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Economic and Social Impact of the MBTA’s Proposed Fare Increases and Service Cuts; with Further Research on the Commuter Rail

Alexander Alan Flores
Worcester Polytechnic Institute

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Economic and Social Impact of the MBTA’s Proposed Fare Increases and Service Cuts; with Further Research on the Commuter Rail

An Interactive Qualifying Project
submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE
in partial fulfillment of the requirements for the degree of Bachelor of Science

by
Alexander Flores

Date:
26 April 2012

Report Submitted to:

Professors Constance Clark and Jill Rulfs
Worcester Polytechnic Institute

This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its web site without editorial or peer review. For more information about the projects program at WPI, see http://www.wpi.edu/Academics/Projects
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Abstract

The commuter rail is more than just another means of transportation. It allows for interconnectivity between cities expanding employment diversity, education, and leisure. The MBTA’s services provide numerous economic and social benefits to the communities it serves and the Commonwealth. The MBTA is dealing with a financial deficit and rider protest to proposed solutions. For this project, surveys were conducted on riders to test the hypothesis that the MBTA’s proposed service cuts and fare increases would cause adverse economic and social effects as well as a decrease in ridership numbers. A critique of proposed short-term solutions is given and data of the sort that might influence future MBTA decisions is presented.
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Introduction/ Literature Review

Public Transportation

Public transportation is an important part of cities in modern civilization, not only providing mobility and greater accessibility but also influencing community and economic development. The direct and indirect effects of public transportation have been studied by transportation agencies worldwide. According to a study of the economic impact of public transportation investment prepared for the American Public Transportation Association by Glen Weisbrod of the Economic Development Research group and Arlee Reno of Cambridge Systematics, investments and service operations in public transportation have helped create an average of 36,000 jobs for every 1 billion dollars spent. (Weisbrod, 2009) The authors also reported that an average of $1.6 billion in labor income is gained for every $1 billion spent on transportation funding. Besides direct employment, public transportation provides consumers and businesses with more employment accessibility. Car ownership costs are reduced or removed for consumers who rely completely on public transportation. Public transportation also benefits those who do not use it by relieving traffic congestion and improving air quality. A functional reliable public transportation system could take thousands of cars off the roads, reducing environmental impacts and traffic congestion. (Weisbrod, 2009) According to a 2004 study on Montreal’s public transportation by the Montreal Chamber of Commerce, public transportation has eliminated nearly 500,000 car-trips per year, during periods of peak traffic, producing 4.2 times less air pollutants. (Montreal, 2004) In 2003, public transportation saved the city of Montreal an estimated $61.9 million in road accidents (Montreal, 2004). Certain USA cities have already implemented extensive public transportation systems serving as models for development of others. A 2009 article published by US News & World Reports used 2008 ridership, safety, and government spending data to rank the 10 best cities for public transportation. Portland, Boston, New York, Los Angeles, and Denver were among the most praised with the highest ridership (Kurtzleben, 2009).

MBTA

Massachusetts’ public transportation is managed by the MBTA (Massachusetts Bay Transportation Agency). Commissioned by the General Court in 1964, the MBTA was set to improve public transportation in Massachusetts- serving Boston and 77 other cities and towns
Since its inception the MBTA has been federally funded through the UMTA (Urban Mass Transportation Administration) receiving over $3.5 billion for capital improvement programs and operating budget. Now in 2012, the MBTA serves 175 cities and is the 5th largest mass transit system in the United States. Its services include: bus, subway, commuter rail and ferry. Ridership levels are currently at the highest they have ever been averaging 1.279 million weekday riders (Mass.gov, 2012). However the MBTA, just like most public transportation organizations, is operating at a deficit. (Kane, 2009)

A detailed report on the MBTA’s debt, the effects of the debt, and the extent of the debt in comparison with other transportation agencies was compiled by Brian Kane, a budget & policy analyst, of the MBTA advisory board. The report indicated that all United States agencies are in debt, with the MBTA under the highest debt, and are operating at a deficit. Unlike the MBTA, all other transportations agencies in the United States have a dedicated revenue stream for debt or maintenance. (Kane, 2009) The MBTA must fund its operating costs, capital maintenance programs and debt from the same budget. (Kane, 2009).

The MBTA is currently facing an overwhelming multiyear deficit due to a $5.2 billion debt, an increase in operating costs, and an underperforming statewide sales tax. Without an increasing revenue stream the MBTA’s deficit has been increasing annually. Recent legislation demanding that the MBTA operate within a balanced budget has resulted in the proposal of two separate solutions, both of which implement service cuts and fare increases. The MBTA proposals would affect all MBTA transportation services. The impact on the Worcester/Framingham commuter rail line and the cities it connects was further studied in this project.

The Worcester/Framingham commuter rail line travels from Worcester to Boston serving Newton, Auburndale, Wellesley, Natick, Framingham, Southborough, Westborough and Grafton as well.
The MBTA’s financial crisis has two main causes: insufficient sources of revenue, and the “big dig” debt. The statewide sales tax was intended to be a main source of revenue and sustainability for the MBTA by the legislature and Governor. During the 1990’s the sales tax revenue was growing at an annual rate of 6.5%. (Kane, 2009) A 2009 independent review of the MBTA, commissioned by Governor Deval Patrick, details the MBTA’s financial situation and general operation (D’ Alessandro, 2009). In 2000, the Commonwealth presented the “forward funding” reform which would supposedly sustain the MBTA with 20% of the sales tax revenue, leading to its financial self-sustainability (D’Alessandro, 2009). The term “forward funding” refers to the move of the MBTA from an agency which operated without the intention of generating a surplus to a self-sustainable agency with an increasing revenue stream from the sales tax (D’Alessandro, 2009). The expected transformation would eventually allow the MBTA to run a balanced budget (MBTA, 2012). Unfortunately, the amount of revenue produced has remained almost unchanged. According to a 2007 study by the Massachusetts Transportation Finance Commission, an average growth rate of 3 percent a year for the sales tax revenue was considered a conservative estimate at the time; however “a declining economy and an increase in internet sales” has resulted in insufficient growth (Massachusetts Transportation Finance Commission, 2007). Since 2000 the sales tax revenue has only grown an average of 1% annually leading to a cumulative shortfall of $375 million (MBTA, 2012). Alternate sources of funding have rarely been proposed since the failure of the sales tax. In 2009, Governor Deval Patrick proposed a 19-cent increase in the gas tax (Shepard, 2009). Instead, a onetime $160 million allocation was given to the MBTA by the legislature from the sales tax revenue providing a temporary solution to its budgetary needs and subsequently postponing drastic service cuts and fare increases (MBTA, 2012). The sales tax, even though it’s underperforming, currently provides over 50% of the T’s revenue according to the FY2011 MBTA operating budget (Runkel, 2010). The remaining main revenue sources are assessments to cities and towns served; customer fares; advertising; real estate transactions and parking revenue. (MBTA, 2012) These sources of revenue combined with money saving attempts involving personnel cuts and improvements in operation efficiency have helped lessen the deficit substantially. However, with
the demand for a balanced budget for the upcoming fiscal year, service cuts and fare increases appear inevitable (MBTA, 2012).1

The second component of the MBTA’s financial crisis is also a result of the “forward funding” reform, a $5 billion debt. The MBTA has been acquiring debt since 2000 on its own through unfunded capital improvement programs ($1.869 billion) designed to improve and maintain the MBTA’s services (Kane, 2009). The remainder of the debt comes from $1.652 billion of prior obligation for the “big dig” and $1.688 billion in committed transportation projects (Kane, 2009). The Central Artery/Tunnel Project, “big dig”, was a highway project undertaken by the Massachusetts Turnpike Authority to alleviate traffic congestion, improve traffic flow, and allow for continued economic expansion (Chandra, 2001). Initiated in 1968, the “big dig” cost over $10 billion reaching its completion in 2004 (Greiman, 2010). As part of the “forward funding” reform the MBTA was transferred debt from the Commonwealth in exchange for the 20% sales tax revenue. Without a surplus from the sales tax revenue the repayment of this debt became impossible and only increased the deficit gap since a third of the MBTA’s operating budget goes to debt payment (Kane, 2009). Without the “forward funding” reform the MBTA would still run a deficit leaving the Commonwealth directly responsible for these deficits. The MBTA’s current annual budget of over $1 billion is not enough to maintain a balanced budget so its financial crisis remains.

Service and Fare Proposals

The MBTA has proposed two solutions to the deficit, both including service cuts and fee increases. The first scenario utilizes higher fare increases to cover the deficit with an overall increase of 43%. The fare increases would be placed on all MBTA services, passes and parking fees. The suggested increase would potentially provide a $123.2 million revenue increase. The first scenario is supplemented by $38.3 million net savings on operating cuts through service cuts. The proposed service cuts would affect approximately 9.6 million riders in 34-49 million annual trips. The second scenario focuses on service cuts more than fare increases, saving $78.4 million in operating costs affecting 38.1 million riders. The second part of the proposal involves 35% overall fare increases providing $86.8 million in revenue. The MBTA estimated to produce around $163 million from either proposal combining revenue and savings. (MBTA, 2012)

1 During the writing of this paper the MBTA released a final recommendation for service cuts and fare increases.
The service cuts for the commuter rail, the light rail and the ferry are identical under both proposals (Guptill, 2012). The light rail service cuts would affect 2% of the light rail riders saving $1.5 million in operating costs; the ferry would be eliminated completely, saving $3.7 million. The commuter rail would stop trips after 10pm on weekdays and terminate all weekend service on all lines (MBTA, 2012). 12% of commuter rail riders, 4.3 million riders, would be affected by the service cuts. Although the MBTA would be saving $5.7 million in operating costs the loss of economic benefits of commuters to cities was not included in the MassDOT finance committee’s report (MBTA, 2012).

The approximate $160 million collected would solve this year’s deficit, however; solutions that don’t affect riders have been proposed by groups against these proposals, like Occupy the MBTA to close this year’s deficit.

**Alternative solutions**

**Improved Fare collection**

Maintenance of MBTA services has been a major criticism of the MBTA by riders. Before the “forward funding” initiative the MBTA was running on a deficit but still investing in maintenance. With the demand of a balanced budget by the legislature, less money has been allocated to maintenance, increasing the number of broken fare boxes and inoperable trains. (Kane, 2009) There are hundreds of free rides every day, many fare boxes go days without repair and many fares are simply not collected by drivers due to overcapacity of riders during peak hours. No accurate estimate exists of the amount lost due to uncollected fares, however, utilizing an industry-wide formula that assumes 3% of fares go unpaid $13.5 million go unpaid (Fischer, 2009). The proper maintenance of their buses and trains would not only make sure that all fares are being collected but could raise public opinion for the MBTA and possibly encourage more riders to use their services. (Kane, 2009)

**Advertising**

Advertising in vehicles and stations has become a big part of the MBTA’s services, providing about $12 million in revenue yearly. A raise in these rates would provide more reliable revenue without sacrificing ridership. (Moskowitz, 2012) According to a 2012 letter from Jonathan R. Davis, acting General Manager and Chief financial officer, to Steven James,
Massachusetts house clerk, about the MBTA’s efforts to maximize non-transportation revenue, the MBTA’s major advertising company Titan couldn’t reach their guaranteed minimum annual payment for the 2011 fiscal year due to the current economic situation (Davis, 2012). Due to this shortcoming the MBTA could profit from exploring all advertising possibilities to close the budget gap.

The MBTA recently took a stand against alcohol advertising. The MBTA wanted to keep its services family friendly and refused to place alcohol advertisements in their services. (Rocheleau, 2012) This moral stand conflicts with alcohol advertising in sporting events and other family friendly venues. Instead of disregarding this revenues source, the MBTA could charge alcohol companies a higher advertising rate. The MBTA has already started exploring the potential of digital advertising, planning to implement it in a few stations. This would also make advertising at select times possible for companies. An estimated additional $1 million would be gained annually by these digital advertisements according to a report by the Boston Globe. (Moskowitz, 2012)

Blue-Ribbon Summit

Policy option papers prepared for the Blue-Ribbon Summit by the Dukakis Center for Urban and Regional Policy and the Conservation Law Foundation address possible policies for financing the MBTA and RTAs (Regional Transit Authorities). Among the proposed policies are: a gas tax increase, a vehicle miles traveled VMT) tax, an increase in local funding, implementation of parking fees and taxes, use of cross-subsidies for transit, university access passes and MBTA debt relief. (Dukakis, 2010)

Gas tax

The gasoline tax in Massachusetts has remained at 21 cents/gallon since 1991. The Dukakis Center approximates $26 million in revenue annually for every one cent increase in the tax. Massachusetts’ gasoline tax rate falls below the national average of (29.3 cents in 2010). An increase in the gasoline tax by 8.3 cents to reach the national average would adjust the tax to inflation. Public transportation ridership might increase due to this as well. (Dukakis, 2010)
**VMT tax**

A VMT tax would charge motorists a fee for every mile travelled providing funding for both highways and transit. Unlike the gas tax, a VMT tax would charge consumers directly and not influence the price of fuel. A test of this tax was conducted in Oregon; the Department of Public Transportation paid for and placed GPS devices on volunteer automobiles recording the miles driven. Depending on the time and areas travelled, a calculated amount would be automatically charged. (Dukakis, 2010)

**Increasing local funding**

Currently, cities served by the MBTA pay a service fee which supports the MBTA’s operating budget. An increase in local funding could provide the MBTA with a higher revenue stream and support for capital projects. (Dukakis, 2010)

**Universal Pass**

A university pass funded by colleges in the surrounding areas would provide the MBTA with a large consistent revenue stream. The benefit of private sector “universal access” programs for universities has already been demonstrated in Chicago; a per student fee is paid to the Chicago Transit Authority providing transportation for all students in the 22 participating colleges and universities. A University Pass system guarantees fares and maximize ridership for the Transportation Authority. (Dukakis, 2010) The same universal ridership system can be put into place with housing developments and companies. In Santa Clara Valley, Californica, unlimited ride passes can be purchased by residential communities of 25 or more units. (Dukakis, 2010)

**Debt Relief**

The MBTA allocates a high percentage of its budget to debt repayment. In order to ease some of the financial burden, relief could occur in one of two forms: the debt transferred to the MBTA through the “forward funding” initiative could be moved back to the Commonwealth, or the MBTA could be provided with more sources of dedicated or temporary debt relief revenue. (Dukakis, 2010) Currently the Commonwealth has accumulated a $40 million surplus in their snow and ice budget. Allocation of these funds to the MBTA is one albeit temporary, way to help cover the budget deficit or lower debt payments. (ACE, 2012)
All of the Blue-Ribbon Summit solutions require major legislature approval and Commonwealth support.

**MBCR accountability**

The MBCR (Massachusetts Bay Commuter Railroad) has been managing the commuter rail since 2003. The MBCR, a private company, has received scrutiny from the public due to its failure to deliver with contractual obligations in regard to T operations and promised maintenance. (ACE, 2012) Late trains, improper maintenance, and missed performance measures are just some ways in which the MBCR has been performing less than adequately. Assessing fines on the MBCR would save the MBTA $49.6 million in payment to the MBCR. (ACE, 2012)

These alternatives, although temporary, have the immediate benefit of reducing the proposed impact on riders’ fares and services.

**Proposal Outcomes**

The implementation of either of the two proposals would provide approximately $160 million dollars in additional revenue, covering the MBTA’s operating deficit for the next fiscal year. While savings from service cuts would produce the estimated amount, fare increases may produce significantly less than predicted due to unwillingness of riders to pay. The MBTA is coming out of its strongest fiscal year with regards to ridership, running more than 1.3 million average weekday trips with all of their services (MBTA, 2012). However, implementation of any combination of the two proposals could result in a significant loss in ridership. The proposals suggest that the MBTA’s model for estimating affected riders is lacking any consideration of the riders’ economic and social situation. While some riders are willing to pay more for their service there are many who will not or in many cases cannot. The MBTA has developed a reputation of improperly maintained service among riders; which may result in an unwillingness to deal with fare increase.

While some commuters are weary of the MBTA’s business tactics and may search for other forms of transportation, others have no alternative. Unfortunately those that rely on the service the most are the least likely to be able to handle a fare increase. An article in the *Boston Globe* reported that fare increases and service cuts of bus lines affect residents of lower income areas to a proportionally greater extent (Rocheleau, 2012). This is due to a large portion of bus
users not being able to afford alternative transportation, such as cars or taxis. Residents with a fixed income or a disability may not be able to afford higher rates for MBTA services. The RIDE, a door-to-door transportation service for people with disabilities, will receive the highest percent fare increases (MBTA, 2012). Also, students who rely on MBTA services to get to school are more affected by these cuts since they may not have access to alternative forms of transportation due to age limitations.

Service cuts not only benefit the MBTA by lowering operating costs, they also result in savings due to reductions in employee salary and benefit costs. With less service being offered fewer employees are needed; approximately 100 jobs would be lost with under scenario 1 and approximately 550 under scenario 2 (Guptill, 2011).

An expected minimum of 16% annual ridership loss is estimated by the Metropolitan Area Planning Council to affect the MBTA (MAPC, 2012). 78,000 riders would lose MBTA service to their work under scenario 1. Under scenario 2, 340,000 riders would have their work commutes affected. (MAPC, 2012)

Boston and surrounding areas rely on public transportation to support their intercity development. New developments near subway and commuter rail stations may stop, derailing planned city expansions. The MAPC estimates that “there are currently more than 250 private-sector developments planned or proposed near subway and commuter rail stations” (MAPC) The viability of these development projects relies on easy access to public transportation. Without it, investor interest will probably drop and new jobs resulting from these projects could be lost.

According to the MAPC, the 250 developments would create 36,000 housing units, space for 92,000 permanent jobs and thousands of construction jobs. (MAPC, 2012) A 2004 transportation executive summary from the Office of Housing and Urban Development details how cities like Somerville and Medford have grown rapidly due to their proximity to Boston and availability of public transportation which makes residents less dependent on automobiles (Curtatone, 2004).

The importance of public transportation in reducing environmental effects has been widely acknowledged and the drastic cuts the MBTA is proposing are regressive in reducing CO₂ emissions. With the potential of thousands of more cars on the road, the amount of CO₂ emissions will increase drastically to around 50,000 tons per year (MAPC, 2012). The MBTA
has acknowledged the definite environmental impact the cuts would cause but has not proposed environmentally neutral alternatives. (Guptill, 2011)

**News/ movements**

The MBTA’s fiscal situation has led to constant media coverage of the current proceedings. Groups like “Occupy the MBTA” and “Occupy Somerville” are strongly protesting the MBTA’s current proposals. The MBTA has held open discussion across the counties affected to get public feedback on the current proposals and answer any question they can. Alternatives have been brought up by the public in these hearings however the true harshness of the impact on riders is on the forefront of these open discussions. At the Somerville open discussion, on February 28th at Somerville High school, Jonathan Davis, MBTA general manager, and staff listened to comments and suggestions by members of the public. Among the topics discussed were: the impact on low income riders, the alternatives to fare increases and service cuts, the impact on Somerville residents, the potential environmental effects and the role of legislature.

**Commuter rail**

The MBTA’s fare increases and service cuts are spanning through all of their services. The effects on the commuter rail specifically the Framingham/Worcester line were further studied in this report. The shutdown of weekend and after 10 pm service; the willingness of passengers to pay fare increases, and the potential economic benefits of commuter expenditures were studied.

**Methods**

**MBTA information collection**

General information about the MBTA was gathered from the MBTA website. Reports detailing the MBTA’s practices, history, past and current operating budgets, and its financial situation were available on the MBTA’s website. Information on the MBTA’s service and ridership statistics (MBTA Blue book) for the 2010 Fiscal Year was also available at the MBTA website. The offices of the Worcester city manager, the lieutenant governor and the Boston MPO were contacted requesting information as well.
Station surveys

Surveys were taken of passengers using the Worcester/Framingham line of the commuter rail. The surveys consisted of 9 multiple choice question regarding: their usage of the commuter rail, the effects of proposed service cuts and fare increases on their commutes, and their average non travel commute expenditures. (Appendix 1) Participation was completely voluntary and anonymous. The participants were interviewed and their responses recorded. Any additional comments provided were also recorded. An average count of the total number of riders per trip surveyed was also taken. Riders in three different time groups were surveyed: weekday mornings, weekdays after 10 pm and weekends. The times for the trains surveyed on morning weekdays: 6:30 am, 6:55 am and 7:35 am; after 10 pm: 12:10 am; and Saturday: 6:20 pm. The information recorded was used to quantify the average number of riders who would be affected by the proposed service cuts. The data were compared to the MBTA’s predicted affected riders. Information on how much commuters spent was collected to assess potential economic benefits or loses for cities.

The results gained from early morning surveys and weekend surveys are limited by the sample size taken. Since fewer than 10% of the riders for each trip were surveyed due to rider participation and time limitations, the results do not encompass a significant sample of the total riders. Surveys taken after 10 pm represent at least 50% of the riders per trip due to the small number of riders at that time.

WPI student surveys

An online survey was sent to the student email alias of WPI regarding weekend use of the commuter rail. (Appendix 2) The survey contained 5 questions and only focused on weekend service and non-travel expenditures. The participation in the survey was completely voluntary and anonymous. The survey was sent to all current students. Out of approximately 5,000 students 487 responses were submitted representing approximately 10% of the student body.

Results and Discussion

Surveys were given out to passengers of the commuter rail with the purpose of collecting ridership data. The surveys contained multiple choice questions inquiring about their usage of the
commuter rail and knowledge of the MBTA proposals. (Appendix 1) The data were compiled and quantified to show the different commuter trends in the three different travel times.

An average was taken of the number of passengers leaving from Union Station in Worcester at each surveyed time. (Table 1) An estimate for each train surveyed was taken and averaged respectively. By averaging the passenger counts for each individual time, an average number of riders for each time frame could be found.

<table>
<thead>
<tr>
<th>Table 1 Average Number of Riders Per Trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Weekdays</td>
</tr>
<tr>
<td>After 10pm weekdays</td>
</tr>
<tr>
<td>Weekends</td>
</tr>
</tbody>
</table>

The highest average number of travelers per trip was found in the weekend trains each train containing anywhere from 40 to 50 riders. Cumulatively, weekdays before 10 pm contribute the majority of the commuter rail’s passengers throughout a week. All of the early morning surveys were conducted before 8 am on three separate days. A total of 21 surveys were collected from early riders. Official peak hours of highest ridership for the Worcester/Framingham line are between 4:45am and 7:35 am.

The first set of questions asked riders about their current MBTA travel schedule. Riders were asked the number of times a week they use the commuter rail. It was predicted that the early weekday riders would commute at least 5 times and that weekend riders would commute fewer than 5 times each week. The data were used to determine the frequency of usage by different riders and to calculate how much they would be affected by fare increases. A histogram of the times per week that passengers used the commuter rail was plotted (Figure 1).
Passengers from the early weekday trips primarily traveled mostly from Monday through Friday only; and would be the most affected by fare increases due to their frequency of travel. Both weekend and after 10 pm riders mostly travelled fewer than 5 days. The frequency of travel was compared to the reasons for travel; with a correlation of work travel and higher rates of commuter rail use. A histogram of the passengers’ reasons for travelling was plotted (Figure 2).
Early morning commuters mainly travel due to work while weekend commuters mainly travel due to pleasure. Early morning riders commuting for work would receive no service cuts but be affected the most by the fare increases. Based on these results, it was predicted that early morning riders would be less tolerant of fare increases while weekend and after 10 pm riders would be more flexible due to infrequent usage. Riders were asked what percentage of fare increase would lead them to consider alternative transportation: 20%, 30%, 40% and 50%. The percentages were added to current ticket price of $8.25 and price was calculated for trip to the end of the line. A histogram representing the most someone would be willing to pay before finding alternative transportation was plotted (Figure 3)
As predicted, daily commuters, being the most affected, are the least accepting of a fare increase. Over 75% of the early morning riders said they would consider alternative transportation if the fares went over $9 one way. Infrequent, off-peak riders who would be affected by the service cuts were mostly more accepting of higher fare increases.

Riders were asked what method of alternative transportation they would use if service was cut or fare increases were too high. The data collected were plotted in a histogram (Figure 4) comparing the riders from the three different usage times.
The majority of the riders would resort to driving if an alternative method had to be found. Several weekend riders mentioned carpooling as an alternative way to reduce their transportation costs. Other forms of public transportation had the lowest responses.

An increase in commuters’ driving would increase an estimated 431,000 daily auto miles under Scenario 1 and 626,000 miles under Scenario 2. This equates to 55,000 and 92,000 more cars on the road each day than current traffic. (MAPC, 2012) The resulting traffic congestion would produce longer commutes for drivers, less accessibility to jobs, and a long term environmental impact.

With a combination of fare increases and service cuts spanning throughout MBTA services, the number of people driving is likely to increase. Adding to the likelihood of transition to driving, the surveyed riders’ complaints were focused primarily on the commuter rail’s limited schedule, poor maintenance, and slow speed.

The second group of riders surveyed was WPI students. Surveys were sent out to undergraduate and graduate WPI students; approximately 10% (487) of the recipients responded. Out of 487 students: 11% responded to using the commuter rail often, 33% occasionally, 37% seldom, and only 21% reported never having used it (Appendix Table). It was predicted that weekend users
would mostly travel due to pleasure. The students were asked their reason for using the commuter rail on the weekend (Figure 5)

**Figure 5 Bar Graph of WPI Students’ Commuter Rail Weekend Usage**

The majority of the students travel for pleasure during the weekend; traveled for school and work obligations represented about 10% of the responses; “other reasons” represented 22.8% of the responses. As seen in Figure 6, when asked what alternative form of transportation a student would use if service was cut 58.5% would drive and 29% would use other public transportation.
The minimum fare increase that students would be willing to pay on a one-way end of the line trip was determined (Figure 7).

Figure 6 Alternative Method of Transportation if Weekend Service Was Cut

If you needed to use the commuter rail on a weekend, what alternative method would you use if that service was cut?

<table>
<thead>
<tr>
<th>Method</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>283</td>
</tr>
<tr>
<td>Other public transportation</td>
<td>136</td>
</tr>
<tr>
<td>None, I would not travel</td>
<td>122</td>
</tr>
</tbody>
</table>

Figure 7 Minimum Amount of Fare Increase that Would Lead to Alternate Transportation

What level of fare increase would lead you to consider alternative transportation?

<table>
<thead>
<tr>
<th>Fare Increase</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to $9 one way</td>
<td>210</td>
</tr>
<tr>
<td>Up to $11 one way</td>
<td>169</td>
</tr>
<tr>
<td>Up to $13 one way</td>
<td>100</td>
</tr>
<tr>
<td>Up to $15 one way</td>
<td>84</td>
</tr>
</tbody>
</table>
Over 40% of the surveyed students would consider alternative transportation if the fares rose to $9 one way. 17% of students surveyed would be willing to pay more than $13. The cost of a car ride from Worcester to Boston (South Station) averaging 25 mpg, considering gas prices as $3.93 per gallon, and including all tolls along the Mass Pike route, is $10.79. While 17% of students would pay $13 one way, only 5% of weekday riders would pay $13 one way showing that students were more willing to deal with higher fares.

After 10 pm and weekend riders may utilize the commuter rail as a necessity for infrequent major events happening in Boston. For instance, the commuter rail serves a special purpose during sporting events The MBTA has previously had to deploy extra trains to deal with excess demand during games (Elias, 2011). Highway gridlock has already occurred and with no commuter service gridlock could become inevitable, affecting everyone driving that night. Riders who rely on the convenience of this service to enjoy their outings may be more willing to pay a higher fee than regular users.

Finally, riders were asked about their average expenditures in their destination city and possible expenditures in Worcester’s Union Station. Riders spend money on their destination city every day. It was predicted that service cuts would have an effect on Boston’s tourist revenue. Figure 8 is a histogram of the average amount of money the survey riders estimate they spend weekly.
The majority of riders spend less than $50 weekly in their destination city. Also, riders that traveled for work were more likely to spend less than $50 than those who traveled for pleasure. The same question was asked to the surveyed students. (Figure 9)

Figure 8 Average Money Spent Per Week at Travel Destination

Figure 9 Average Non-travel Expenditures of Students at Destination City

On average, apart from travel expenses how much money would you spend at your travel destination (food, shopping, etc)?

less than $50 305 responses
$50-$100 178 responses
more than $100 25 responses
As with riders surveyed at the station, the majority of students spend less than $50 dollars at their destination. 36.9% spend between $50 and $100 and 5.2% spend more than $100.

Conclusions

Weekend riders represented the largest number of riders per trip. The data suggest that considering MBTA trips, the proposed cuts would be targeting the largest group of users of the service and those most willing to accommodate higher fares. This would also eliminate the riders using the rail primarily for pleasure and thus spending the most per visit reducing Boston’s tourist and student revenue. Most riders would resort to driving increasing traffic congestion and negative environmental impacts.

The data suggest that any fare increase above 20% would result in at least a 40% drop of ridership among students. Nearly all early weekday riders would also seek alternative transportation given this fare increase.

If this research were to be conducted again a larger sample size of riders would produce more statistically significant data. Different weekday rider groups could be studied in more detail to show how different groups, e.g. residents, tourists, are affected by the proposed fares and services. Certain routes could be specifically studied, resulting in more precise ridership data. Future studies could also research the correlation between the commuter rails maintenance and reliability against riders’ willingness to pay more. Complaints by riders during the train surveys mostly involved train maintenance and service, suggesting that an improvement in service might improve ridership.

The student surveys conducted at WPI showed a high weekend usage for students, however, no research was done on weekday use. The Worcester college student usage of the commuter rail could be further studied by collecting data from more schools in the consortium. If high numbers of student ridership is found a university pass system could also be implemented in Worcester.
schools. By studying any of these proposed projects a recommendation on improvement of Worcester service could be presented to the MBTA.

Finally, future research could be conducted on the potential revenue stream for the city and MBTA by having multiple shops and restaurants at Union Station in Worcester, MA. Around 40% of riders surveyed said they would utilize shops and restaurants if available at union station (data not shown).

**MBTA Final Recommendation/ Fare and Service Changes**

After a three month period of open discussions the MBTA reached a decision on the fare increases and service cuts. The resulting recommendation has a 23% overall fare increase. Service cuts were reduced substantially from the initial proposals. Weekend commuter service was eliminated only for the Needham, Kingston/ Plymouth and Greenbush lines instead of entirely, as originally proposed. The ferry will still operate, losing only weekend Quincy service, and the RIDE will have no service reductions. The MBTA had estimated that 9,182,790 trips would be lost under proposal 1 and 37,900,618 trips under proposal 2. The final fare and service changes will result in 1,212,242 trips lost.

Commuter rail fare for a single ride will increase from $8.25 one way to $10.50 one way.
Appendix

Appendix 1: Rider Survey

Worcester Rail Service Survey (commuter rail refers to the train service between Worcester and Boston)

1. On average, how many days per week do you use the commuter rail?
   a. Fewer than 5 days       c. more than 5 days
   b. 5 days

2. What do you use the commuter rail for?
   a. Work                             c. pleasure
   b. School                           d. other

3. Do you live in Worcester?
   a. yes
   b. no

4. If Union Station had several shops and restaurants, how often would you likely shop/eat there?
   a. Often                              c. seldom
   b. Occasionally                  d. never

5. Are you aware of the proposed MBTS service cuts/ fee increases?
   a. yes
   b. no

6. Do you ever use the commuter rail after 10pm or on weekends?
   a. Often                              c. seldom
   b. Occasionally                  d. never

7. If you needed to use the commuter rail after 10pm or on weekends, what alternative method would use if that service was cut?
   a. Car                                  c. none, I wouldn’t travel
   b. other public transit (bus, van pool, etc)    d. other

8. What level of fare increase would lead you to consider alternative transportation?
   a. Up to $9.9
b. up to $11.55  
c. up to $13.2  
d. up to $14.85  

9. On average, apart from travel expenses how much money would you say you spend in a week at your travel destination (food, shopping, etc)?  
   a. less than $50  
   b. $50-$100  
   c. more than $100  

If you have any opinions you wish to share on the MBTA service cuts/ fare increases feel free to comment below:

Appendix 2 Student Survey  
1. How often do you use the commuter rail on weekends?  
   a. Often  
   b. Occasionally  
   c. Seldom  
   d. Never  

2. What do you use the commuter rail for?  
   a. Work  
   b. School  
   c. Pleasure  
   d. Other  

3. If you needed to use the commuter rail on a weekend, what alternative method would you use if the service was cut?  
   a. Car  
   b. Other public transportation  
   c. None, I wouldn’t travel  

4. What level of fare increase would lead you to consider alternative transportation?  
   a. Up to $9 one way  
   b. Up to $11 one way  
   c. Up to $13 one way
d. Up to $15 one way

5. On average, apart from travel expenses how much money would you spend at your travel destination (food, shopping, etc)
   a. Less than $50
   b. $50-$100
   c. More than $100

Appendix 3 Table

<table>
<thead>
<tr>
<th>How often do you use the commuter rail on weekends?</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often</td>
<td>11.1%</td>
<td>54</td>
</tr>
<tr>
<td>Occasionally</td>
<td>33.1%</td>
<td>161</td>
</tr>
<tr>
<td>Seldom</td>
<td>37.4%</td>
<td>182</td>
</tr>
<tr>
<td>Never</td>
<td>21.6%</td>
<td>105</td>
</tr>
</tbody>
</table>
Bibliography


MBTA. MBTA Fare and Service Changes. Print.


