PIONEER INSTITUTE
PUBLIC POLICY RESEARCH

POLICY BRIEF

The MBTA Commuter Rail's Cost Structure is Off the Rails

by Gregory W. Sullivan and James Stergios

Background

Over the past two months, Pioneer Institute has focused substantial resources on analyzing the MBTA's operations, finances, pension system and governance (leadership and accountability). A key piece of our work has included comparisons of the Authority to other American transit systems. We have provided comparisons to all systems, but have made like or peer systems our main focus. To identify "peer" groups and ensure objective assessment, we have looked at bus systems similar in number of vehicles, population served and coverage area. We have also focused on systems that are large and multi-modal. This week we have begun another set of comparisons, using the peer identification methodology developed by the Florida Transit Information System (FTIS) sponsored in part by the Federal Transit Administration (more below).

Last week, we released *The MBTA's Problem is Not Lack of Funding*, which provides comparisons to the American transit systems most like the MBTA, using the Federal Transit Administration's (FTA's) methodology. In performing those analyses, we took a system-wide (all-mode) approach. This report is the first in a series of analyses providing an in-depth, mode-specific approach to using the FTA peer groupings. To be precise, what follows are analyses of the MBTA's commuter rail services compared to the commuter rail system the Integrated National Transit Database Analysis System (INTDAS) rated as most similar, the Southeastern Pennsylvania Transportation Authority (SEPTA). SEPTA operates 13 branches to more than 150 stations in Philadelphia and its suburbs.

Using INTDAS' peer-group methodology

This report compares the MBTA's operating funding from 2008 to 2013 with SEPTA, which INTDAS has identified as the MBTA's closest peer in terms of

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commuter rail services. INTDAS is a web database system designed for retrieval and analysis of data from the National Transit Database (NTD) and is partially funded by the FTA in cooperation with and under the direction and leadership of the Florida Department of Transportation's Transit Information System. Among the system's many useful functions is an automated transit agency peer selection process that identifies comparable systems for peer analyses.

The peer-grouping methodology can be applied to a transit agency as a whole (considering all modes operated by that agency), or to any of the specific modes an agency operates. This report presents an analysis comparing the MBTA to its closest peer transit agency as regards commuter rail service.

The peer transit agency utilized in this report (SEPTA) has the closest INTDAS "likeness scores." Likeness scores are used to determine the level of similarity between a potential peer agency and the target agency.

According to INTDAS:

> [A] total likeness score of 0 indicates a perfect match between two agencies (and is unlikely to ever occur). Higher scores indicate greater levels of dissimilarity between two agencies. In general, a total likeness score under 0.50 indicates a good match, a score between 0.50 and 0.74 represents a satisfactory match, and a score between 0.75 and 0.99 represents potential peers that may usable, but care should be taken to investigate potential differences that may make them unsuitable. Peers with scores greater than or equal to 1.00 are undesirable due to a large number of differences with the target agency, but may occasionally be the only candidates available to fill out a peer group.

SEPTA received a commuter rail peer likeness score to the MBTA of 0.71 from the INTDAS automated peer selection software program, making it a satisfactory match. No commuter rail system other than SEPTA is rated by INTDAS as a good or acceptable match with the MBTA. INTDAS recommends that a peer group analysis include at least four peers if possible, which the Institute did in its recent report *The MBTA's Problem is Not Lack of Funding*. In forthcoming analyses, Pioneer will be presenting an analysis of all peers deemed acceptable (with likeness scores at or below 0.74) and those that fall into the category "may be usable" (with likeness score between 0.75 and 0.99) for commuter rail and additional services, such as bus, hard rail subway, light rail trolley, electric trolley, and demand response (The Ride.)

For today's analysis, we compare MBTA commuter rail with SEPTA commuter rail.

Findings

Operating Expense Analyses

In Figure 1 we present the operating expenses per capita for both the MBTA and SEPTA commuter rail systems. In 2008, SEPTA was 20 percent more expensive per capita than the MBTA. In the intervening years, its expense per capita grew by 13.7 percent. In contrast, from 2008 to 2013, the MBTA increased its per-capita expense by 50.5 percent, and now outpaces SEPTA by 15 percent.

Figure 1. Operating Expense per Capita

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$55.85	$61.45	$62.14	$72.13	$77.04	$84.04	50.5%
SEPTA Commuter Rail	$64.73	$65.84	$70.82	$71.64	$76.80	$73.57	13.7%

Figure 2. Operating Expense per Peak Vehicle

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$601,235.38	$663,082.38	$670,543.43	$742,752.54	$774,251.34	$844,611.03	40.5%
SEPTA Commuter Rail	$678,213.27	$678,340.48	$727,416.41	$729,877.11	$779,829.49	$738,994.14	9.0%

Figure 2 shows operating expenses per peak commuter rail vehicle, i.e., the number of revenue vehicles operated during maximum service. In 2008, SEPTA was more than 10 percent more expensive per peak vehicle than was the MBTA. In the intervening years, its expense grew by 9 percent. In contrast, from 2008 to 2013, the MBTA increased its expense per peak vehicle by 40.5 percent, and now outpaces SEPTA by 14 percent.

In Figure 3 we present the operating expenses per passenger trip for both the MBTA and SEPTA commuter rail systems. In 2008, SEPTA was more or less in line with the MBTA by this measure. In the intervening years, SEPTA's expense per passenger trip rose only 5.8 percent. In contrast, from 2008 to 2013, the MBTA increased its expense per passenger trip by an eye-popping 55.2 percent, and now outpaces SEPTA by 50 percent.

Figure 4 shows operating expenses per commuter rail passenger mile. In 2008, SEPTA spent about 30 percent more expensive per passenger mile than did the MBTA ($0.44 versus $0.32). In the intervening years, the MBTA's operating expense per passenger mile caught up to and surpassed SEPTA's. By 2013, the MBTA's operating expense had increase by 51.6% to $0.48 per passenger mile. By contrast, SEPTA's operating expense per passenger mile increased by only 11.9% from $0.44 to $0.48 per mile.

In Figure 5 we present the operating expenses per revenue mile for the MBTA and SEPTA commuter rail systems. tThe measure looks at expenses per vehicle mile travelled, regardless of how many passengers are on board. In 2008, SEPTA was 20 percent more expensive than the MBTA by this measure ($12.97 versus $10.76). In the intervening years, SEPTA's expense per revenue mile rose by only 1.9 percent, from $12.97 to $13.21. By contrast, the MBTA increased its expense per revenue mile by 48 percent, from $10.76 to $15.92 and now outpaces SEPTA by more than 20 percent ($15.92 versus $13.21).

Figure 6 shows operating expenses per commuter rail vehicle revenue hour. Revenue hours represent the number of hours that vehicles are scheduled to or actually travel while in revenue service. In 2008, SEPTA was more 5 percent more expensive per commuter rail revenue hour than the MBTA ($349.00

Figure 3. Operating Expense per Passenger Trip

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$6.43	$6.83	$7.59	$8.33	$8.93	$9.97	55.2%
SEPTA Commuter Rail	$6.28	$6.16	$6.42	$6.31	$6.91	$6.64	5.8%

Figure 4. Operating Expense per Passenger Mile

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$0.32	$0.34	$0.37	$0.40	$0.44	$0.48	51.6%
SEPTA Commuter Rail	$0.44	$0.44	$0.46	$0.44	$0.49	$0.49	11.9%

Figure 5. Operating Expense per Revenue Mile

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$10.76	$11.56	$11.92	$13.19	$14.17	$15.92	48.0%
SEPTA Commuter Rail	$12.97	$12.89	$13.51	$13.41	$13.88	$13.21	1.9%

Figure 6. Operating Expense per Revenue Hour, $

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$328.43	$346.81	$357.04	$388.14	$418.32	$473.32	44.1%
SEPTA Commuter Rail	$349.00	$346.80	$363.40	$360.69	$373.39	$355.45	1.9%

versus $328.43). During the subsequent six years, SEPTA's expense per revenue hour grew by only 1.9 percent, from $349.00 to $355.45. In contrast, from 2008 to 2013, the MBTA increased its expense per revenue hour by 44.1 percent, from $328.43 to $473.32. Over this six years period, the MBTA went from being less expensive per revenue hour than SEPTA to being 33% more expensive ($473.32 versus $355.45).

A consistent pattern that can be readily discerned from the foregoing operating expense analysis is that the MBTA increased its costs dramatically more than did SEPTA by every measure.

Maintenance Expense Analyses

We now move from operating expense metrics to those that focus on maintenance expenses. In Figure 7 we present the maintenance expense per revenue mile for both the MBTA and SEPTA commuter rail systems. In 2008, SEPTA spent 22.5 percent less per revenue mile than did the MBTA. In the intervening years, SEPTA's annual per vehicle maintenance expense rose by only one cent per revenue mile (from $4.71 per mile in 2008 to $4.72 per mile in 2013). By contrast, from 2008 to 2013, the MBTA increased its maintenance expense per revenue mile by 56.6 percent, from $5.77 per mile to $9.03. As an editorial note, this increased investment does not seem to have translated into more dependable service.

Figure 8 demonstrates a precipitous rise in annual commuter rail maintenance expenses at the MBTA on a per vehicle basis. In 2008, SEPTA spent 14.5 percent less on maintenance per commuter rail vehicle than did the MBTA ($124,352 versus $142,839). In the following six years, SEPTA's annual maintenance expense per commuter rail vehicle increased by only 8.5 percent, from $124,352 to $134,868. By contrast, the MBTA's annual per vehicle maintenance expense skyrocketed by 73.5 percent from $142,830 to $247,744.

What could possibly explain the fact that the MBTA spent $113,000 more per year in 2013 per vehicle for maintenance? One possibility is that the MBTA's vehicles have been experiencing more wear and tear because they travel greater distances on an annual basis. The other possibility is that the MBTA has much older vehicles. Figures 9 and 10 examine these two hypotheses.

Figure 9 shows that the two transit systems' vehicles traveled virtually the same number of annual revenue miles between 2008 and 2013, 55,588 per year for the MBTA and 54,212 for SEPTA. That breaks down to a difference of less than four miles per day. So vehicle wear and tear does not seem to be the answer.

Figure 7. Maintenance Expense per Revenue Mile

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$5.77	$6.34	$6.66	$7.42	$8.00	$9.03	56.6%
SEPTA Commuter Rail	$4.71	$4.80	$5.16	$4.82	$4.74	$4.72	0.24%

Figure 8. Maintenance Expense per Commuter Rail Vehicle

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	$142,830	$173,406	$185,314	$207,828	$225,186	$247,744	73.5%
SEPTA Commuter Rail	$124,352	$125,459	$141,032	$132,761	$136,643	$134,868	8.5%

Figure 9. Annual Revenue Miles per Commuter Rail Vehicle

Transit Agency	2008	2009	2010	2011	2012	2013	Average
MBTA Commuter Rail	55,898	57,356	56,259	56,329	54,626	53,059	55,588
SEPTA Commuter Rail	52,286	52,621	53,830	54,433	56,181	55,925	54,212

What then is driving the T's precipitous rise in vehicle maintenance expenses? In recent weeks, MBTA spokespeople have repeatedly referred to the T's "pre-Blizzard of 78" rail vehicle inventory as the main reason for the collapse of its commuter rail system. Figure 10 demonstrates that the "old vehicle" explanation lacks credibility. In 2008, the average age of commuter rail vehicles at the MBTA was 18.8 years, fully 14 years younger than SEPTA's 32.9 year average. By 2013, the MBTA's average vehicle age rose to 23.5 years. SEPTA's average commuter rail vehicle age in 2013 is 25.5 years, two years older than the MBTA's. From 2008 to 2013, the average age of an operating SEPTA commuter rail vehicle was 31.1 years, nearly ten years older than the T's average vehicle, which was 21.2 years. And with its older vehicles, SEPTA is getting better performance at a far lower maintenance cost per vehicle.

All of this suggests that MBTA leaders need to figure out why the MBTA's commuter rail maintenance expenses have ballooned in comparison with those of its closest peer agency. Opportunities for improvement clearly exist. To make the opportunity costs clear, in Figure 11 we present the magnitude of savings possible if the MBTA's maintenance expense per vehicle (MEPV) could be brought into line with SEPTA's. As was demonstrated in Figure 8, the MBTA's MEPV grew by 73.5 percent from $142,830 per vehicle in 2008 to $247,744 in 2013 while SEPTA's rose by only 8.5 percent from $124,352 to $134,868 per commuter rail vehicle. As Figure 11 shows, if the MBTA's maintenance cost per commuter rail vehicle had been equal to that of SEPTA between 2008 and 2013, the MBTA would have saved $160 million dollars over the six-year period.

Figure 10. Average Age of Commuter Rail Vehicles

Transit Agency	2008	2009	2010	2011	2012	2013	Average
MBTA Commuter Rail	18.8	19.8	20.7	21.7	22.7	23.5	21.2
SEPTA Commuter Rail	32.9	33.8	34.8	33.2	26.3	25.5	31.1

Figure 11. Savings if the MBTA's MEPV equaled SEPTA's

Transit Agency	2008	2009	2010	2011	2012	2013	Total
MEPV (MBTA vs SEPTA)	$18,478	$47,947	$44,282	$75,067	$88,543	$112,876	
Number of MBTA Vehicles	419	418	418	406	416	416	
Potential Savings	$7,742,282	$20,041,846	$18,509,876	$30,477,202	$36,833,888	$46,956,416	$160,561,510

This current report focuses on MBTA and SEPTA commuter rail expenses. It is important to note as well a significant revenue trend—the decline in the percentage of the MBTA's commuter rail system funding derived from passenger fares (farebox recovery). It is worth noting that the MBTA's farebox recovery in 2008 was 54.0% and that it declined to 48.1% by 2013, a proportionate drop of 10.9% (see Figure 12). SEPTA's farebox recovery rate in 2013 was considerably higher at 55.7%. A contributing factor in the T's farebox recovery rate is its decline in ridership –notwithstanding recent commuter rail system expansions- cited in a recent Pioneer analysis.

Figure 12. Farebox Recovery (%)

Transit Agency	2008	2009	2010	2011	2012	2013	% Change
MBTA Commuter Rail	54.0	49.6	47.6	44.9	42.8	48.1	-10.9%
SEPTA Commuter Rail	57.0	56.1	51.5	56.7	52.7	55.7	-2.4%

Conclusion

To address the emergency at the MBTA, we need to study the system's history, but we also need to seek out and emulate best practices and successes of peer transit systems. Comparative analysis is critically important in identifying a sound, effective, and practical way forward. Pioneer Institute acknowledges the extraordinary efforts and pioneering work of the Florida Transit Information System and the innumerable public transit officials who worked to devise it. Together with officials of the highly respected National Transit Database and the FTA, FTIS has done groundbreaking and invaluable work by building and making available at no cost its INTDAS information system and by so doing making the nation's public transit systems more transparent to citizens and public officials.

Comparisons to other American transit systems are a critical piece of effective transit analyses. Using the most appropriate comparative methodology, Pioneer will continue to provide ample opportunity for interested parties to review the results drawn from the most trusted peer identification methodology in the industry, the Federal Transit Administration-funded Integrated National Transit Database Analysis System.

The analyses provided above suggest five important findings. First, the MBTA's overall commuter rail operating expenses are high relative to SEPTA's, its most similar peer commuter rail system. Second, T costs have risen far faster than SEPTA's. Third, NTD data suggest that the MBTA commuter rail system has dramatically increased its expenditures on vehicle and non-vehicle maintenance over the period studied. Fourth, significantly increased expenses in operations and maintenance since 2008 have not led to improvements in vehicle performance. Finally, the most-frequently cited explanations for MBTA commuter rail underperformance, inadequate funding and outdated transit vehicle inventory, deserve further scrutiny in light of the MBTA comparative level of funding, expenditure, and performance with SEPTA.

These results comport with the Institute's initial recommendations for meaningful reform of and debt relief for the MBTA. The commuter rail system's operating costs are rising far faster than is sustainable. In addition, the fact that this winter's crisis occurred after six recent years of increasing maintenance investments, including nearly one-half billion dollars in commuter rail vehicle maintenance expenditures, highlights the failure of the T's management to implement an effective asset management system. We must change the way we do business to bring the system into a state of good repair and acceptable performance.

These are tentative confirmations of Pioneer's recommendations. With numerous mode-specific analyses forthcoming in the coming weeks, the Institute will conclude with a final set of steps to address the crisis at the MBTA.

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