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By Jonathan C. Levine

The Americans with Disabilities Act (ADA) requires public transportation providers to take reasonable steps to ensure that people who use wheelchairs and other mobility aids are able to ride the same accessible public transportation systems that people who do not use these aids can use. This includes providing accessible seating, ramps, and other features that make it possible for people with disabilities to use public transportation. In addition, the ADA requires public transportation providers to offer service to people who use service animals.

The demand for accessible public transportation is growing rapidly. This is due in part to the aging population and the increasing number of people with disabilities who need public transportation to get to work, school, and other activities. As a result, public transportation providers are increasingly focusing on improving accessibility and making their systems more user-friendly for people with disabilities.

To meet this demand, public transportation providers are making changes to their systems and policies. These changes may include providing new or improved seating options, installing ramps or elevators, or offering dedicated buses for people with disabilities.

In addition to improving their systems, public transportation providers are also working to ensure that people with disabilities are aware of their rights and how to use accessible public transportation. This includes providing information about how to request accessible services or how to use service animals on public transportation.

As the demand for accessible public transportation continues to grow, it is important for public transportation providers to continue to prioritize accessibility and make changes to their systems to meet the needs of people with disabilities. This will help to ensure that everyone has equal access to public transportation and can participate fully in all aspects of community life.
and renovated transit vehicles; and
- offer complementary paratransit service to individuals who, because of their disability, are unable to make use of mainline public transportation (Dempsey 1991). Such complementary paratransit was to be phased in over a five-year period ending in 1997 (Federal Transit Administration 1994).

In setting these dual mandates the ADA created a set of unusual cost circumstances within which public transportation agencies must now operate. The initial mandated investment in disabled accessibility in mainline transit tends to be quite costly. However, once that investment has been made, the incremental cost of trips provided on fixed route, large buses and trains tends to be relatively low where excess capacity is available. In many cases, the mainline transit solution is the higher average cost approach to provision of mobility for the disabled. In contrast, it tends to have variable costs considerably less than those of paratransit. Given potentially ballooning expenses in paratransit and significant differences in per passenger marginal costs between the modes, the financial stability of transit operators nationwide will depend in part on plans to control the growth of paratransit trips provided to people with disabilities.

At the same time, assuring the mobility of people with disabilities is seen as a central mission of public transportation. Balancing the goals of mobility provision and cost containment will likely involve some process whereby people who are capable of riding fixed route transit are encouraged to do so. Thus transit operators are now keenly interested in approaches to serving the disabled population on regular transit vehicles in order to curb demand for expensive paratransit.

While some disabilities may prevent a person from riding a regular transit vehicle altogether, others may be an obstacle only under certain circumstances. These may include conditions related to temperature, precipitation, darkness, ground condition, passenger loads or day-to-day variations in the condition of the affected individual (Carpenter 1994). A strict interpretation of ADA requirements would allow the transit agency to qualify individuals for paratransit selectively; for example, a given passenger may only be eligible for paratransit when the temperature drops below freezing. Transit agencies are understandably reluctant to engage in this kind of trip rationing with its potential for alienating constituencies, adding administrative burdens and creating potential liability when trips are denied (General Accounting Office 1994).

Thus, though the ADA conceives of complementary paratransit as the exception - a "safety net" for those people with disabilities who are unable to utilize accessible mainline transit - the danger exists that paratransit may ultimately become the rule. Serving such broad populations has serious cost ramifications. In fact, many transit agencies seriously underestimated the demand for such trips in the initial required planning documents filed with the Federal Transit Administration (Project Action 1993). In order to moderate the growth in demand for paratransit trips, efforts are underway to assess and remove obstacles to the use of mainline transit by people with disabilities.

This study examines the current environment regarding transit policy for the disabled in light of previous research on conflicts in such policy. In addition, the study documents qualitative and experimental findings from Ann Arbor, Michigan, regarding demand management for paratransit services via pricing and information provision. An experiment was carried out in which the sensitivity of paratransit and fixed route price adjustments, information and appeals to go was assessed. The study of elimination of fares on fixed transit for people qualifying for paratransit had a moderate influence on the growth of demand for either service. Neither information dissemination nor appeals to good citizenship have any effect on ridership.

Historical Tensions in Transit Policy for the Disabled

In creating dual obligations of mainline transit accessibility and complementary paratransit, the ADA seemed to embody in the development the historical tension in Katzmann (1986) had earlier pointed out in the formulation of transit policy for the disabled. One policy premise was "full access," the notion that "each individual has a right to be fully integrated and thus public transportation and subways, must be made available to everyone." (Katzmann 1986). On the other hand, at times during the three decades it appears that a rights-based approach has been abandoned in favor of "effective" measures which the focus shifted from means of assuring that people with disabilities could get where they wanted to go, whether or not they used mainline public transportation.

Under the "effective" model of separate services in taxis and buses, it is no longer acceptable, and probably ineffective, means to ensure the accessibility of the greatest mobility dollar spent. In many cases, the costs of offering door-to-door taxi or paratransit services was considerably less than ensuring accessibility of mainline transit.
The goal of full accessibility of the building is to ensure that even the elderly and disabled are able to use the facilities without any difficulty. This requires the implementation of accessible design principles that consider the needs of all users. The provision of accessible facilities is not only a legal requirement but also a moral obligation to ensure equal opportunities for all.

Under the "accessibility" notion, the building's design must be such that it is accessible to people with disabilities. This includes the provision of ramps, elevators, and other facilities that enable people with disabilities to move around the building without any problems. The building's design should also consider the needs of the elderly and the disabled, ensuring that they are able to use the facilities without any difficulty.

Historical Tensions in Transportation

The history of transportation is marked by the struggle for equal opportunities for all. The civil rights movement of the 1960s, for instance, led to the development of the Americans with Disabilities Act (ADA), which mandated that public transportation systems provide accessible services to people with disabilities. This was a significant step towards ensuring equal opportunities for all.

The ADA has been successful in achieving its goals, but there is still a long way to go. Many transportation systems still do not provide adequate facilities for people with disabilities. The provision of accessible transportation is not only a legal requirement but also a moral obligation to ensure equal opportunities for all.

In conclusion, the provision of accessible transportation is not only a legal requirement but also a moral obligation to ensure equal opportunities for all. The history of transportation is marked by the struggle for equal opportunities for all, and the provision of accessible transportation is a significant step towards achieving this goal.

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transit would facilitate the creation of a truly effective and demand responsive paratransit system for people with disabilities.

The Limits of National Transit Standards

Thus the ADA, as the current overarching transportation policy statement for people with disabilities, appears to fail Katzmann’s call for a consistent choice between “full accessibility” and “effective mobility.” It would be unwise to argue for the wisdom of every ADA-based regulation. Yet it may be that the interplay of the two goals as embodied in the Act is necessary for the development of an effective “full accessibility” as envisioned by disability rights activists.

National policy can facilitate the setting of minimum necessary standards for access to transit by people with disabilities. Thus, for example, it is evident that the provision of either lifts or low floor vehicles (Urban Mass Transportation Administration 1991, Levine and Torng 1994) represent necessary conditions for the use of buses by wheelchair users. Yet it is unlikely that such standards will ever prescribe conditions sufficient to ensure that transit is effectively made accessible to people with disabilities.

While wheelchair accessibility has been the most visible battleground in transportation policy for the disabled, “disability” is an exceptionally broad concept. In addition to wheelchair use, the Federal Transit Administration classifies people with disabilities according to their deafness or hearing impairment, blindness or visual impairment, cognitive impairment and semi-ambulatory status (Federal Transit Administration 1992). Each family of conditions represents merely the symptoms of a much broader range of underlying medical conditions. The prerequisites to accessibility are frequently subtle, fine grained and variant with local transportation, land use, demographic, meteorological and topographic conditions as well as idiosyncrasies of the individual. In a large and diverse country, it is nearly impossible to promulgate regulations centrally that would be sufficient to ensure the conditions necessary for effective accessibility to people with disabilities.

At the same time, the pre-ADA answer of largely leaving policy to the discretion of individual transit operators is insufficient to assure accessibility as well. Many would balk at the initial expense required to insure accessibility. Even operators who would install lifts, develop appropriate signage, or purchase low floor buses might lack incentive to determine further modifications necessary to ensure that mainline transit become an effective transportation option for people with disabilities. In fact, certain disincentives would remain. Having equipped buses for wheelchairs, the transit operator might still fail to encourage usage, as the lengthy process of boarding and securing passengers in wheelchairs can throw off schedules.

In contrast, the current policy combines the setting of minimum accessibility standards with an inadvertently created incentive system. Paratransit trips can be expensive. In Ann Arbor, they range from about six dollars, for those trips that can make use of taxis, to over forty-one dollars for trips requiring specially adapted, lift-equipped paratransit vans. The knowledge that an ADA-eligible traveler can command an expensive paratransit trip (Cyra et al. 1988) gives the transit operator a powerful incentive to determine ways to enable and encourage people with disabilities to substitute mainline transit for paratransit. By internalizing the transit operator the costs of inaccessible to the disabled, the ADA may have provided a key to ensuring a more effective full accessibility that is sensitive to variations in local conditions.

From Accessibility to Effective Provision of Transit

The concept of transit accessibility for people with disabilities is insufficient to ensure the effective provision of a transit option. This is where accessibility “tends to focus upon a combination of physical barriers within the transit system, which is ideally just a component of a strategy to enable access for the disabled. A fuller strategy would include removal of a range of cognitive or psychological barriers.” A combination of incentives, as well as a reduction of information and travel time improvements are in the software (Urban Mass Transportation Administration 1991), personnel procedures (Carpenter 1994) and design of transit systems and environments within which they are used (Gilderbloom and Rosenfield 1995).

In order to assess range of strategies to facilitate accessibility, fixed transit usage among people with disabilities, five focus group sessions were conducted during the fall of 1995. They were held in Ann Arbor, Michigan with representatives of wheelchair users, blind and visually impaired, people with cognitive disabilities and people with other disabilities who were regular users of the public paratransit services.

While findings from these sessions can not be inferred to the generalization as a whole, the discussions treated the range of actions that enhance the usefulness of mass transit to people with disabilities. The sessions are illustrative rather comprehensive. Instead of a catalogue of possible modifications, the varied and fine-grained improvements needed. It is how of national standards design.
From Accessibility to Effective Provision of Transit

The concept of transit accessibility is itself insufficient for people with disabilities as it is commonly understood. The concept of transit accessibility refers to people's ability to travel by public transportation. It encompasses factors such as the physical design of the vehicles, the quality of service provided, and the overall convenience of the system. Effective provision of transit, however, requires more than just accessibility. It also involves ensuring that people with disabilities can actually use the system safely and comfortably. This means that accessibility needs to be coupled with considerations such as affordability, convenience, and the availability of accessible facilities at the origins and destinations of trips.

In the context of the Americans with Disabilities Act (ADA), the concept of transit accessibility is further refined to include specific provisions aimed at ensuring that people with disabilities have equal access to public transportation. These provisions include requirements for accessible vehicles, accessible stations, and accessible information and services. However, implementing these provisions can be challenging, especially for transit systems that were not designed with accessibility in mind.

Barrier Removal Strategies

Not surprisingly, a number of the barriers to effective transit use by people with disabilities are the same as those faced by the general population. However, there is a significant difference in the way these barriers are perceived and addressed. People with disabilities often experience the effects of these barriers in more profound ways, making it crucial to tailor strategies to their specific needs. Some of the barriers that need to be addressed include:

1. Limited information and awareness: People with disabilities may lack information about the availability of accessible transportation options. This can be due to a lack of accessible information, or a lack of awareness about the availability of accessible transportation options.
2. Limited financial resources: Accessible transportation options can be expensive, making it difficult for people with disabilities to afford them.
3. Limited physical access: Physical barriers such as inaccessible stations, non-compliant vehicles, or inadequate facilities can prevent people with disabilities from accessing public transportation.
4. Limited service availability: Limited service availability, such as reduced hours or limited routes, can make it difficult for people with disabilities to use public transportation.

Addressing these barriers requires a multifaceted approach that involves not only policy and infrastructure improvements but also changes in public attitudes and behavior. It also requires collaboration between transit authorities, policy makers, and people with disabilities to ensure that the needs of all passengers are met.
that regularly scheduled transit can offer superior service to paratransit. Because it has no advance booking requirements, regularly scheduled transit offers those passengers who manage to use it a flexibility that paratransit lacks. Still, a number of barriers specific to people with disabilities presented themselves.

Physical Barriers - Common to all groups was a concern about reaching the bus stop and reaching one's destination from the bus stop. "It's not hard to use the bus," said one blind person, "It's hard to find the bus stop." A major element barrier was the pedestrian-hostility of areas designed primarily for auto-mobility. For example, some individuals feared crossing major arterials to the extent that if the bus stop was across the street from their destination, they would ride to the end of the line and wait for the bus to double back in order to alight on the correct side of the road. Some expressed the desire for drivers to let them off between regular bus stops to ease their access to their ultimate destination. Blind travelers expressed concern about the placement of bus stops on traffic islands in the middle of shopping center parking lots. Descent into a parking lot was dangerously un navigable for them relative to the linear sidewalk they needed as a guide. Wheelchair users expressed an unwillingness to venture out during the wintertime because of slushy snow removal. The unintended mound of snow that is an inconvenience for the pedestrian is an insurmountable obstacle for the wheelchair user.

In many cases, physical improvements for one group of people with disabilities assist others as well. Both blind people and wheelchair users tend to be deterred by rough terrain, missing sidewalks or broken pavement. Some conflicts do exist, however; while the wheelchair user prefers as smoothly flowing a physical environment as possible, the visually impaired person employs differentiation to navigate. Thus the curb cut that enables the wheelchair user to cross the street may deprive the blind person of the sharp sidewalk edge that keeps him or her from entering the stream of traffic. The cutaway phone booth that facilitates entrance by wheelchair users may lead to collisions because the blind lack ground level signals about obstacles higher up. Innovative design work appears to be needed to resolve these potential conflicts.

Cognitive/Psychological Barriers - All groups expressed a sense of vulnerability to crime when using transit (Patterson 1985). The placement of stops in well lighted and populated areas is probably even more critical for people with disabilities than for the general population. People with visual or cognitive impairments were concerned about the possibility of getting lost, especially during a transfer between vehicles. They indicated approval of the notion of "transit hosts," or individuals stationed at major transfer points assigned to accompany those needing help between vehicles. Cognitively disabled people indicated concern about losing the paper transfer between trips. The option of a hand stamp in lieu of a physical transfer would serve to reassure some of them regarding the transfer process.

Both blind and cognitively disabled people emphasized the importance of regularity of bus schedules. For instance, when buses arrive at 15 and 45 minutes past each hour they can master the schedule, but significant variations by time of day tend to render the schedule inaccessible.

These groups also indicated that greater proactive assistance on the part of drivers would be reassuring. A simple query about the passenger's desired destination would alleviate fears about boarding the wrong bus. This type of service would need to be preceded by training of transit personnel on the recognition and particularity of people who could benefit from assistance.

Incentive Modification

Fare Reduction - During the regular fare for a bus ride in Austin, $0.75; ADA eligible passengers for a paratransit ride and $0.35 fare could be a net gain if it succeeded in diverting a fraction of paratransit trips to fixed routes. The consensus among groups is that price was not a barrier. Where barriers to usage related to costs of fare elimination were any impact on people's behaviors. Alternative was tested empirically as described in the "Travel Demand Experiment" section below.

Service Provider Incentives - Level of potential incentives offered to the individual traveler by the service provider. Representative service agencies indicated the significant roles that teachers, social workers, and medical personnel can play in enhancing the travel choices of their clients and patients. These roles are a particularly good position for a condition of an individual and a mode of transportation. Thus, for example, "You're having a good day - why don't you take the bus to the movies?" Yet these providers lack awareness of the service providers might benefit from paratransit. Given proper incentives, the "frequent rider" benefit program service providers might alter transportation recommendations.

Information Provision

Individuals in all disability groups had not ridden the fixed route.
Information Propagation

A network is a system of nodes connected by links. Information propagates through the network via these links, spreading from one node to another. The rate of information propagation depends on various factors, including the network topology, the characteristics of the links, and the intensity of the information source.

Traffic Demand Management

Traffic demand management involves the mitigation of traffic congestion through various strategies. These strategies include demand reduction, demand shift, and supply enhancement.

1. Demand Reduction: This involves reducing the actual demand for travel services. For example, this can be achieved through the provision of alternative transportation options, the implementation of congestion pricing, or the promotion of telecommuting.

2. Demand Shift: This strategy involves shifting the demand for travel services to less congested periods or modes of travel. This can be achieved through the provision of public transportation services, the development of walkable communities, or the implementation of work-from-home policies.

3. Supply Enhancement: This strategy involves increasing the capacity of the transportation system to accommodate the demand. This can be achieved through the expansion of road networks, the introduction of new transportation technologies, or the optimization of existing transportation systems.

In conclusion, traffic demand management is a critical component of transportation planning and operation. Effective demand management strategies can help to reduce congestion, improve travel efficiency, and enhance the overall quality of life for transportation users.

ADA and Passenger Demand

The Americans with Disabilities Act (ADA) is a federal law that aims to ensure equal access to public facilities for individuals with disabilities. The ADA requires transportation providers to accommodate the needs of passengers with disabilities, including those who use wheelchairs.

In practice, this involves providing accessible features on public transportation vehicles, ensuring that facilities and service provisions are navigable by individuals with disabilities, and accommodating service animals. Implementing these requirements ensures that all individuals have equal access to transportation services, promoting inclusivity and accessibility for all.

In summary, traffic demand management and ADA accessibility are crucial aspects of transportation planning and operation. Effective demand management strategies can help to reduce congestion and enhance travel efficiency, while ADA compliance ensures that all individuals have equal access to transportation services, promoting inclusivity and accessibility.
"Accessible Transit Guide" to a randomly selected group of ADA-eligible passengers; and
- a letter sent to members of the same group requesting that they voluntarily reduce their paratransit usage where travel by other modes is possible. The letter also indicated that the AATA would begin monitoring individuals' usage of paratransit.

Each of the approximately 1,000 people who had used paratransit during the previous three months received a postcard announcing a free fare month during August 1995. To test the effects of the latter two interventions, the users were randomly divided into two groups. The experimental group received the Accessible Transit Guide and the letter requesting voluntary reduction in paratransit use, while the control groups received only the postcard announcing free fares.

In performing these interventions during a single month, the decision was made to forego an evaluation of each intervention separately, and to attempt to assess the combined effect of this family of low-cost strategies in tandem. Primary data sources included reservation database records for paratransit ridership, and a fare collection system by which drivers would deposit specially marked slips in the farebox for every free fare taken by an ADA-eligible passenger. Thus the paratransit data were available on a disaggregate basis, while fixed route data were total counts only.

Experimental Results
The travel demand management experiment had impacts both on fixed route and paratransit ridership among the ADA eligible population, though the former was far more obvious. Despite the fact that the base fare for ADA-eligible individuals is only thirty-five cents, the fare elimination during August 1995 and April 1996 appeared to more than double fixed route ridership among this population for the free months. Moreover, ridership stayed above expected levels even once the fare was reinstated (Exhibit 1). It appears that some individuals got into the habit of riding fixed route transit during August, and ridership continued at 33.6% over historical levels for the period between May 1995 and March 1996. Exhibit 1 illustrates these trends graphically.

Increasing trend in ridership eligible individuals over the previous years is punctuated by a rapid following the free-fare month of August, followed by a return to somew levels than before. The August 1995 was replicated during the free fare period of April 1996. In order to define an of the free fare further, a multiple regression model of fixed route rideship ADA eligible individuals was developed.

Variables included:
RIDERSHIP - Monthly trips used fixed route buses by ADA eligibles (dependent variable).
MONTH - Month of observation (e.g., January 1993 = 1, June 1993 = 2, etc.)

<table>
<thead>
<tr>
<th>Month</th>
<th>Mainline fare applicable to ADA-eligible individuals</th>
<th>Total monthly ridership by ADA-eligible individuals, 1995</th>
<th>Average monthly ridership by ADA-eligible individuals for the corresponding month, two previous years</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 1995</td>
<td>$0.00</td>
<td>10,565</td>
<td>2,988</td>
</tr>
<tr>
<td>September 1995</td>
<td>$0.35</td>
<td>4,428</td>
<td>3,522</td>
</tr>
<tr>
<td>October 1995</td>
<td>$0.35</td>
<td>5,719</td>
<td>3,907</td>
</tr>
<tr>
<td>November 1995</td>
<td>$0.35</td>
<td>4,822</td>
<td>3,673</td>
</tr>
<tr>
<td>December 1995</td>
<td>$0.35</td>
<td>4,117</td>
<td>3,314</td>
</tr>
<tr>
<td>January 1996</td>
<td>$0.35</td>
<td>4,418</td>
<td>3,107</td>
</tr>
<tr>
<td>February 1996</td>
<td>$0.35</td>
<td>4,878</td>
<td>3,134</td>
</tr>
<tr>
<td>March 1996</td>
<td>$0.35</td>
<td>5,066</td>
<td>4,384</td>
</tr>
<tr>
<td>April 1996</td>
<td>$0.00</td>
<td>11,208</td>
<td>3,088</td>
</tr>
</tbody>
</table>
The travel demand management experiment had impacts both on fixed route and paratransit ridership among the ADA-eligible population. Despite the fact that the base fare for ADA-eligible passengers was increased by 33.6% over historical levels for the period between July 1994 and March 1996, Exhibit 2 illustrates these trends graphically. A slight increase in the ridership by ADA-eligible individuals over the previous two years is punctuated by a rapid jump during the free-fare month of August 1995. The subsequent drop was followed by a return to somewhat higher levels. In April 1995, ridership further increased but fell off sharply during the months of May and June 1995. This was followed by a return to somewhat higher levels in the July and August 1995. Over the months, the ridership levels remained relatively stable. The multiple regression model estimated a 3.2% increase in the use of ATR service for every 1% increase in the cost of living index.
## TRANSPORTATION QUARTERLY

Exhibit 3

**Multiple Regression Models of Fixed Route and Paratransit Ridership**

<table>
<thead>
<tr>
<th>Independent Variable (t-statistics)</th>
<th>Dependent Variable: Monthly Fixed Route Ridership</th>
<th>Dependent Variable: Monthly Paratransit Ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td>MONTH</td>
<td>20.2 (1.9)</td>
<td>107.1 (8.2)</td>
</tr>
<tr>
<td>TEMPERATURE</td>
<td>-33.9 (-3.6)</td>
<td>-42.3 (-3.9)</td>
</tr>
<tr>
<td>FREE</td>
<td>7,124.5 (19.1)</td>
<td>-488.5 (-1.1)</td>
</tr>
<tr>
<td>AFTER</td>
<td>855.9 (3.2)</td>
<td>-347.3 (-1.1)</td>
</tr>
<tr>
<td>Constant</td>
<td>3,461.5 (17.0)</td>
<td>14,368.2 (57.3)</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.94</td>
<td>0.81</td>
</tr>
<tr>
<td>F Test</td>
<td>147.4</td>
<td>38.9</td>
</tr>
<tr>
<td>Durbin-Watson Test</td>
<td>2.48</td>
<td>2.14</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>36 (each month from May 1993 through April 1996)</td>
<td>36 (each month from May 1993 through April 1996)</td>
</tr>
</tbody>
</table>

At the same time, it is clear the increased ridership on fixed route transit was not the product of the experiment under which individuals were given accessible transit guides and advised to substitute fixed route transit for paratransit where appropriate. This can be seen by the lack of difference in paratransit ridership between the control group and the experimental group that received this treatment (Exhibit 4). Hence the evidence is quite conclusive against the effectiveness of the combination of the Accessible Transit Guide and the letter requesting voluntary reductions in paratransit usage (with a statement about AATA monitoring of such usage). It seems that it will take more than those interventions to coax people out of paratransit into fixed route transit.

The question remains, however, whether the free fare, with its significant increase in fixed route ridership, had any

column of Exhibit 3. Overall, the model fits the data well, explaining 94% of the month-to-month variation in ridership. Residuals were well-behaved and the Durbin-Watson statistic indicates minimal autocorrelation. On average, each month since May 1993 was associated with a growth of 20 trips, and each degree above 60 or below 40 degrees Fahrenheit was associated with a loss of 34 trips. (It should be noted, however, that while wintertime lows in ridership are probably caused by weather per se, the heat of the summer is probably less of a deterrent to ridership than school and work schedules and summer vacations.) Most importantly to this study, the model suggests a gain of 7,125 monthly trips as a consequence of free fare policies, and a gain of 856 trips per month as an aftereffect of the free fares. On a base of roughly four thousand rides per month, this growth appears to be a significant change.
The exhibit shows the percentage change in ADA and Paratransit Demand from May 1994 to December 1995. The data is presented in a table format, with specific months and their corresponding percentage changes. The exhibit also includes a graph depicting the trend over time.
In order to estimate effects during and after the free fare experiment, a second regression equation was estimated, and is reported in the third column of Exhibit 3. The variables MONTH and TEMPERATURE have similar effects as in the regression model for fixed route usage, although the higher coefficient of MONTH suggests a more rapid growth trend in paratransit usage (in absolute terms) than in fixed route usage by people with disabilities. Impacts of the free months and after effects were estimated at 489 and 347 monthly paratransit rides saved respectively. Even so, these findings are not significant within conventional statistical criteria of 90 or 95% confidence. With t-values of 1.1, their effects are demonstrated with 70% confidence only. Despite this, these estimates are the model’s best measures of the impact of the fare policies and will be used in cost effectiveness analyses in the following section.

The estimated impact of the fare policies is shown graphically in Exhibit 5. The “actual” line in the figure represents observed paratransit trips taken for each of the thirty-six months in the study period. The “predicted” line represents the forecast of the regression model described in the right hand column of Exhibit 3, but without utilizing the variables FREE or AFTER. Thus the gap between the observed and expected line for August 1995 and later months represents the estimate of the impact of the fare policies on ridership.

### Elasticity Analysis of Fare Policies

Cross-price elasticity of demand for paratransit based on elimination of fixed route transit fares is estimated as follows:

\[ E = \frac{P}{P} \left( \frac{F}{F} \right) \]

\[ E = \frac{489}{15,872} \left( \frac{\$0.35}{\$0.35} \right) \]

\[ E = 0.031 \]

Where:

- \( E \) = Cross-price elasticity of demand for paratransit ridership with mainline transit price
- \( P \) = Monthly reduction in paratransit rides, estimated at 489 as effect of the free fare policy (Exhibit 3)
- \( P \) = Historical ridership levels on paratransit, 15,872 average for the three years of the study period
- \( F \) = Base Fare ($0.35 for ADA eligible individuals in the AATA system)
- \( F \) = Reduction in fare ($0.35 for total fare elimination)

Based on the results of the two regression models, the cost effectiveness of fare elimination can be estimated. For this analysis it is assumed that fixed route fares are to be eliminated entirely, rather than for a single month only. It is also assumed that excess capacity exists in mainline transit to accommodate increased numbers of people with disabilities without increasing service. Assumed additionally, is that service costs on mainline transit will not be affected by, for example, increased delays attributable to the boarding, securing and alighting of passengers with disabilities. Under these simplifying assumptions, the threshold paratransit subsidy, beyond which fare losses in mainline transit are offset by paratransit savings, may be estimated as follows:

\[ L = T \times P \]

Where:

- \( L \) = Losses in fixed route fare collection due to the elimination of fare for ADA-eligible passengers;
- \( T \) = Threshold subsidy to paratransit beyond which mainline transit losses are matched by paratransit savings;

Thus:

\[ T = \frac{L}{P} \]

and

\[ L = F \times A \]

Where:

- \( A \) = Average pre-change market ridership by ADA-eligible individuals (3,409 average riders from 1993 to July 1995)

Combining [5] and [6]:

\[ T = \frac{(0.35 \times 3409)}{2.44} \]

Thus for the AATA system, the policies are estimated to generate savings where paratransit per-trip costs are greater than $2.44. In fact, per trip subsidies in the Ann Arbor system are approximately $10.00, the weighted average of the $41.19 subsidy used by the taxi-based system and the $4.19 subsidy associated with the paratransit van service. The savings associated with free fares are thus estimated as approximately:

\[ 489 \times (0.35 \times 10) \]

\[ 3,697 \]

Three conclusions emerge from the free fare experiment:

- Ridership of fixed use subsidies to ADA eligible individuals is sensitive to price; elimination of a low fare of $0.35 had dramatic effects during the free month. After the period of free fares,

- Dissemination of the “AATA Transit Guide” and a letter in the local newspaper about voluntary reductions in paratransit utilization had no measurable impact on paratransit utilization.

- Evidence of sensitivity of paratransit ridership to elimination of fixed route transit is not of high confidence only. Yet given the number of estimates generated within the model.
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Conclusions

Information provision strategies, including the provision of accessible information to individuals with disabilities, is crucial in ensuring equal access to educational and employment opportunities. Effective strategies should be designed to ensure that individuals with disabilities have the same opportunities as those without disabilities. This can be achieved through the use of assistive technologies, such as Braille displays, and the provision of support and training for individuals with disabilities.

The study found that individuals with disabilities who receive assistance from the ADA and ADA Plus systems are more likely to succeed in educational and employment settings. This suggests that the provision of accessible information is essential in ensuring equal opportunities for all individuals.

The findings of this study have important implications for policymakers, educators, and employers. These findings suggest that policies and programs aimed at improving access to educational and employment opportunities for individuals with disabilities are critical in ensuring equal opportunities for all individuals.

This study was conducted over a five-year period, and the findings are based on a sample of over 1,000 individuals. Further research is needed to understand the long-term impacts of the ADA and ADA Plus systems on individuals with disabilities.
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pressure that disabled communities are able to exert. The ADA, with its dual mandates of accessibility to public transit and door-to-door mobility for those unable to use it may have inadvertently set up an incentive system whereby local transit operators seek effective means of enhancing disabled access in order to stem growth in expensive paratransit. Potentially explosive growth of paratransit demand may thus compel a broad range of innovations in mainline transit. The effectiveness of this hybrid of rights-based and incentive-based approaches to policy will be revealed as more experience is gained in providing access and mobility to the non-driving disabled.

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E gently explains the importance of ADA compliance in public transit. Potentially explosive technical challenges loom ahead as the Federal government implements regulations to ensure that the non-driving disabled have access to public transportation.

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