Impact of Fare Change on Railroad Commuter Ridership

EDWARD A. HARVEY, Southeastern Pennsylvania Transportation Authority

This paper summarizes the experience gained by the Southeastern Pennsylvania Transportation Authority in demonstration projects that have been conducted during the past 7 years. It also covers various programs developed by different segments of the transportation system in the SEPTA area. The paper describes the Philadelphia area system of the rail commuter, suburban and long-haul passenger service, and defines the delineation of this service as between public-private and entirely private systems. A description of the objectives of the pricing policies adopted on the system is followed by a description of the results of the implementation of the pricing policies that have evolved from the objectives. A discussion of the impact of flexible fare schedules on various segments of the transportation market in the Philadelphia area includes the characteristics of the traveler and the description of the types of transportation provided to accommodate them. A recap of the results of the operational demonstration program conducted between 1960 and 1967 in the SEPTA area covers the effect of various fare changes on ridership levels in different segments of the Philadelphia Transportation System.

The final section of the paper draws conclusions from the results of these demonstration programs. It then relates these conclusions to program projections for the Philadelphia Transportation System with estimates of ridership potential, fare potential, and the impact of the system as a whole on the Philadelphia region.

•A DISCUSSION of the economics of railroad passenger service is fast becoming akin to a dissertation on "Americana." The substantial decline and, in most cases, irrevocable elimination of those services in many areas is a fact which needs no substantiation. Without addressing the merits, the railroad industry has argued that the decline is the result of the public's abandoning them as a passenger carrier rather than vice versa. The resulting "chicken or the egg" exercise before the regulatory agencies in the hallowed halls of ivy or in the trade magazines has not abated the aforementioned decline.

The development and the decline of railroad passenger service has taken place within the framework of private enterprise. Although regulated through its total cycle, the prime responsibility remained in the private sector, qua railroad.

It should be assumed that railroad management would be willing to retain, promote, and improve passenger service wherein it contributes to the total corporate financial structure in direct proportion to the corporate commitment of management, labor, and capital necessary to operate such service. It is understandable that railroad management will be less than enthusiastic in retaining a service that does not contribute its

Paper sponsored by Committee on Passenger Transportation Economics and presented at the 47th Annual Meeting.

share to or, worse, is a burden upon the corporate structure. Accordingly, it follows that the decision to establish, retain, or abandon a particular segment of passenger service was made initially by management within the framework of its own corporate economics.

Although the regulatory agencies, reviewing management decisions, provided an overview of the "public convenience and necessity," they also were mandated to give consideration to the viable economics of the involved carrier—an extremely difficult "line to walk," at best, to which the aforementioned resulting trend attests.

Implicit in the trend of passenger service is the effect on commuter as well as long-haul operations. The rather clumsy distinction is a product of the lack of a clearly defined, generally accepted criteria to differentiate one from the other. With few exceptions, railroad management makes no distinction organizationally and, furthermore, mixes labor, equipment, and facility generally without regard to difference, but specifically in an effort to lessen the economic burden on the corporate purse.

PHILADELPHIA AREA PROGRAM

In the past decade the Philadelphia area has been actively involved in a program to revitalize its regional rail commuter service on the Pennsylvania and Reading railroads. That program has clearly defined that segment of the passenger services which will be considered "commuter" in nature, and has established a new relationship between the public and private sectors. In addition, it has added a new dimension with which to evaluate the economics for the retention and improvement of that service.

As noted, prior to 1958 the expansion and development of the rail commuter systems serving the Southeastern Pennsylvania region was solely the responsibility of the private sector. That responsibility was met to varying degrees, depending upon the magnitude of the burden on the total railroad corporate financial structure as well as the availability of profits from other than passenger operations which offset those burdens. Prior to 1958, the public policy of the region was primarily protected by the regulatory process which governs the two carriers, both Pennsylvania and Reading railroads. In retrospect, it is fair to characterize the expression of such a public policy as one founded on the result of an adversary proceeding dealing primarily with individual train-off cases and fare increases. The situation that existed in 1958 demonstrated graphically the inadequacy of this approach wherein (a) annual ridership on both the Pennsylvania and Reading railroads was declining at a rate of approximately 4.5 percent; (b) highway congestion was already at an intolerable level during peak periods of the day; and (c) although additional highway facilities were soon to be opened, it was not anticipated that they could, for any substantial period of time, alleviate these conditions. In the face of rising costs and declining ridership, there appeared no totally acceptable plan or solution in the private sector alone that could reverse these trends.

In 1958, Philadelphia entered into a pilot program, referred to as "Operation Northwest," wherein service was purchased from both the Pennsylvania and Reading railroads. In subsequent years the public sector's participation has expanded via purchase of service and demonstration projects and presently envelops the total rail commuter systems on the Pennsylvania and Reading railroads.

Thus the region, in a series of steps, placed under contract that service which it was in threat of losing. By doing so, it defined more clearly the service which the railroad could consider as "commuter" pursuant to the urban-suburban needs; and it evolved a partnership of the public-private sector, melded the public interest and private enterprise, and established a public enterprise. The economics of the region's needs for better mass transportation telescoped the economics of the individual carriers.

PROGRAM ECONOMICS AND OBJECTIVES

Public Policy: Regulation vs Participation

The region's decision to participate with the railroads in the revitalization of the area's commuter service required a new framework of reference with which to evaluate, express, and implement public policy. The region analyzed the impact of an

improved railroad commuter system on such concerns as regional economic growth and land use, i.e., protect and improve CBD property investment, suburban residential, commercial and industrial investment, and land use as tax ratables; and such concerns as regional mobility and accessibility in balance, i.e., obviate existing highway congestion, provide access to social and economic opportunity to those otherwise isolated, provide emergency backup alternates, obviate exorbitant replacement costs, and provide time and schedule for evolution of a total regional transportation system.

The touchstone of this analysis was growth. Assuming the validity of the region's decision to retain the commuter system, it followed that it must also contribute to that effort with growth of its own. A common denominator to quantifying growth is ridership.

Present Railroad Commuter System: Capacity

To evaluate this region's rail commuter system in the context of growth required extensive program experimentation and analysis of the system's present and potential capacity, and of the efforts necessary to achieve capacity. The declining trend in commuter patronage, prior to the region's program involvement, had fortunately outstripped the facility and equipment retirement cycle of railroad management.

Quantitatively, the region enjoys a network of 217 route-miles of private right-of-way track facilities extending in every direction from the region's core (Fig. 1). This system serves approximately 200 stations on 12 separate lines and is over 90 percent electrified. The fleet of equipment assigned to the operations has varied over the

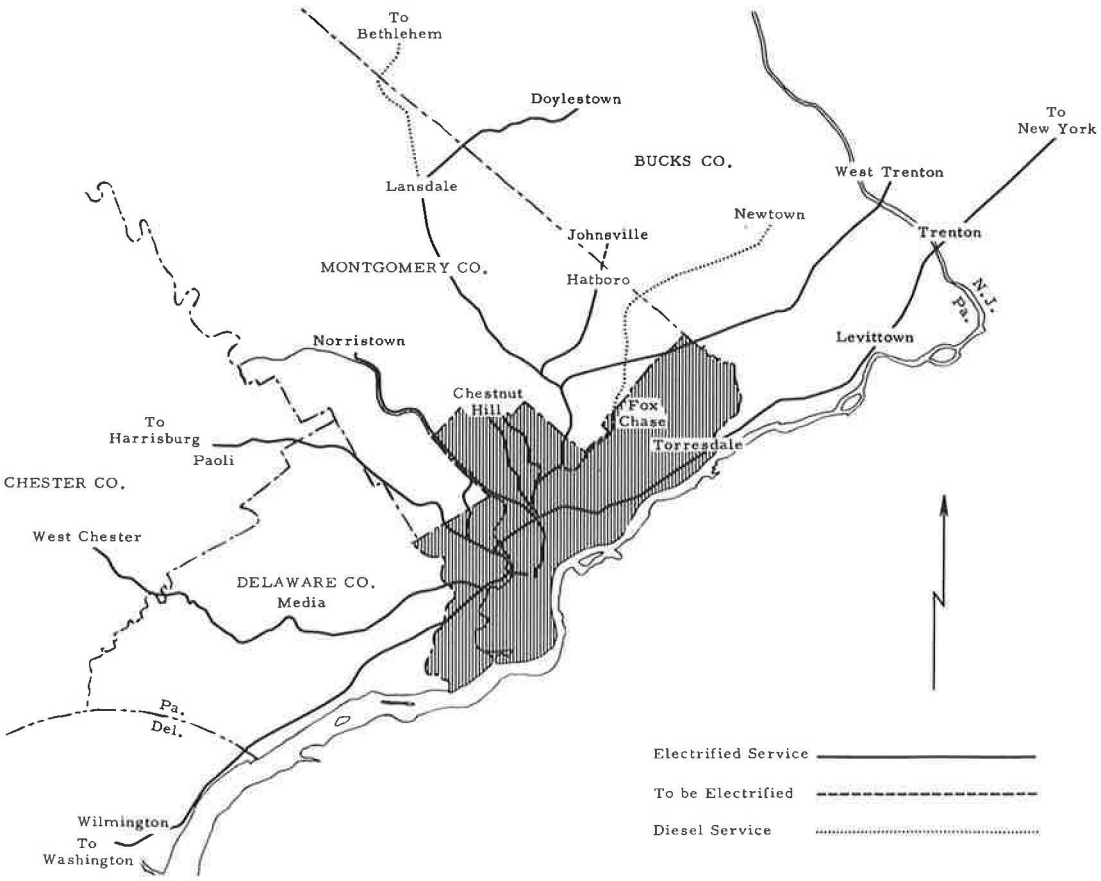

Figure 1. Philadelphia metropolitan commuter system.

program years, but, on the average, numbers approximately 450 cars, providing some 38,000 seats, before shopping. Weekday scheduled trains have, in the main, increased with each schedule change during the program effort (1958, approximately 600; 1968, approximately 800 weekday scheduled trains).

A qualitative review is necessarily more subjective. However, it should suffice to note:

1. There has been no expansion of the basic system for a period of 50 years.
2. No new stations have been established in over 30 years.
3. Sixty percent of the equipment is over 30 years old and a substantial portion of that is over 50 years old.
4. Only 30 percent of the assigned fleet has been replaced or rehabilitated in the last 10 years.
5. Less than 30 percent of the equipment is air conditioned.
6. Approximately 48 percent of weekday scheduled service is provided during the four peak hours (7-9 a.m., 4:30-6:30 p.m.).

In summary, the regional program enjoyed the benefits and suffered the burdens of revitalizing a system with which the community was quite familiar and which had not substantially changed quantitatively for 30 years, but, in relative terms, had been on a decline qualitatively for a decade or more prior to 1958. It was, however, a system that in 1958 had a considerable unused capacity.

Pricing Policy: Pre- and In-Program

It is of particular moment to note that prior to 1958 there were few, if any, logical threads which can rationalize the carriers' pricing policy and the relative economics for the commuter service they rendered. Although the fare structure had as a basis a fixed terminal, plus a mileage increment, it allowed limited consumer flexibility. In view of the service and facility committed, the fare was not competitive; furthermore, it failed to provide sufficient revenues to offset the costs of the service. There were a few attempts at selected fare reductions to encourage ridership increase. However, these were limited in scope and were subsequently erased in the overall effort for fare increases to offset the passenger service losses.

The initial program assumptions rationalizing pricing policy reflected that:

1. Payment of tax dollars should inure to the commuting public in reduced fares, as well as increased service; and
2. There was a relative unawareness on the part of commuters of the cost of his auto transportation other than the immediate out-of-pocket cost.

Accordingly, initial program pricing policy established fares slightly higher than other available mass transit modes, and commensurate approximately with the cost of parking in the CBD on an all-day (commuter) basis. Subsequent program efforts toward the goal of total system contracts evolved different basic policies on the pricing of service. The policy ran the gamut of:

1. Reducing suburban fares (SEPACT I),
2. Reducing and increasing fares (SEPACT III), and
3. Retaining carrier's existing fares (PRR contract January 1966 to June 1967).

Initially, and through all subsequent program steps, payments of public funds were made to the carriers to reduce their deficits incurred in providing improved commuter service.

Programming Pricing Policy

The region's use of pricing policy to obtain a growth objective in its commuter service has had an excellent result to date. It would be less than candid to suggest that the separate project efforts were the result of a vast premeditated plan. It was the program's initial inability (for a number of reasons) rather than its failure to design the total effort toward the desired objectives that holds us in good stead today. (No

small credit should be given the cooperative sufferance of the region and carriers alike through the program's evolution.)

Accepting the premise that enhancement of rail commuting services and facilities would most effectively conserve total public transportation funds, the effective use of pricing policy vis-a-vis improved service levels, new equipment, expanded parking, etc., became most essential. It became apparent that a sound, but flexible, fare structure to implement the pricing policy was equally essential to achieving the program objectives.

FARE STRUCTURE AND RIDERSHIP

Fare Structure Criteria

Extensive program effort was expended to determine the criteria for an effective fare structure. That effort included marketing studies, operational design, and data collection and review. The results of the program marketing efforts indicated the necessity and the benefits of a fare structure with flexibility.

There was evidence that, although weekday ridership counts did not vary in substantial amounts from day to day, there was a constantly changing composition of actual riders. (The study result of the Reading market area indicated that only 35 percent to 57 percent of the average daily work purpose ridership could be considered "hard core.") Accordingly, peak-hour commutation pricing should acknowledge a regular rider as one who rides as little as three times a week.

The peak-period rider is most aware of his transportation cost, has a work purpose, and cites the following as the reasons for rail use over other modes: (a) speed, (b) avoidance of traffic congestion, (c) rail as more direct route, (d) elimination of parking problem, and (e) greater comfort. To that end, the peak rider appears most inelastic to fare charged, given a quality of service reflective of his needs.

The off-peak rider has a low awareness of fare charges, is a part of a highly competitive transportation market, has a shopping, recreational or cultural trip purpose, travels primarily from 9:30 to 11:30 a.m. and 2:30 to 4:00 p.m.; and, as an occasional rider, is highly susceptible to promotion and advertising. Accordingly, the competitive nature of this market group demands a relatively greater amount of total management effort and pricing incentive to develop.

Evolution of the program to include the total commuter operations of both railroads has evidenced that the fare structure must and can aid in the effort of maximizing the effective use of a rail commuter operation.

The 12 separate lines of the regional system so fan the area as to allow a high accessibility to the market, not only in terms of the large number of separate communities directly served, but also in terms of the availability of several lines or services to the same market segment. Operational design, e.g., express and local service configuration, and facility design, e.g., railhead terminal storage and/or turnaround facilities allow and demand an effort to constantly increase the average length of ride per rail trip.

Equally important in obtaining the maximum use of the rail system capacity is the achievement of a better ratio of off-peak to peak-hour use. Train profitability studies graphically demonstrate the relatively low incremental cost of operating off-peak vs peak service. Accordingly, increased patronage and revenues during off-peak periods tend to contribute to and are necessary to a better balance of the economics of rail commuter service.

Consequently, the program has sought a fare structure which provides:

1. A zone system with only three major ticket types, i.e., one-way, peak; 10-trip commutation, peak; and a "bargain" one-way, off-peak.
2. The 10-trip, peak commutation ticket is the base of the structure (100 percent). The one-way peak is established at approximately 120 percent of base per ride and the "bargain," one-way off-peak is established at approximately 85 percent of base per ride.
3. The pricing formula establishes a basic user charge plus a mileage increment that declines as the mileage from the CBD terminal increases.

4. The 10-trip commutation ticket allows a saving to the peak-hour commuter who uses the system with a greater frequency than the commuter who uses the system as a backup to his normal mode and who purchases the one-way peak ticket. The lower bargain, one-way, off-peak ticket reflects the lower cost of that service and the higher unused capacity that exists. (The term "bargain" also provides a public relations and advertising sales point to attract a highly competitive market; this approach is difficult to quantify and should be held in good perspective.)

Fare Change and Ridership

The program has run the gamut of fare reductions and increases and, in the context of that mentioned, it should surprise no one that in each situation ridership continued to increase (Fig. 2).

Generally, program fare reductions, combined with service improvements, had a much greater effect in reversing the declining trend of rail commuter ridership and establishing, in fact, a growth trend. However, also in a general application, fare increases combined with service improvements failed to have an adverse effect on the growth trend.

Fare Reductions—Initial program efforts were limited to segments or individual lines of the two systems. Fare reductions and service improvements in these limited service areas produced substantial percentage increases over prior line ridership records. The initial and immediate success of these efforts failed to have a substantial effect on system ridership, but did spur the program to establish more and more coverage of the system. With the termination of the region's first demonstration project, SEPACT I, covering approximately 20 percent of the systems' services, ridership increases by line were of sufficient magnitude to halt and begin to reverse the systems' declining trend. The use of fare reductions was accordingly very effective in its limited goal, but its implementation created low fares on high service lines and high fares on low service lines, with a system impact of:

1. The abandonment by many patrons of their local stations for the use of closer-in stations or stations on other lines, which offered more favorable fare and service levels;
2. A lower average revenue per passenger resulting from the fare reductions and the shorter average length of ride; and
3. The virtual offsetting of revenue gains, realized from increased patronage, wherein system costs could not be pared operationally to reflect the market change.

The response to market studies in areas provided reduced fares and increased service, reflected favorably on the fare effort, but only secondarily to the response for improved service and its benefits.

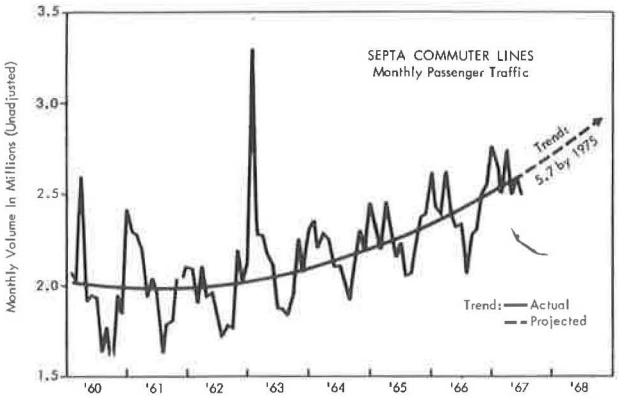

Figure 2. Pennsylvania Railroad and Reading Company unadjusted monthly passenger traffic.

A recent market study indicated that a 50 percent fare reduction would cause 60 percent of actual users to increase rail usage, but 35 percent of that group would be unaffected. It further noted that only 23.5 percent of potential users would increase rail usage, while 74.3 percent of that group would be unaffected with a 50 percent fare reduction.

Fare Increases—The region had its first opportunity to establish coverage of a complete commuter operation in SEPACT III, "Operation Reading." This demonstration project allowed the

program to adjust, in part, the imbalance created in earlier efforts and provided a better base against which to evaluate the total impact of fare change, generally, and fare increases, specifically.

During an 18-month period fares were increased on the average of 13 percent, with a resulting increase in actual ridership of 4.8 percent, or a ridership increase of 9 percent if annualized phases (before and after project) are compared.

This project effort, involving an operationally self-sufficient system, evidenced substantial benefits from a better balanced, if higher, fare structure. Average length of ride increased from 13.8 to 14.6 miles and a change in ratio of peak to off-peak ridership mix of 56.4/43.6 percent to 54.5/45.5 percent respectively was established.

Market studies indicated that diversion of ridership would take place from fare increases in excess of 20 percent. In addition, it was suggested that a 100 percent fare increase would not alter the rail habit of 51.7 percent of actual users, whereas 42.1 percent would reduce rail usage. Of potential users, 66.7 percent stated they would never use the railroad in the event of a 100 percent fare increase.

CONCLUSIONS

The Philadelphia area program to revitalize its rail commuter system has evolved through a series of steps that supports the conclusions that:

1. Retention and improvement of a transportation facility and service which is vital to a region's viability, but which is unsound economically within its own framework, cannot succeed solely within the present regulatory process.
2. The public's participation in the revitalization of such facilities and services must ultimately be programmed to meet regional transportation objectives, but remain cognizant of relative economics of the involved carrier.
3. Programming for system growth, although primarily oriented to facility and service improvement, must also establish pricing policies to offset long-term wage and material escalation.
4. Timely and properly supported fare increases need not deter from regional goals, and should never be evaluated by less than a total plan standard.
5. Pricing policy should be implemented through a fare structure which maximizes system use, as well as responds to the total market requirements.

ACKNOWLEDGMENT

The author gratefully acknowledges research support from the demonstration programs Project No. PA-MTD-1 (SEPACT I), Project No. PA-MTD-4 (SEPACT II), and Project No. PA-MTD-5 (SEPACT III), and the operational data received from the purchase of service program supported locally in Southeastern Pennsylvania.