, the goal of that fare change was to generate acceptance of a special tax to subsidize transit improvements and operations.

San Diego experienced a different type effect after the fare was reduced. Ridership increased by 115 percent, more than covering the average fare decrease from 37¢ to 23¢ (38 percent decrease in fare).

Washington increased fares during the peak period with essentially no change during the off-peak. This can be viewed as a general increase overall and a decrease in the off-peak. The intent of this change was to take advantage of the fact that peak ridership is less apt to find other means to get to work and will pay the increased fares. In addition, increasing the peak fares results in a more equitable charge structure, since the peak demand determines the size of the system, and hence gives rise to much of the capital and operating outlays that are required. Increasing fares during the peak would thus tend to advance two fare goals: increase revenue, and provide more equitable fares.

Specific results noted after the fare changes shown are somewhat clouded by effects of other simultaneous changes, such as service improvements, sale of discount passes, etc. It is nevertheless instructive to note that in the cases involving fare decreases:

- Ridership increased, from about 18% in Los Angeles and Rome, to over 100% in Cincinnati and San Diego.
- Changes in automobile usage were generally small on a percentage basis, but reported as reductions of over 20,000 trips per work day in Atlanta and reductions of 530,000 vehicle miles per work day in Los Angeles.
- Only San Diego reported a revenue increase; however, this was more than off-set by costs of added service. The Rome experiment implied no net cost, since the revenues projected with the "old" fare would just cover the cost of handling fares.

The generalizations that can be drawn from these case histories and through review of available reports are that:

1. General fare reductions increase ridership, but not at sufficient levels to offset the loss of revenue.

2. Conversely, fare increases lead to decreases in ridership, but there is an increase in revenue.

3. With any fare level change, increase or decrease, the greatest percentage change in ridership occurs in the off-peak; however, the greatest absolute change occurs during the peak.

4. There is little impact on the use of automobiles due to changes in fare level.

Bulk Discounts

Bulk discounts include a variety of plans whereby regular transit users pay, on the average, less than the standard fare per trip. Such plans generally take the form of prepaid passes or discounted ticket books or tokens.

Table 3 contains information on bulk discounts (passes) that have been instituted in six cities; all but one - Stockholm - are United States cities. In most instances the passes are unlimited, free per use, and transferrable. In the case of San Diego the monthly pass price was adjusted at the time of the general fare decrease discussed under the previous category.

The practice of providing bulk discounts for transit users can be expected to attract primarily the regular riders, thus resulting in revenue losses. On the other hand, once a rider has such an unlimited-ride pass, his use and dependence on the transit system should increase. In particular, regular work-trip riders will think of the pass as free transportation at noon, in the evening and on weekends.

In Pittsburgh (not shown in Table 3, but included as Case #8) passes are provided which reduce the base fare to 10¢. Users must thus pay 10¢ plus any zone charges for each ride. This approach, like free ride passes, provides the regular rider with a reduced average fare, which is reduced even further as he makes additional trips. Unlike the free ride passes, however, this approach also generates additional income for the operator as the pass holder increases his use of the system.

Table 3

BULK DISCOUNTS

CITY	ITEM	OLD	NEW
SAN DIEGO	Monthly pass for unlimited rides.	$16-$36	$10
LOS ANGELES	Monthly pass for unlimited rides.	--	$10
STOCKHOLM, SWEDEN (Oct. 1971)	Monthly pass for unlimited rides.	Variety of seasonal passes	$12.15
BOSTON	Non-transferrable monthly pass thru payroll deductions. * Cost varies with routes on which they are valid.	--	$8.74 - $17.50*
SEATTLE	1. Annual non-transferrable pass for unlimited rides. 2. Monthly transferrable pass for 10¢ discount per ride.	-- --	$150.00 $4.00
CHICAGO	Monthly pass for shuttle from commuter trains to CBD.	35¢	$12.00

Bulk discounts, like other pricing policies, produce best results when they are part of a broader plan to achieve goals. Thus in Stockholm when fares were increased, the impact was minimized by the availability of the passes and both ridership and revenue actually increased. In San Diego the combination of reduced fares, monthly passes and increased service brought major increases in ridership and revenues.

Quantitative results attributable to bulk discount practices are limited. Reports indicate, however, that:

- Sales of monthly passes increased from 200 to 300 percent in both San Diego and Stockholm when the cost was reduced.

- Usage of passes ranged from 27% of the ridership in Los Angeles to 70% in Stockholm.

Bulk discounts appear to increase ridership during the off-peak, usually by peak riders, and have very little effect on automobile ridership. This practice should be useful in reducing costs of fare collection, and in improving the transit system's cash flow.

Off-Peak Discounts

Off-peak discounts refer to the establishment of special reduced fares for off-peak hours and/or weekend days. Table 4 contains information about off-peak discounts in four U.S. cities. The typical plan has a reduced fare during midday or on weekends. For example, in New York City a rider can use the system for half-fare on Sunday (commuter railroad, bus or subway) through purchase of one-way ticket and getting the return trip free. This has resulted in a 30 percent increase in ridership and in fact has yielded increased revenues on the commuter rail, while losing revenue on the subway.

The results obtained in these cases include:

- Off-peak ridership increases ranging from "small" in Boston to 50% in Trenton.

- Only slight increase in overall ridership.

- Insufficient new trips to cover lost revenue on old trips.

Table 4

OFF-PEAK DISCOUNTS

CITY	PERIOD	REGULAR	OFF-PEAK
BOSTON (March 1974)	10 AM - 2 PM and all day Sunday	25¢/50¢	10¢/25¢
TRENTON (Sept. 1971)	10 AM - 2 PM After 6 PM and all day Sunday.	30¢	15¢
NEW YORK (Dec.1973)	All day Sunday	35¢ One-way	35¢ Round trip
CHICAGO (Jan.1974)	All day Sunday	45¢	25¢

The general conclusions are that these types of plans can result in an increase of the off-peak usage and only minimally reduce the peak usage. Usually the off-peak plans result in a loss of revenue, but do have a positive impact on the system's image.

Free or Multi-Stop Service

This category of fare structure changes covers a broad spectrum of options. Table 5 lists four cases of such changes. The main feature in all these is that the rider can make several stops while paying a single fare. They range from Oakland's one-way/Stop-off and Go-again plan to Seattle's free Magic Carpet service in the Central Business District. This type service is generally geared to increasing ridership in off-peak periods and attracting people to otherwise less accessible merchants. It is used to counter advantages of the auto, in that stops can be made at negligible cost.

The major results reported for such service are significant increases in business for the areas effected; this includes a 5 million dollar increase in sales in the Seattle CBD during the first year of its Magic Carpet service.

The conclusions are that this is a good technique to increase off-peak ridership, improve the image of the transit system, and may result in much increased sales in the business area.

Table 5

FREE AND MULTI-STOP SERVICE

CITY	ITEM	FARE
NEW YORK (Nov: 1974)	1. Night-on-the town with merchant discounts.	75¢
	2. Culture tours.	$1.00
	3. Off-peak midtown shoppers pass.	75¢
SEATTLE (Sept. 1973)	150 block CBD free zone.	0
OAKLAND (June '65)	1. One-way stop and go (regular fare)	25¢ base
(March '64)	2. Off-peak shoppers pass in CBD	25¢
(July '62)	3. Sunday and holiday fun pass	60¢
CHICAGO (June 1974)	1. Unlimited rides on Sunday	70¢ adult
	2. Amusement tour	10¢

Summary

This limited review of case histories provides little that can be used to firmly establish cause/effect relationships related to fare practice changes. However, the information available does suggest a few general conclusions. These are outlined in Table 6. Summaries related to individual fare practices (as opposed to the categories discussed here) are presented in the Case Histories that follow.

Peak hour riders are usually dependent on transit to such an extent that fare increases will yield decreases in transit deficits. Fare decreases can yield significant ridership increases during the off-peak, but generally result in revenue losses. Fare adjustments alone do not reduce auto usage. Special plans, such as the free zone, improve merchant sales in that zone.

As indicated, there are positive impacts of fare structure changes, but it should be emphasized that fare practices are only one way to accomplish a transit system's objectives. Service improvements, better information aids, new communication campaigns, and other means to improve the transit system should all be considered as a package when you attempt to understand the effect of a fare change, or when you set out to achieve a goal, whether it be increased ridership, improved revenue position, improved community relations, etc.

Table 6

SUMMARY OF EFFECTS OF FARE CHANGES

- GENERAL FARE CHANGES

  1. Reductions tend to increase deficit
  2. Increases tend to decrease deficit
  3. Little effect on auto usage

- BULK DISCOUNTS

  1. Increase ridership during off-peak
  2. Little effect on auto usage
  3. Reduces fare collection costs
  4. Improves cash flow

- OFF-PEAK DISCOUNTS

  1. Significant increases in off-peak usage
  2. Minimal reduction in peak usage

- FREE/MULTI-STOP

  1. May lead to significant increases in business

CASE #1—MARTA—ATLANTA, GEORGIA

SUMMARY

In order to win support for a 1% sales tax increase to be used to support major improvements in the regional transit system, Atlanta base fares were reduced from 40¢ to 15¢ in 1972. The combination of this fare change together with a large number of service and equipment improvements has produced a ridership increase of about 28%.

FARE PRACTICE CHANGES

1. Reduced General Fares
   a. Date: March 1, 1972
   b. Change:
      - Bus fare reduced from 40¢ to 15¢.
      - Zone charges eliminated.
      - Transfer fee (5¢) eliminated.
   c. Goal:
      Obtain voter support of proposed 1% sales tax, to be used for subsidizing transit improvements and operations.

OTHER SIMULTANEOUS CHANGES (During 1972)

1. Vehicle miles of service increased approximately 30%
2. Number of vehicles used increased approximately 20%

RESULTS

1. Referendum on sales tax approved in two of four counties participating in MARTA. Those two counties constitute over 85% of the population in the greater Atlanta metropolitan area.
2. In comparison with 1971, ridership was up approximately:
   - 11% in 1972
   - 19% in 1973
   - 28% in 1974

3. Trip pattern changes for the first year under the new fare are reflected in the following statistics:

Percent of total ridership using transit on indicated day		Before	After
	Average Weekday	18.0	17.7
	Saturday	7.9	8.6
	Sunday	2.3	3.2

Percent Ridership by <u>Demographic Group</u>:	Male	35.1	48.9
	Female	64.9	51.1
	Age 18-35	48.2	64.3
	Income over $10,000	21.2	30.4
	White	27.9	39.2
	Non-White	72.1	60.8

<u>Further</u>: Over 90% of the increase is attributed to new riders.

4. It has been estimated that over 21,000 automobile trips per weekday and over 116,000 auto trips per week were eliminated by the increased transit ridership.

COMMENTS

1. The percentages given in Result 2 above indicate actual observed increases in ridership. They do not directly reflect the impact of the fare change since:
   a. There were simultaneous service increases.
   b. A ridership loss was projected, had the old 40¢ fare been retained.

   It has been estimated[6/] that the fare reduction by itself produced a 19% increase in ridership during the first year in comparison with ridership projected for that period under the 40¢ fare.

2. Surveys of the Atlanta riders indicate that had the base fare been reduced to 25¢ rather than 15¢, the ridership increase would have been only 20% less than that experienced.

6/ Kemp, M. A., "Transit Improvements in Atlanta - The Effects of Fare and Service Changes", (see Bibliography Reference 26).

CASE #2—MBTA—BOSTON, MASSACHUSETTS

SUMMARY

Boston has implemented a program of selling transit passes in cooperation with major employers using the payroll deduction mechanism to pay for the passes. This program was directed toward increasing the commitment of commuters to transit. Boston also experimented with off-peak discounts (dime time) in an effort to increase off-peak ridership, especially by shifting the demand away from the peak periods. The dime time practice proved ineffective and was discontinued.

FARE PRACTICE CHANGES

1. Off-peak Discounts
   a. Date: (1) April 1973, (2) March 1974-July 1975
   b. Change:
      (1) Standard base fares of 25¢ and 50¢ reduced to 10¢ and 25¢ respectively, during period from 10 A.M. to 1 P.M. on weekdays.
      (2) Same as (1) above, except hours extended to cover 10 A.M. to 2 P.M. weekdays and all day Sunday.
   c. Goals:
      - Increase off-peak ridership.
      - Attract new transit riders.
      - Shift some demand from peak to off-peak periods.
2. Bulk Discounts
   a. Date: March 1, 1974
   b. Change:
      Initiated sale of annual pre-paid passes. Passes cost $8.75 to $17.50 per month or $105.00 to $210.00 per year, with the price varying with the type service covered. Passes are sold in cooperation with employers using the payroll deduction mechanism to pay for the passes.
   c. Goals:
      - Reduce auto usage for work trips.
      - Increase commitment of riders to transit.
      - This is part of a five-year program to increase ridership by 30 percent.

OTHER SIMULTANEOUS CHANGES

None

RESULTS

1. Dime Time produced:
   a. A revenue loss.
   b. A small increase in off-peak ridership, mostly by regular riders (i.e. few new riders added).
   c. No significant shift of peak riders to the off-peak.
2. Annual passes are being sold to approximately 20,000 employees in 117 companies. Over 100 additional companies have expressed interest in joining the program.
3. Annual passes account for 6 percent of transit revenues and 8 percent of transit riders.
4. No significant change in ridership or revenue has yet been noted.

COMMENTS

1. Dime Time was discontinued due to its failure to meet objectives.
2. Efforts are underway to provide a monthly pass in addition to the annual pass. No more employers are being added to the program until this change is implemented.
3. Although ridership and revenue have not yet shown significant increases as a result of the passes, the program is felt to be very effective in that, for the minimal cost to the transit system, it appears to be creating the desired commitment to transit (also see Comment 4).
4. Some of the administrative burden of this pass program falls on the employers. Their willingness to accept this reflects their commitment to transit in the Boston area. In addition, the employers are finding some direct effects:
   (a) Employers can use the passes as a fringe benefit, giving or discounting the passes to employees. Many employees view the passes as a fringe benefit even if they pay full price.
   (b) Employers with limited parking facilities sometimes use potential employees' intent to buy the passes as one consideration in hiring.
   (c) The passes apparently produce some reduction in job absenteeism. The employees are apparently reluctant to waste the prepaid pass.
   (d) Employers are beginning to evaluate the cost of providing parking to their employees in comparison to their costs in administering the pass program.

CASE #3—SORTA—CINCINNATI, OHIO

SUMMARY

As part of a major transit marketing effort, Cincinnati reduced its base fare from 55¢ to 25¢. This effort resulted in a ridership change over a one year period, which was more than double that projected.

FARE PRACTICE CHANGES

1. Reduced General Fares
   a. Date: April 1, 1973
   b. Changes:
      . Base fare reduced from 55¢ to 25¢
      . Zone charge of 5¢ modified so as to reduce maximum fare from $1.00 to 60¢.
      . Transfer fee of 10¢ abolished.
   c. Goals:
      Increase ridership.

SIMULTANEOUS CHANGES

1. Major efforts directed toward marketing, including vehicle clean-up, etc.
2. Schedules and routes adjusted, but no significant change in equipment was made.

RESULTS

1. Ridership for 1974 was more than double that which was projected before the changes. (Ridership decrease was projected.)
2. In comparison with actual ridership before the change, ridership in early months of the change was up approximately 50%. This has since leveled off to about 15%.
3. Peak period ridership, which formerly used 75% of the transit capacity available, has increased to 97% of capacity. Off-peak ridership increased from 25% of capacity to 75%. (Note the off-peak capacity is much lower than the peak capacity.)

CASE #4—CTA—CHICAGO, ILLINOIS

SUMMARY

Chicago is experimenting with a number of promotional efforts to increase transit ridership on Sundays. These efforts appear highly successful. In addition, efforts are being made to encourage the use of commuter rail and downtown shuttle, as an alternative to use of automobiles, by providing discount shuttle passes.

FARE PRACTICE CHANGES

1. Off-peak Discounts
   a. Date: February 1974
   b. Change:
      . Base fare on Sunday reduced from standard 45¢ to 25¢.
   c. Goal:
      . Increase Sunday ridership.
2. Bulk Discounts
   a. Date: Early 1975
   b. Change:
      Initiated $12 monthly pass for unlimited use of shuttles from commuter railroad station to central business district. Without the pass, the shuttle trip is 35¢.
   c. Goals:
      Encourage use of commuter trains, thereby reducing auto traffic in CBD.
3. Multi-stop Service
   a. Date: June 1974
   b. Change:
      o Initiated Sunday Super Transfer, providing unlimited rides on Sunday. Cost is 70¢ for adults, 45¢ for children and senior citizens.
   c. Goal:
      Increase Sunday ridership.

SIMULTANEOUS CHANGES

1. CBD 35¢ shuttle service referred to in Change 2 was initiated during this period. Initially only two commuter railroad stations were serviced. Additional stations have been or are being added to the service.
2. These changes are part of a marketing program involving a variety of service and promotion innovations.

RESULTS

1. There have been significant increases in Sunday ridership during 1974, apparently due to three causes:
   - Fuel shortage
   - Bargain Sunday fare
   - Sunday Super Transfers

   In comparison with 1973, Sunday ridership increased:
   (a) 9.2% in January and February due to fuel shortage.
   (b) 17.5% in March to May due to fuel shortage and Bargain Sunday fare.
   (c) 20% in June to October due to bargain fare and Sunday Super Transfer.
2. Also in comparison with 1973, revenues on Sundays decreased:
   (a) 22% in March to May.
   (b) 11.5% in June to October.
3. The very limited data available relative to the 35¢ commuter shuttle suggests a possible 9% increase in ridership with a 1% revenue decrease.

CASE #5—SCRTD—LOS ANGELES, CALIFORNIA

SUMMARY

In an effort to encourage people to use the transit system rather than automobiles, the various transit operators in the Los Angeles area adopted a series of fare and transfer standardization practices. This included an experimental flat fare of 25¢ plus a 10¢ transfer charge between lines. Although the reduction in automobile usage was small on a percentage basis (about .5%), for an area like Los Angeles this results in a significant decrease (about 530,000 vehicle-miles per work day).

FARE PRACTICE CHANGES

1. Reduced General Fares
   a. Date: April 1, 1974
   b. Changes:
      - Base fare reduced from 30¢ to 25¢.
      - Zone charges eliminated.
      - Zone and transfer fees replaced by a 10¢ transfer fee between transit lines.
   c. Goal:
      To induce drivers out of private cars and onto buses.
2. Bulk Discounts
   a. Date: April 1, 1974
   b. Change:
      Provided $10 monthly pass for unlimited system use.
   c. Goal:
      Increase transit usage.

SIMULTANEOUS CHANGES

1. The fare changes involved seven different municipal bus companies with totally different fare structures and no mutually accepted transfers between them. With the fare change adopted by these companies, the complexity of longer distance transit use was essentially eliminated.

RESULTS

1. Private vehicle travel decreased 530,000 miles per average work day (approximately .5% reduction).
2. Average workday ridership increased by about 101,000. This was a 27.9% increase over 1973 and 17.2% increase over estimated ridership without fare change.

3. 64% of the new riders had previously made the trip as automobile drivers.
4. Cost of 3 month trial was $5.6 million.

DISCUSSION

1. An important aspect of the fare change is that the new fares involve single coins (quarters and dimes), which can be a significant attraction when exact fares are required.
2. The trial period during which the "Results" were obtained was a 3-month period following the fuel shortage. At that time auto usage was increasing (and transit usage decreasing) following a major decrease in auto usage (and increase in transit usage).

CASE #6—MTA—NEW YORK CITY

SUMMARY

New York City is experimenting with a number of promotional efforts designed to increase transit usage during off-peak hours and on Sundays. Included in these is a half-price Sunday fare. This has resulted in increased Sunday revenues for some lines (especially the rail commuter lines), while significantly reducing Sunday revenues on the more heavily traveled lines (i.e. the subway lines).

FARE PRACTICE CHANGES

1. Off-Peak Discounts
   a. Date: December 16, 1973
   b. Change:
      - Round trip tickets sold on Sundays and holidays for the cost of a standard one-way fare (35¢).
   c. Goals:
      - Encourage people not to use cars on Sunday during fuel shortage.
      - Help reacquaint population with the transit system.
2. Multi-Stop Service
   a. Date: November 1974
   b. Change:
      - Initiated 75¢ "Night on the Town" ticket permitting unlimited ridership during the period from 6 P.M. to 2 A.M. Monday through Saturday.
      - Initiated 75¢ Mid-Town Shoppers Special ticket for unlimited use during specific off-peak periods in the Mid-Town shopping grid.
   c. Goal:
      - Increase off-peak ridership.

SIMULTANEOUS CHANGES

1. A Marketing Division was created in 1974.
2. Merchants provided discounts for Sunday and Night-on-the-Town transit users.

RESULTS

1. Sunday ridership increased by 30% during the first year.
2. During that same period, Sunday revenues declined 12%, however some lines, (especially the commuter railroads) increased their Sunday revenues.

COMMENTS

See Case #7 for more recent fare practice change in New York City.

CASE #7—MTA—NEW YORK CITY

SUMMARY

In 1975 the base fares on New York City buses and subways were raised from 35¢ to 50¢. Simultaneously, tolls on most interborough bridges and tunnels were also raised. Although transit ridership decreased, the decrease was less than would have been expected without the toll increases.

FARE PRACTICE CHANGES

1. General Fare Increase
   a. Date: September 1, 1975
   b. Change:
      . Base fare increased from 35¢ to 50¢.
      . Bus-to-bus transfer fee of 25¢ replaced previous policy of full fare on each bus.
   c. Goal: Increase revenues.

SIMULTANEOUS CHANGES

1. Tolls on most interborough bridges and tunnels increased.

RESULTS

1. Ridership during 4 month period decreased about 7 percent over previous year. This reflected a 4 percent decrease in subway ridership, and a 10 percent decrease in bus ridership.
2. Revenues during 4 month period increased about 29 percent over previous year. This reflected a 35 percent increase in subway revenues and a 20 percent increase in bus revenues.

COMMENTS

1. Before the fare change, transit ridership was down over previous year by about 4 percent. Thus no more than 3 percent of ridership decrease can be attributed to the fare change. This was less than expected.
2. Bus ridership loss was much closer to expectations than subway ridership loss. This apparently results from the increased tolls and the fact that buses are primarily used for intra-borough trips (requiring no bridge or tunnel crossings, if trip were made by auto). Subways on the other hand are used for most of the interborough trips.
3. Bridge and tunnel revenues increased while vehicles using these facilities decreased following the change. Indications are, however, that use of these facilities is again approaching previous levels.

CASE #8—PAT—PITTSBURGH, PENNSYLVANIA

SUMMARY

Pittsburgh has engaged in a multi-faceted marketing program to increase transit ridership and revenues. These efforts include sale of discount permits which require riders to pay only 10¢ of the base fare (normally 40¢) for each ride.

FARE PRACTICE CHANGES

1. Bulk Discount
   a. Date: January 1, 1973
   b. Changes:
      - Monthly permits reduced from $13.25 to $10.00.
      - Weekly permits reduced from $3.10 to $2.60.
      - Instituted a $100 annual permit (June 1973).
      - Provided for sale of monthly permits through payroll deductions by employers, and giving 12th month permit free (October 1973).
   c. Goal: to increase ridership and improve image.
2. Off-Peak Discounts
   a. Date: 1973
   b. Changes:
      - Installed a $1.00 weekend pass good for unlimited rides by 4 people (no more than two adults over 16), all day Saturday and Sunday.
      - Cash fare reduced 15¢ on Tuesdays during midday and evening hours.
   c. Goal:
      To increase ridership during the off-peak periods with the same number of vehicles and manpower (i.e. at no additional cost).
3. Multi-Stop Service
   a. Date: 1973
   b. Change: Offers transfer which allows enroute stopovers.
   c. Objective:
      Not stated.

SIMULTANEOUS CHANGES

1. These changes were part of a major new marketing effort including expanded information services, express service, vehicle renovations, and public service projects.

RESULTS

1. Ridership in 1974 increased 14% over 1973.
2. Revenue up about 13%.
3. Weekend ridership up about 35%.
4. Monthly permit sales increased 850% (i.e. 18,000 per month). Weekly permit sales doubled.
5. Over 1000 annual permits were sold the first year. By October 1974 there were over 1200 employees signed up for the year-round payroll deduction purchase of monthly permits.

COMMENTS

1. The permits sold by PAT, unlike other pass systems, require that the rider pay a 10¢ base fare plus zone charges in cash for each trip. The effective base fare for permit users is thus about 35¢ for routine work trips (i.e. 10 to 12 trips per week) plus 10¢ for each additional trip. The standard base fare is 40¢.
2. PAT has what appears to be a complex system of fare schedules and zones. The added complexity of three types of permits, plus the need to use additional cash with the permit, may lead to difficulties with public acceptance. However, the ridership increase noted suggests that PAT must have conducted a highly effective information campaign in implementing its new programs.

CASE #9—ATAC—ROME, ITALY

SUMMARY

In 1972 Rome, Italy experimented with a no fare transit policy. The results of these experiments were disappointing in that no major change in transit or automobile usage was noted.

FARE PRACTICE CHANGE

1. Reduced General Fares
   a. Date: (1) January 1972; (2) May 1972
   b. Change:
      (1) All fares eliminated for a nine-day experiment. Standard fare is 50 lire (about 9¢) with a 25-lire fare before 8 A.M.
      (2) No fares were collected during peak periods for a two month experiment.
   c. Goal:
      To determine impact of fare elimination on auto usage.

SIMULTANEOUS CHANGES

1. Efforts were made to avoid other simultaneous changes, e.g. service was not increased and tickets were still issued.
2. During second experiment, a 1.1 mile two-way bus lane was introduced.

RESULTS

1. During the first experiment (a nine day period with only one normal workday) ridership was up 44% over previous year. For the normal workday, ridership was up about 20% over the previous year.
2. During the second experiment (a two-month period) ridership was up 11% over the previous year.
3. In the first experiment, ridership before 8 A.M. decreased by 15% on the normal workday. On a percentage basis, the biggest change in ridership was noted after 8 P.M., a 47% increase.
4. Ridership on the route using the exclusive bus lanes in the second experiment increased by 25%.
5. Little change was noted in automobile use during the experiment. Over 90% of the ridership indicated they would not or could not have used autos for the trip, even if fares had been charged (first experiment).

COMMENTS

1. Despite the tight controls on these experiments, the results can be misleading due to two major factors. First, because there was no increase in service, the congestion during peak hours may have discouraged additional ridership. Second, the short duration of the experiments, which was known to the public, may have discouraged some auto users from changing their routines.
2. The theoretical impact of fare elimination on transit system deficit in Rome is negligible, since the projected revenues for 1973 would just cover the cost of fare collections (they use a conductor in addition to a driver on each vehicle).
3. Although this fare practice change is categorized as "Reduced General Fares", it probably is also comparable with "Multi-Stop Service" or "Bulk Discounts", since there is no charge for additional trips.
4. Due to the fare differential before and after 8 A.M., the elimination of fares had the reverse effect of an off-peak differential. Thus with riders receiving no fare advantage by traveling before 8 A.M., this early morning ridership actually declined, while general ridership increased.

CASE #10—MTD—ST. PETERSBURG, FLORIDA

SUMMARY

St. Petersburg represents a somewhat unique transit market. The retirement community is such a large part of the population that 60 percent of the transit demand occurs during periods from 10 A.M. to 3 P.M. and after 6 P.M. on weekdays and on weekends and holidays. These are the "off-peak" periods in most urban areas. As a result, the combination of a fare increase and a senior citizens half fare rate resulted in increases in both ridership and revenue.

FARE PRACTICE CHANGES

1. Increased General Fares
   a. Date: November 27, 1975
   b. Change:
      - Fare increased from 25¢ to 30¢.
      - Price for unlimited ride weekly pass increased from $2.00 to $3.00.
   c. Goal:
      To increase revenues.
2. Senior Citizen Discount
   a. Date: November 27, 1975
   b. Change: Senior citizens allowed to ride at half fare (15¢) during periods from 10 A.M. to 3 P.M. and after 6 P.M. on weekdays, and all day weekends and holidays.
   c. Goal: To take advantage of available Federal grants in providing low cost service to the community.

OTHER SIMULTANEOUS CHANGES

1. Installed radio-dispatched small bus service in selected areas and during off-peak periods, where scheduled service was not economical.
2. Installed door-to-door service for handicapped using special vehicles.

RESULTS

1. Ridership increased about 10 percent.
2. Revenues increased about 18 percent.
3. Sale of weekly passes decreased.

COMMENTS

The somewhat unusual results, significant increases in both revenues and ridership following a general fare increase, can be attributed to the special character of the St. Petersburg market. A relatively large part of ridership and potential ridership actually obtained a fare decrease when the senior citizen half fare policy went into effect. This market element is very sensitive to fare levels, and thus significantly increased their use of transit. The reduction in revenue expected from the half fare policy was offset by the fact that many senior citizens had previously used weekly \$2.00 passes yielding an average fare per ride of 12¢. They now either pay the 15¢ individual ride fare or buy a \$3.00 pass.

CASE #11—SDTC—SAN DIEGO, CALIFORNIA

SUMMARY

In 1972 San Diego reduced its base fare from 40¢ to 25¢. The result of this and related changes was that San Diego experienced major increases in both ridership and revenues, suggesting a very high price elasticity for that area.

FARE STRUCTURE CHANGES

1. Reduced General Fares
   a. Date: September 1972
   b. Change:
      . Base fare reduced from 40¢ to 25¢
      . Zone charge (10¢) eliminated.
   c. Goal:
      Increase ridership.
2. Bulk Discounts
   a. Date: August 1972
   b. Change: Cost of unlimited monthly pass reduced to a flat $10 from old range of $16 to $36.
   c. Goal:
      Increase ridership.

SIMULTANEOUS CHANGES

1. Vehicle miles operated increased about 28% in year ending August 31, 1973.

RESULTS

1. Ridership has more than doubled (up 115%) and is still increasing. In particular, comparing March 1975 with March 1974 (a month during the fuel shortage) ridership increased another 15%.
2. Revenues have increased (estimated at about 30%). Costs have also increased significantly; however, leading SDTC to subsequently increase fares again (see Case #12).

COMMENTS

This is one of the rare cases where a fare reduction was followed by a revenue increase. The degree to which fare, as opposed to service or other factors, caused this result is unknown. It has been suggested, however, that the ratio of riders to total population in the SDTC service area was much lower than, for example, in Atlanta. Thus the elasticity of the ridership could be expected to be greater relative not only to fares, but also to service.

CASE #12—SDTC—SAN DIEGO, CALIFORNIA

SUMMARY

After a significant fare reduction in 1972, San Diego found it necessary to raise fares again to increase revenues. A small revenue increase was obtained, and ridership increased, due to a simultaneous decrease in fares for special groups of riders.

FARE STRUCTURE CHANGE

1. General Fare Increase
   a. Date: July 1, 1975
   b. Change:
      - Fare increased from 25¢ to 35¢.
      - Cost of passes increased in proportion to fare change.
   c. Goal: Increase revenues.

SIMULTANEOUS CHANGES

1. Added routes in effort to reduce the need for multiple transfers on a single trip.
2. Set fares for senior citizens and handicapped at 15¢; fares for students remained at 25¢. These fares apply at all times.
3. Riders are now allowed to use transfers (which were given free) to make a stop for up to 3 hours, while traveling in one direction.

RESULTS

1. Overall ridership up. Ridership among senior citizens, the handicapped and students increased; ridership at regular fares (35¢ or corresponding pass) decreased.
2. Revenues increased. Average fare paid increased from 23 1/2 ¢ to 26¢ (had expected increase of 29¢).
3. Transfer usage up 23%.

COMMENTS

1. Monthly passes are priced at 40 times the single ride fare; i.e. $14.00 for most riders, $6.00 for senior citizens and handicapped, and $10.00 for students.

2. Senior citizens are defined in San Diego to include those aged 60 and over. Thus many senior citizen trips are work trips.
3. There was a surprisingly large increase in ridership by students, whose fares did not change. Although the cause for this has not been determined, it would appear that the general fare increase made students feel they were getting a fare decrease. This notion may have been fostered by the fact that no distinct student fares or student passes were identified prior to the change.

CASE #13—METRO TRANSIT—SEATTLE, WASH.

SUMMARY

In 1973 Seattle inaugurated a free transit zone in the Central Business District (CBD). Although CBD ridership increased dramatically, auto usage was only slightly reduced. The big impact of this policy was a major increase in retail business activity in the CBD.

FARE PRACTICE CHANGES

1. Multi-Stop Service
   a. Date: September 1973
   b. Change: Created a free transit zone in CBD, effective all hours, seven days a week.
   c. Goals:
      - Reduce auto usage in CBD
      - Stimulate retail trade in CBD.
      - Increase transit usage.
2. Bulk Discounts
   a. Date: September 1973
   b. Changes:
      - Initiated $150 annual pass, allowing free unlimited use for trips through up to three adjacent zones.
      - Initiated $4 monthly pass, good for 10¢ discount on each ride.
   c. Goal:
      Increase ridership.

SIMULTANEOUS CHANGES

1. Added 10 buses to handle increased CBD ridership.
2. Added 20 hours per day of service to first zone outside of CBD, to maintain headways and schedules. Service in that zone was effected by new fare collection system outside of the free zone, which involved paying upon departure and use of only the front door.

RESULTS

1. CBD traffic volume reduced about 2%.
2. Ridership in the free zone tripled.
3. 40% of riders indicated they had switched from other transportation modes; 25% indicated they had not made the trip before the free service.
4. Retail sales in the CBD has increased about $5 million a year, with a majority of the increase concentrated around noon.

COMMENTS

1. Basic fare structure includes a 20¢ base fare and a 10¢ zone charge. Prior to the initiation of the free zone, a shoppers' shuttle was available at 10¢ a ride.
2. There appears to have been some increase in ridership in outlying zones (generally toward the CBD) due to the establishment of the free zone.
3. The major impact of the free zone appears to be the increased mobility of people once they are in the zone, especially for workers during the midday break.

CASE #14—STOCKHOLM, SWEDEN

SUMMARY

From 1964 to 1973 Stockholm carried out a major program to integrate various transit lines constituting a regional system. A major element of this program was the sale of monthly passes for unlimited rides. Both ridership and revenues have increased slightly as a result of this program.

FARE STRUCTURE CHANGES

1. Bulk Discounts
   a. Date: October 1971
   b. Change: Adopted 50 Kroner (about $12.15) unlimited monthly pass good for any trips on the regional system. Previously there were a a variety of passes related to different transit lines, etc.
   c. Goal: Part of general changes to integrate the regional system.

SIMULTANEOUS CHANGES

1. Fare structure integration among the lines in the regional system was carried out gradually from 1964 and completed in February 1973.
2. At the time the 50 Kroner pass was adopted, single trip fares were increased.
3. There has been only minimal service increase, most of that on weekends.

RESULTS

1. Ridership has increased about 5%, mostly at lunch hour and on weekends.
2. There has been no discernable reduction in auto usage.
3. Sales of monthly passes have tripled, with pass usage involved in 70 to 80% of all rides as opposed to 33% previously.
4. Revenues at first decreased, but have since exceeded the pre-October 1971 level. Operating costs have increased less than 1%.

CASE #15—MERCER METRO—TRENTON, NEW JERSEY

SUMMARY

In 1971 Trenton initiated a program to increase the utilization of its transit facilities in the off-peak periods. The major element of this program was cutting the base fare in half during these periods. As a result, off-peak ridership increased by 50%.

FARE STRUCTURE CHANGES

1. Off-Peak Discounts
   a. Date: 1971
   b. Change: 30¢ base fare reduced to 15¢ between 10 A.M. and 2 P.M. and after 6 P.M. on weekdays and Saturdays, and all day Sunday.
   c. Goal:
      Increase off-peak transit utilization.

SIMULTANEOUS CHANGES

1. Established a shoppers' coupon, whereby merchants provide riderss discounts on return transit trips in proportion to their purchases. Merchants cover all costs.

RESULTS

1. Off-peak ridership increased 50%.

CASE #16—WMATA—WASHINGTON, D.C.

SUMMARY

Transit fares in the Washington, D.C. metropolitan area have been modified so that peak period commuters generally pay increased fares, while off-peak riders pay the same or less than previously.

FARE STRUCTURE CHANGES

1. General Fare Increase / Off-Peak Discount
   a. Date: September 1, 1975
   b. Change:
      - Peak period base fare increased from 40¢ to 50¢ except within the District of Columbia, where the 40¢ fare was retained.
      - The off-peak base fare was retained at 40¢.
      - Peak period zone charges increased from 10¢ to 15¢, plus an additional 10¢ when crossing a state line. (In Maryland suburbs there is no charge for first zone boundary crossing when traveling intrastate.)
      - Off-peak zone charges have been eliminated except for a 20¢ state line crossing charge.
   c. Goal:
      Increase revenues so as to cover 65 percent of of operating expenses.

SIMULTANEOUS CHANGES

1. Zone definitions were modified to produce zones of more uniform size.
2. There has been a continuing effort to upgrade the system and increase ridership, since public take-over in 1973.

RESULTS

1. Preliminary findings indicate that revenue goals will be met (possibly exceeded).

COMMENTS

This pricing strategy reflects an attempt to tailor the policy change to the market components. The increase will primarily effect the suburban commuters. Service for that market component is relatively expensive because of the longer distances involved and very limited demand during the off-peak hours. As a result, this change results in a more equitable fare structure.

BIBLIOGRAPHY

1. Abe, Mastoshi A., "Pricing and Welfare in Public Transportation," Traffic Quarterly, Vol. 27, No. 3 (July 1973), p. 419.

2. Baum, H.J. (1973), "Free Public Transport," Journal of Transport Economics and Policy 7, pp. 3-19.

3. Boy, J. Hayden and Wells, John D., "Demand for Urban Bus Transit: Two Studies of Fare and Service Elasticities", Institute for Defense Analyses, October 1973.

4. Cantor, M.H. (1970), Elderly Ridership and Reduced Transit Fares: the New York City Experience, Washington, D.C.: U.S. Department of Health, Education, & Welfare Social and Rehabilitation Service.

5. Carnegie Mellon University, Latent Demand for Urban Transportation, May, 1968.

6. Carstens, Impact on Transit Ridership and Revenue of Reduced Fares for the Elderly, Carnegie-Mellon University, UMTA-URT-S, 1969.

7. Carstens, R.L., 1968, written discussion of a paper by J.F. Curin, Highway Research Record 213, p. 19, Washington, D.C.: Highway Research Board.

8. Carstens, R.L., and Csanyi, L.H. (1968), "A Model for Estimating Transit Usage in Cities in Iowa," Highway Research Record 213, Washington, D.C.: Highway Research Board.

9. Charles River Associates, Inc. (1968), "An Evaluation of Free Transit Service," Boston: Charles River Associates Report 125-1.

10. Charles River Associates, Inc. (1972), "A Disaggregated Behavioral Model of Urban Travel Demand," Washington, D.C.: U.S. Department of Transportation.

11. Charles River Associates (1967), A Model of Urban Passenger Travel Demand in the San Francisco Metropolitan Area, Boston: Charles River Associates.

12. Citizens Budget Commission, Inc. (1971), Financing Transit in New York City, New York: Citizens Budget Commission.

13. Curtin, John F., "Effect of Fares on Transit Riding," Highway Research Record, No. 213, 1968.

14. Dillion, R. and Bailey, S., Legal and Political Aspects of Free Transit In Major Metropolitan Areas, Northwestern University (PB-208-246).

15. Domencich, T.A., Kraft, G., & Valette, J.P., 1968, "Estimation of Urban Passenger Travel Behavior: An Economic Demand Model, "Highway Research Record 238, Washington, D.C.: Highway Research Board.

16. "Free Transit for Downtown Seattle," Metropolitan Magazine, (Nov.-Dec., 1973), p. 24.

17. Goodwin, P.B., "Some Data on the Effects of Free Public Transport," Transportation Planning and Technology, January 1973.

18. Gutknecht, R., Alternative Approaches to Public Transport Fares with Their Traffic and Revenue Implications, International Union of Public Transport, 1973.

19. Highway Research Board, Urban Travel Demand Forecasting, Special Report, No. 143, 1973.

20. Hoel, Lester A., and Ervin S. Roszner, "Impact of Reduced Transit Fares for the Elderly," Traffic Quarterly, Vol. 26, No. 3, July 1972, p. 341, 355.

21. Hofmann, P. (1973a), "Bologna Gives Free Bus Rides in Effort to Reduce Use of Cars," New York Times, April 10, 1973, p. 4.

22. Hofmann, P. (1973b), "Rome Likes Traffic-Free Area and Will Enlarge It," New York Times, September 9, 1973, p. 8.

23. Holland, Dempster, K., "A Review of Reports Relating to the Effect of Fare and Service Changes in Metropolitan Public Transportation System", St. Louis University, 1974.

24. Kemp, M.A. (1971), "The Empirical Investigation of Transit Demand," Working Paper 708-53, Washington, D.C." The Urban Institute.

25. Kemp, M.A. (1973a), "Some Evidence of Transit Demand Elasticities," Transportation 2, pp. 25-52.

26. Kemp, M.A. (1973b), "Transit Improvements in Atlanta -- The Effects of Fare and Service Changes," Working Paper 1212-2-1, Washington, D.C.: The Urban Institute.

27. Kraft, Gerald, Domencich, Thomas A., and Valette, Jean-Paul, "Estimation of Urban Passenger Travel Behavior: An Economic Demand Model," Highway Research Report, No. 238 (1968).

28. Kraft, G. (1973), "Free Transit Revisited," Public-Policy 21, pp. 70-105.

29. Kraft, G., and Domencich, T.A. (1970), Free Transit, Lexington, Mass.: D.C. Heath & Company.

30. Kraft, G. & Domencich, T.A. (1972), "Free Transit," in Edel, M., & Rothenberg, J. (eds.), Readings in Urban Economics, New York: MacMillan.

31. Lassow, W. (1968), "Effect of the Fare Increase of July 1966 on the Number of Passengers Carried on the New York City Transit System," Highway Research Record 213, Washington, D.C.: Highway Research Board.

32. McGillivray, R.G. (1970), "Demand and Choice Models of Modal Split," J. Trans. Econ. and Pol., IV, pp. 192-207.

33. Metropolitan Atlanta Rapid Transit Authority, Effect of Fare Reduction and Service Changes on Transit Ridership Patterns in the Atlanta Region, (Summary Report No. 1, August 1973 draft).

34. Motor Transport (1972), "Free Travel Attracts Passengers, but Mainly the Wrong Ones," Motor Transport Bus & Coach Supplement, June 2, 1972, pp. 18-19.

35. Rainville, W.S., Jr. (1948), "Transit Riding, Revenues, and Fare Structures--Basic Approach and Computations by Statistical Laboratory, Division of Industrial Cooperation of Massachusetts Institute of Technology," Washington, D.C.: American Transit Association.

36. Sherman, R. (1971), "Congestion Interdependence and Urban Transit Fares," Econometrica 39, pp. 565-576.

37. Van Tassel, R.C. (1956), "Economics of the Pricing of Urban Bus Transportation," Brown University Ph.D. thesis, Ann Arbor: University Microfilms.

38. Vickrey, W.S. (1952), 'The Revision of the Rapid Transit Fare Structure of the City of New York," Technical monograph 3, New York: Mayor's Committee on Management Survey of the City of New York.

39. Washington Metropolitan Area Transit Commission (1971), Senior Citizens' Reduced Fare Program--Staff Report and Commendations," Reports 1 and 2, Washington, D.C.: WMATC.