

Miami-Dade Transit

**Technical
Memorandum:
Operating Costs**

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The Director of Miami-Dade Transit has asked that the Center for Urban Transportation Research (CUTR) at the University of South Florida conduct a review of a topic that is of interest to him, the County Manager and members of the Board of County Commissioners. Specifically, the Director requested that CUTR review the agencies operating costs for Metrobus and Metrorail and compare them to other transit agencies in the U.S.

The results of this two-week initiative have been included in this brief report. The data for cost comparison has been drawn from the Federal Transit Administration's National Transit Database (NTD) and has not been verified with the reporting agencies.

Operating Cost Analysis

The Director of MDT asked CUTR to examine the trend of the agency's operating costs and to compare them with other similar transit systems. Due to the expedited nature of this response, CUTR was able to use the data that is reported to the Federal Transit Administration (FTA) and compiled in their National Transit Database (NTD). While there are fairly elaborate guidelines and instructions for agencies that report annually to FTA, experience has shown that, invariably, agencies interpret the instructions somewhat differently and may not report in an entirely consistent manner. That said, comparison of MDT to the other transit agencies can be used at the macro level to look for anomalies and to see if the MDT is roughly in the "ballpark" when it comes to costs.

The cautions mentioned above are particularly relevant when looking at operating costs. The operating costs reported are categorized by:

- Vehicle Operations
- Vehicle Maintenance
- Non-Vehicle Maintenance
- General Administration

This analysis was conducted for both Metrobus and Metrorail. While the numbers for Miami-Dade Transit can be used with a high degree of confidence, care must be taken when looking at comparisons with other agencies. This caveat is particularly important when dealing with operating costs because of the methods that different agencies use to allocate the costs for Non-Vehicle Maintenance and General Administration. CUTR is confident, however, that for a general view of the MDT's costs, the analysis is valid.

The analysis conducted for both rail and bus is expressed in both **operating cost per vehicle mile** and **operating cost per passenger mile**. The operating cost per vehicle mile provides some insight into the efficiency of MDT's maintenance and operating practices, while the cost per passenger mile combines a measure

of efficiency with the productivity of the system. For example, an agency could have the most streamlined and efficient maintenance program with too much unused service being provided. In that case, the agency would compare favorably to its peers on a cost per vehicle mile basis. When viewed on a cost per passenger mile, however, the operation would not rate nearly as high. The researchers at CUTR recommend considering both measures.

The most recent data set available on a national level is for 2003. For purposes of this analysis, CUTR used the NTD data for 1999, 2000, 2001, 2002, and 2003. To select peer systems for comparison, CUTR attempted to identify agencies with bus operations that most closely resemble MDT. For the rail comparison, since only 13 other agencies operate a heavy rail system in the U.S., all rail systems are included in the analysis. For the peer agencies for the bus comparison, 13 agencies were selected for consistency with the number used in the rail comparison. CUTR selected the bus systems based on the number of buses that an agency reported having operated in the peak service period during 2003.

Rail Operating Cost Summary

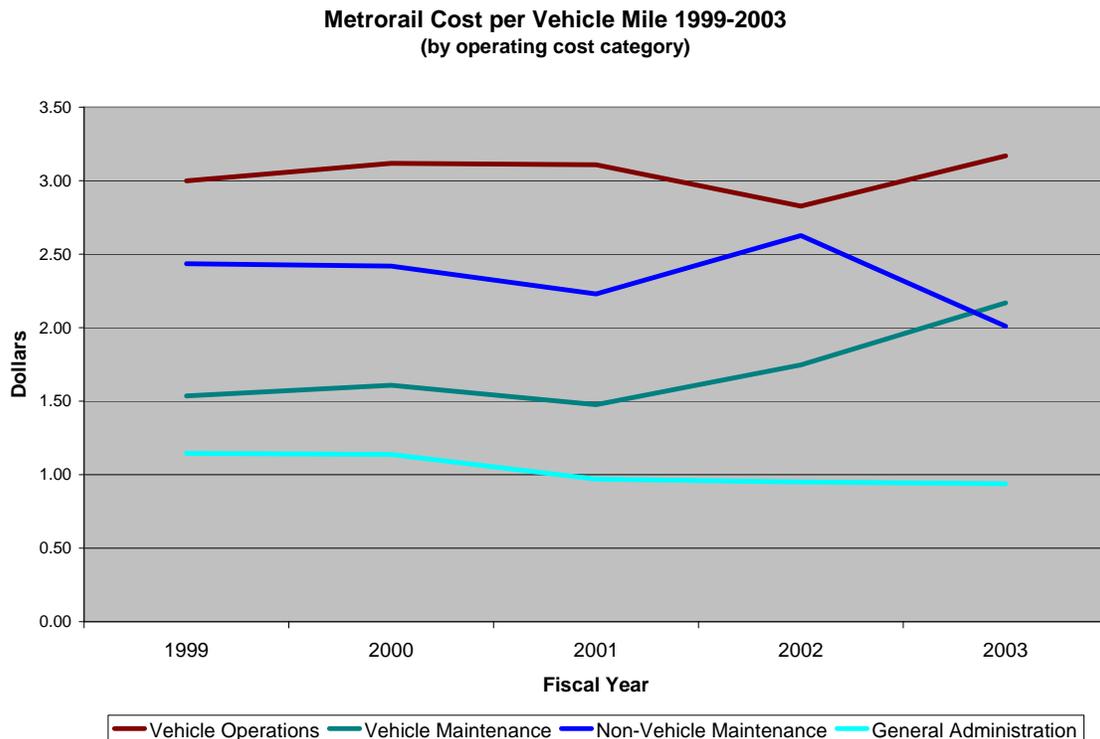
During the 5-year analysis period, MDT's number of rail cars operated in the peak period rose from 68 in 1999 to 96 in 2003. This number is referred to as "Vehicles Operated in Maximum Service" or VOMS.

The peer rail agencies and some selected operating characteristics for FY 2003 are presented below.

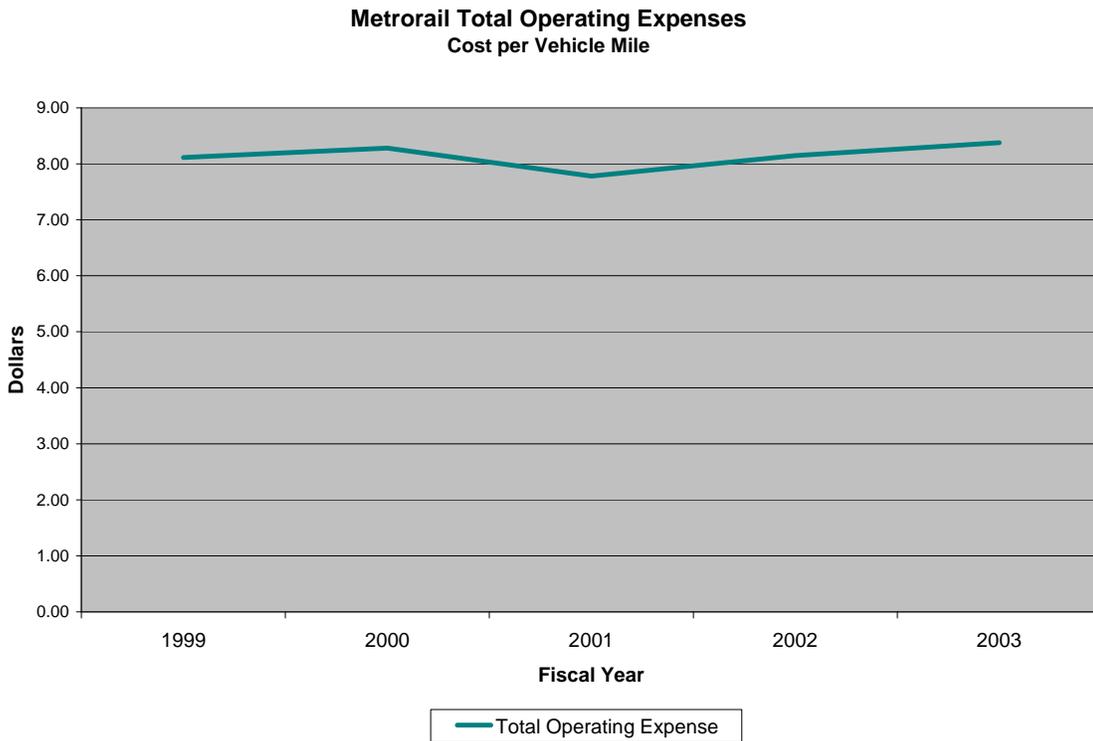
<i>Transit Agencies</i>	<i>VOMS</i>	<i>Vehicle Miles (000s)</i>	<i>Passenger Miles (000s)</i>
MTA New York City Transit (NYCT)	5,102	344,916.3	7,820,491.8
Chicago Transit Authority (CTA)	1,004	63,998.2	1,060,355.4
Washington Metropolitan Area Transit Authority (WMATA)	686	58,683.2	1,451,856.6
San Francisco Bay Area Rapid Transit District (BART)	483	60,637.0	1,147,851.9
Massachusetts Bay Transportation Authority (MBTA)	320	21,570.4	537,032.5
Southeastern Pennsylvania Transportation Authority (SEPTA)	276	16,742.1	382,138.1
Port Authority Trans-Hudson Corporation (PATH)	259	12,056.6	254,002.7
Metropolitan Atlanta Rapid Transit Authority (MARTA)	180	23,509.8	487,349.4
Miami-Dade Transit (MDT)	96	7,865.7	109,218.7
Port Authority Transit Corporation (PATCO)	96	4,388.2	76,419.7
Los Angeles County Metropolitan Transportation Authority (LACMTA)	74	6,199.6	151,901.3
Maryland Transit Administration (MTA)	54	4,738.2	55,736.0
Staten Island Rapid Transit Operating Authority (SIRTOA)	44	2,360.3	21,681.9
The Greater Cleveland Regional Transit Authority (GCRTA)	22	2,206.2	50,159.7

Vehicle Mile Basis

The first graph below shows the MDT Metrorail operating cost per vehicle mile for the years 1999 to 2003 by operating cost type. Further, it shows that general administration has been flat and non-vehicle maintenance has been dropping. It seems understandable that costs directly associated with vehicle operations and maintenance would be rising based on increasing energy and labor costs as well as the fact that the fleet has reached an age when a mid-life rehabilitation is being planned.

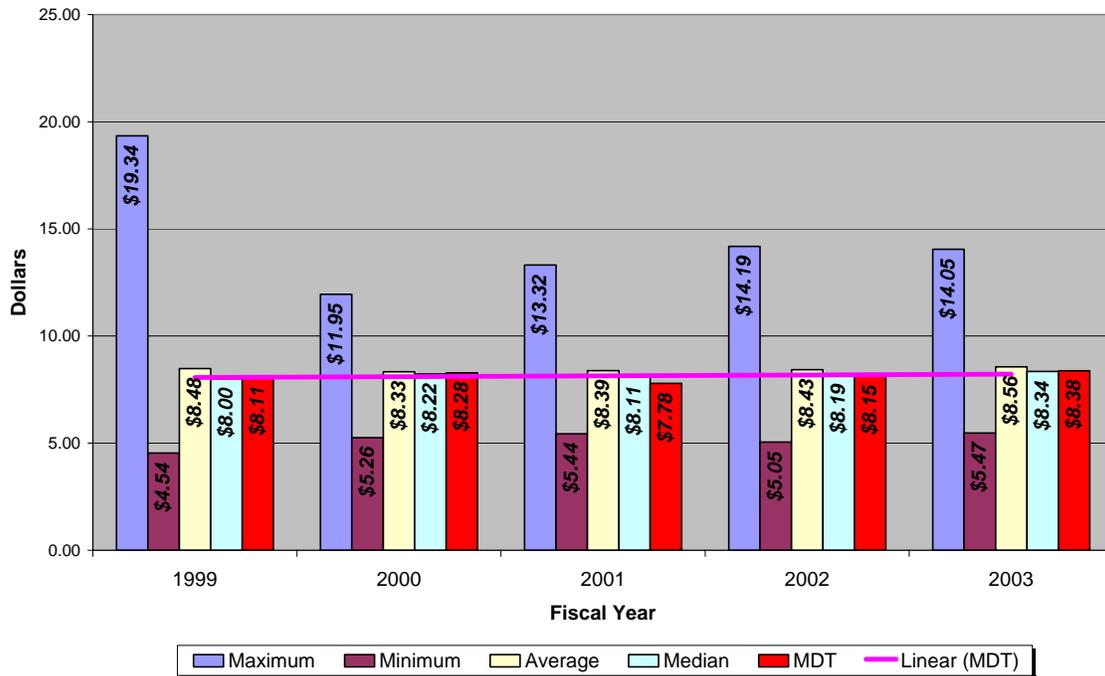


The next graph plots the total operating costs on a vehicle mile basis for the same time period.



The Metrorail operating cost on a vehicle mile basis has increased from \$8.11 per mile in 1999 to \$8.38 per mile in 2003. The increase measured in this manner seems modest. The next graph is the result of an analysis of all of the 13 peer rail agencies that were listed above. The figure illustrates the highest cost, the lowest cost, the median and average for all of the agencies, and the actual costs for MDT.

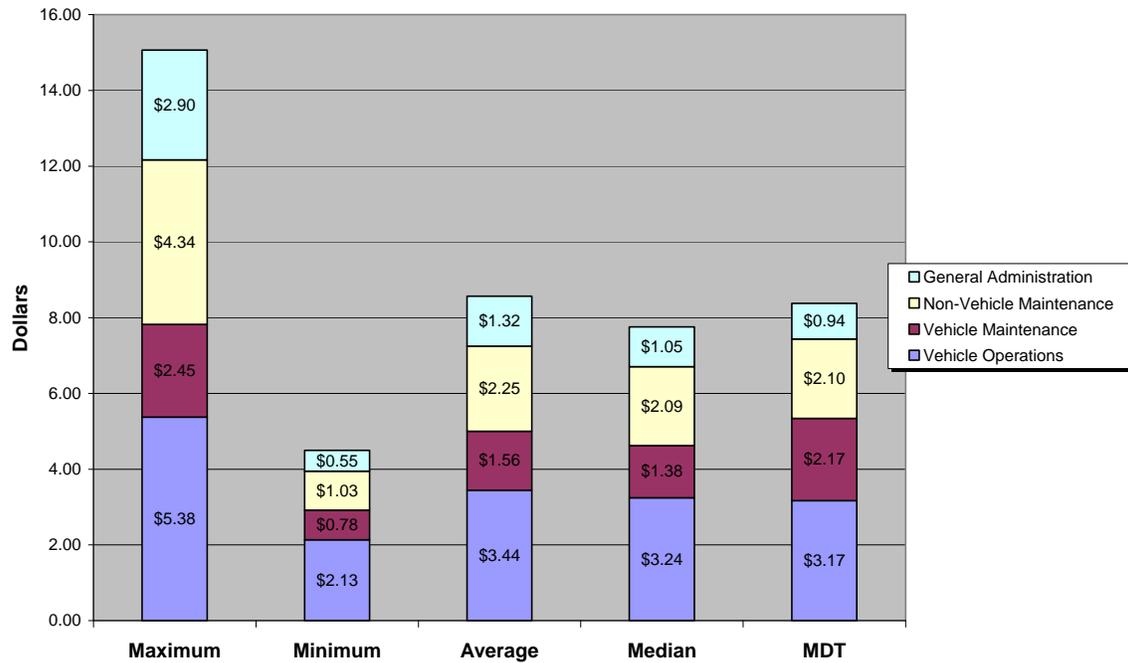
Rail Costs per Vehicle Mile - Total



What is apparent from this comparison is that MDT's rail operating cost, on a vehicle mile basis, is well below the highest cost agency (\$8.38/mile versus \$14.05/mile in FY 2003) and is in line with both the median and average for the 13 other U.S. rail agencies. The lowest cost reported was \$5.47/mile.

The next graph illustrates the comparison of rail operating cost components of MDT with other agencies (again on a vehicle mile basis). The data from 2003 by operating expenditure type is presented. The highest, lowest, average and median costs are compared with MDT. Note: the costs presented for a particular grouping (e.g. "highest") can come from more than one agency. For example, if City "X" reported the highest operating cost for the "vehicle operations" category and City "Y" was highest in "general administration," then the bar labeled "highest" would report costs from at least two different agencies.

Rail Operating Costs per Vehicle Mile by Expenditure Type - 2003

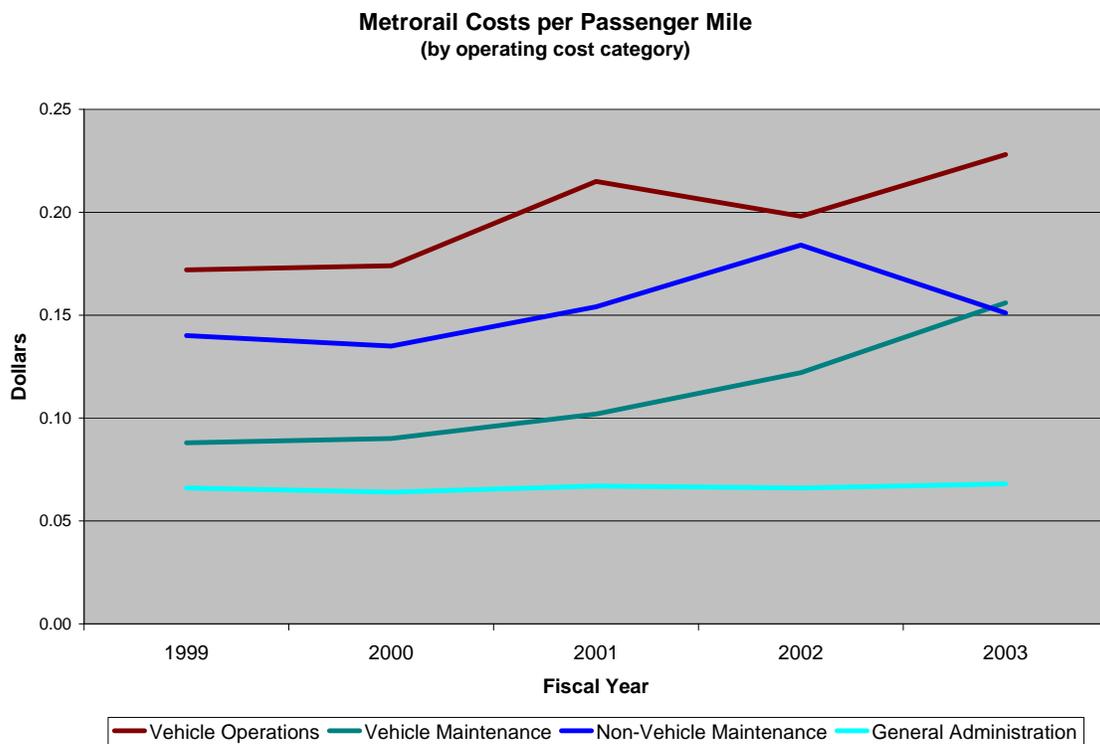


MDT costs on a vehicle mile basis by expenditure type are close to the median costs in three of the four expenditure type categories. Vehicle Maintenance at \$2.17 per vehicle mile is higher than the \$1.38 per vehicle mile median cost.

Passenger Mile Basis

Another way to compare the operating costs is on a passenger mile basis. This view of costs takes into consideration both the efficiency of the operation as well as the effectiveness of the system. The more passengers served, the costs are spread over more passenger miles and are lower than for a system serving fewer customers.

The following graph shows the Metrorail operating costs over the 5 year period by type of expenditure on a passenger mile basis.

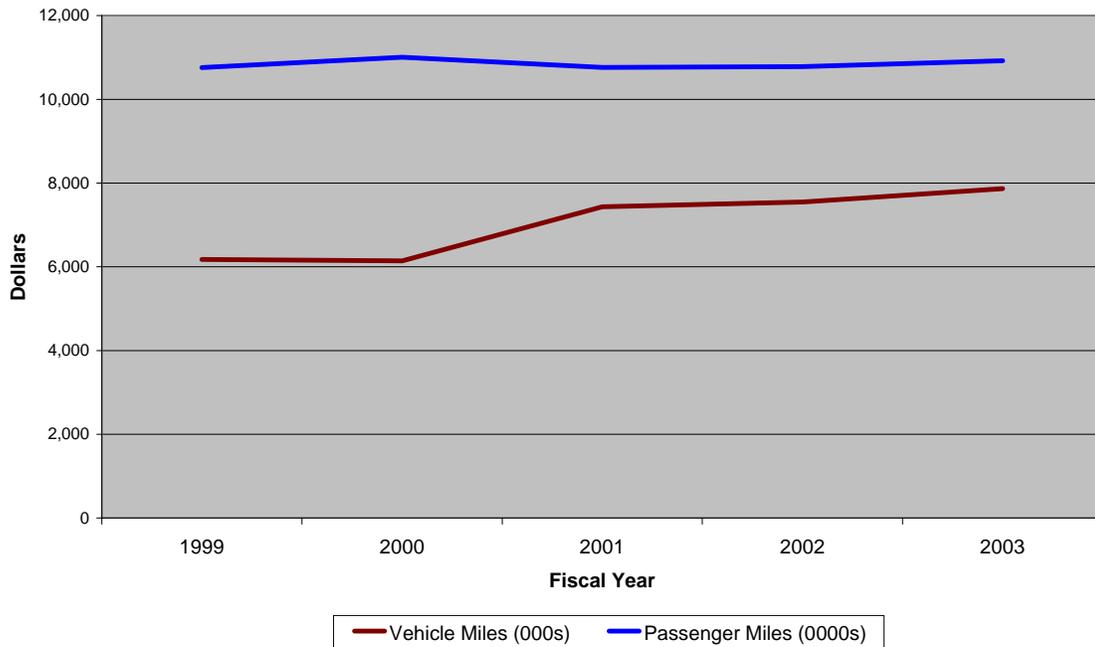


On a passenger mile basis, the distribution of costs looks similar to the graph based on vehicle miles except that the growth rates are higher. This is most likely explained by ridership growth not keeping pace with cost growth at even a modest annual rate.

The following graph shows the increases in passenger and vehicle miles for the study period. It shows that ridership is relatively flat while vehicle miles have increased. The increase in vehicle miles in FY 2003 can be partially explained by the introduction of 24-hour Metrorail service as a part of the People's Transportation Plan. The service expansion appears to have had no positive

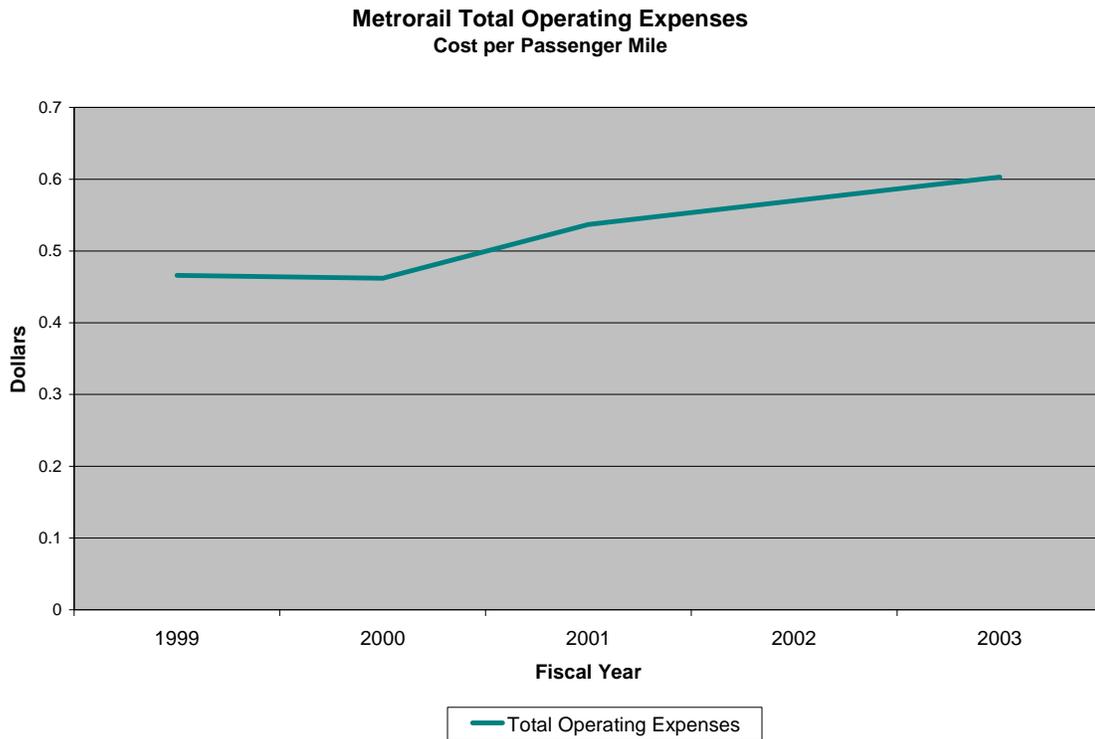
impact on ridership and the suspension of the 24-hour service appears to have been a positive move from an efficiency standpoint.

Metrorail Vehicle and Passenger Miles
FY 1999 - FY 2003



Note in the graph presented above, vehicle miles are expressed in thousands and passenger miles in tens of thousands in order to compare the trends on the same scale.

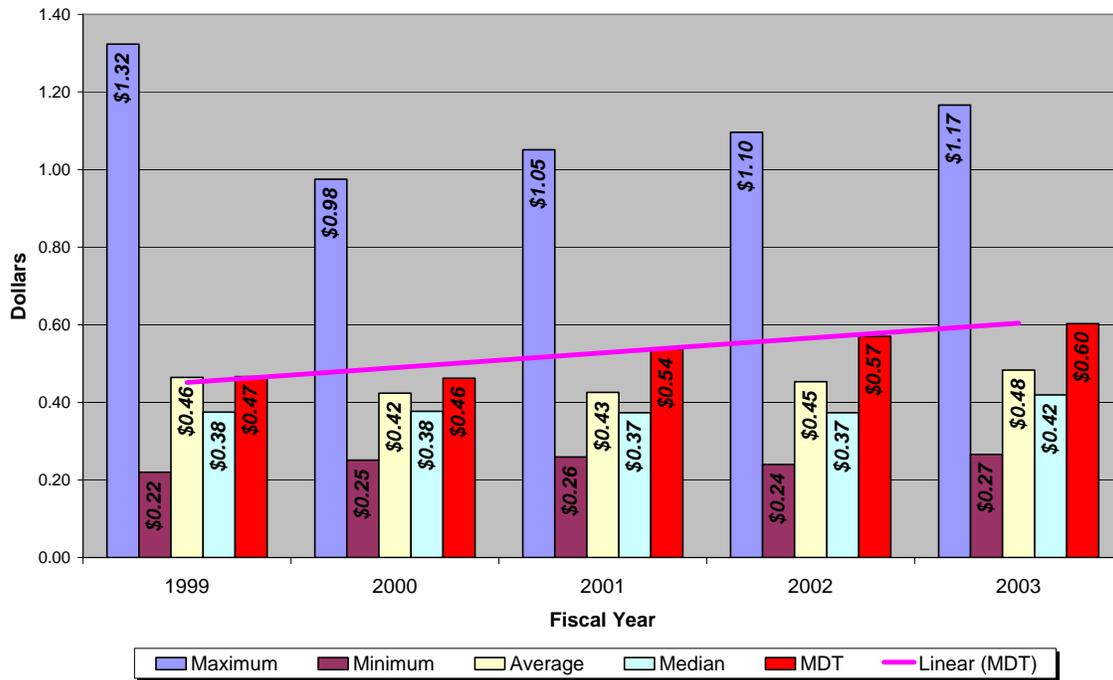
Not surprisingly, the operating costs on a passenger mile basis in total have grown at a faster rate than on a vehicle mile basis from 1999 to 2003. The total operating costs based on passenger miles are presented below.



The cost per passenger mile has risen from \$0.466 in 1999 to \$0.603 in fiscal year 2003. Again, the elimination of the 24-hour service should have a positive impact on this measurement factor in future analyses.

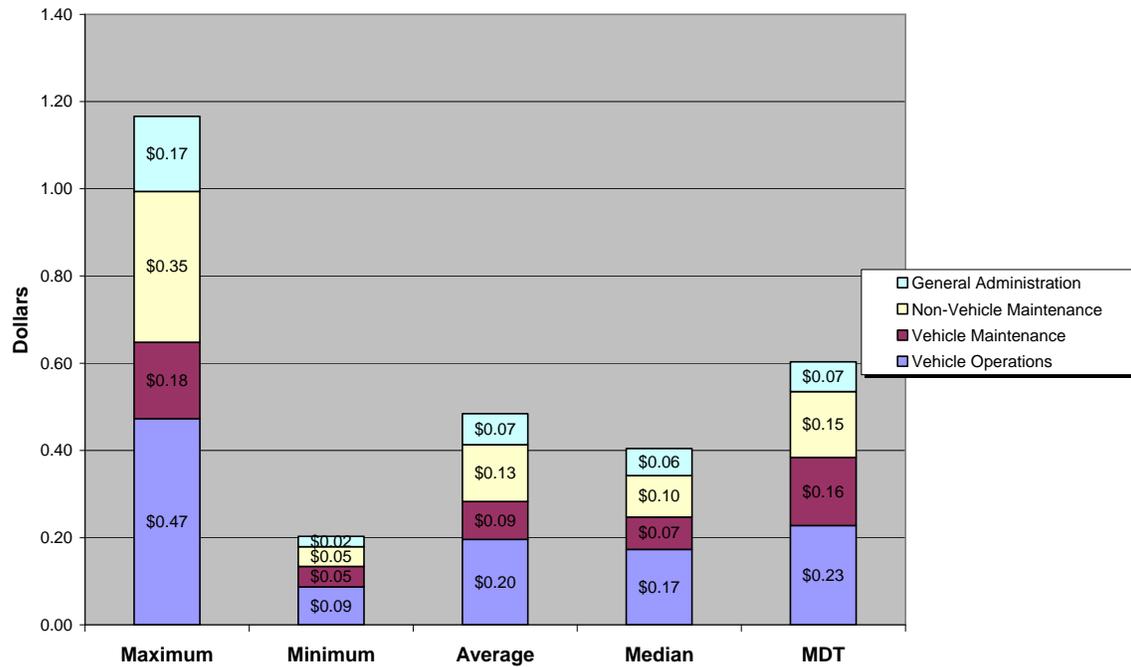
The next graph compares this cost trend with peer heavy-rail agencies. As with the previous graph on vehicle miles, the illustration plots the highest, lowest, median and average costs for the 13 other transit agencies against MDT Metrorail.

Rail Costs per Passenger Mile - Total



The MDT's costs are still closer to the average than they are to the highest cost when viewed in this manner. In fiscal year 2003, MDT was at \$0.603; the average was \$0.483, the median \$0.419, the lowest \$0.266 and the highest \$1.166. Stated differently, the MDT Metrorail cost per passenger mile was 56 cents lower than the highest cost system, 12 cents above the average and 18 cents above the median in 2003.

Rail Operations Costs per Passenger Mile by Expenditure Type - 2003



MDT's rail operating costs, on a passenger mile basis, were higher than the median costs reported by peer agencies in all categories in 2003. Still, the MDT costs for vehicle operations were half of the highest cost, and general administration was equal to the average of peer rail properties.

Bus Operating Cost Summary

The next section of the report will follow the same format as the rail operating cost summary, examining the operating costs for Metrobus. The analysis was conducted in the same manner, looking at costs on both a vehicle and passenger mile basis and comparing MDT to other systems in the U.S. The data were taken from the same source, the NTD, for the same time period, 1999 to FY 2003. Given that there are over 300 systems reporting nationally, 13 peer transit properties were selected by CUTR on the basis of the number of vehicles operated in maximum service (VOMS), passenger miles and vehicle miles.

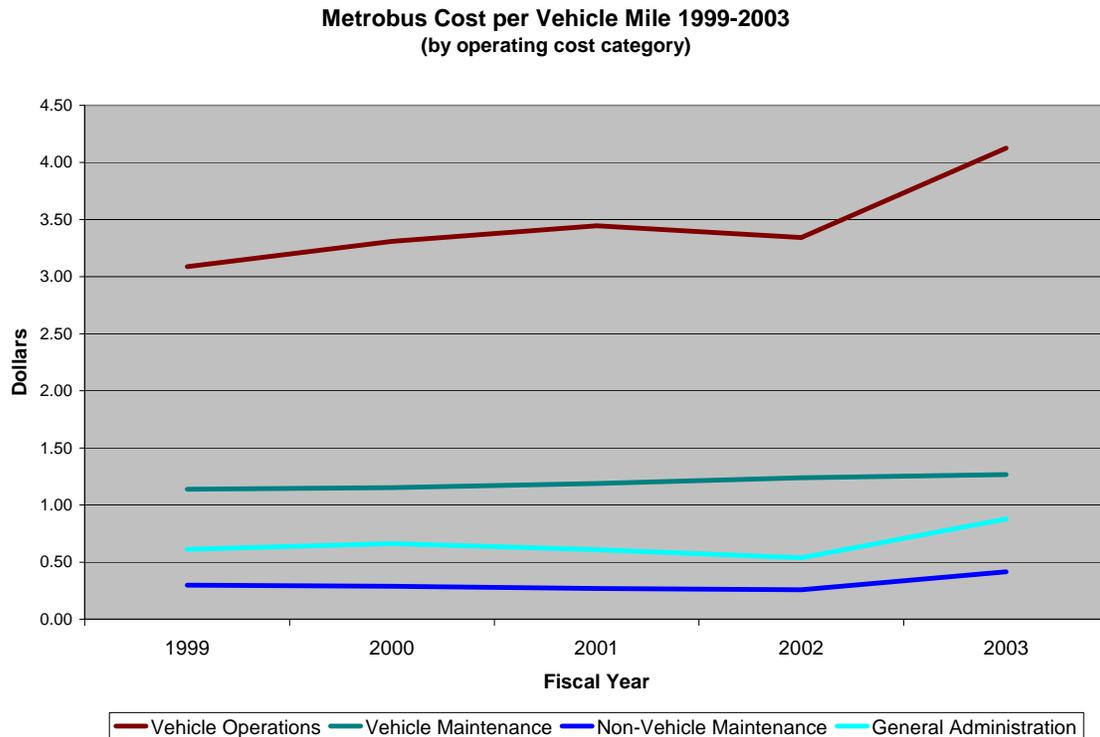
The following table lists the peer systems used in this analysis and some selected characteristics for FY 2003.

Transit Agencies	VOMS	Vehicle Miles (000s)	Passenger Miles (000s)
Washington Metropolitan Area Transit Authority (WMATA)	1,262	48,003.0	447,551.1
Southeastern Pennsylvania Transportation Authority (SEPTA)	1,145	46,268.4	480,305.9
Port Authority of Allegheny County	828	36,745.2	273,194.9
Metro Transit	774	30,969.4	284,715.5
Massachusetts Bay Transportation Authority (MBTA)	770	26,117.0	313,902.8
Maryland Transit Administration (MTA)	633	22,155.6	260,831.2
Denver Regional Transportation District (RTD)	589	30,114.8	226,011.6
Tri-County Metropolitan Transportation District of Oregon (Tri-Met)	562	27,467.8	237,345.0
Metropolitan Atlanta Rapid Transit Authority (MARTA)	555	30,197.0	234,557.2
The Greater Cleveland Regional Transit Authority (GCRTA)	548	25,457.6	189,098.1
Miami-Dade Transit (MDT)	506	32,075.9	279,410.6
Pace - Suburban Bus Division (PACE)	472	22,026.7	181,704.5
Orange County Transportation Authority (OCTA)	452	25,534.7	251,392.0
City and County of Honolulu Department of Transportation Services (DTS)	427	21,482.5	302,238.9

While Miami-Dade Transit ranked lower based on Vehicles Operated in Maximum Service in 2003, it was clearly in the mid-range of the group when considering passenger and vehicle miles. Passenger and vehicle miles are reported in thousands.

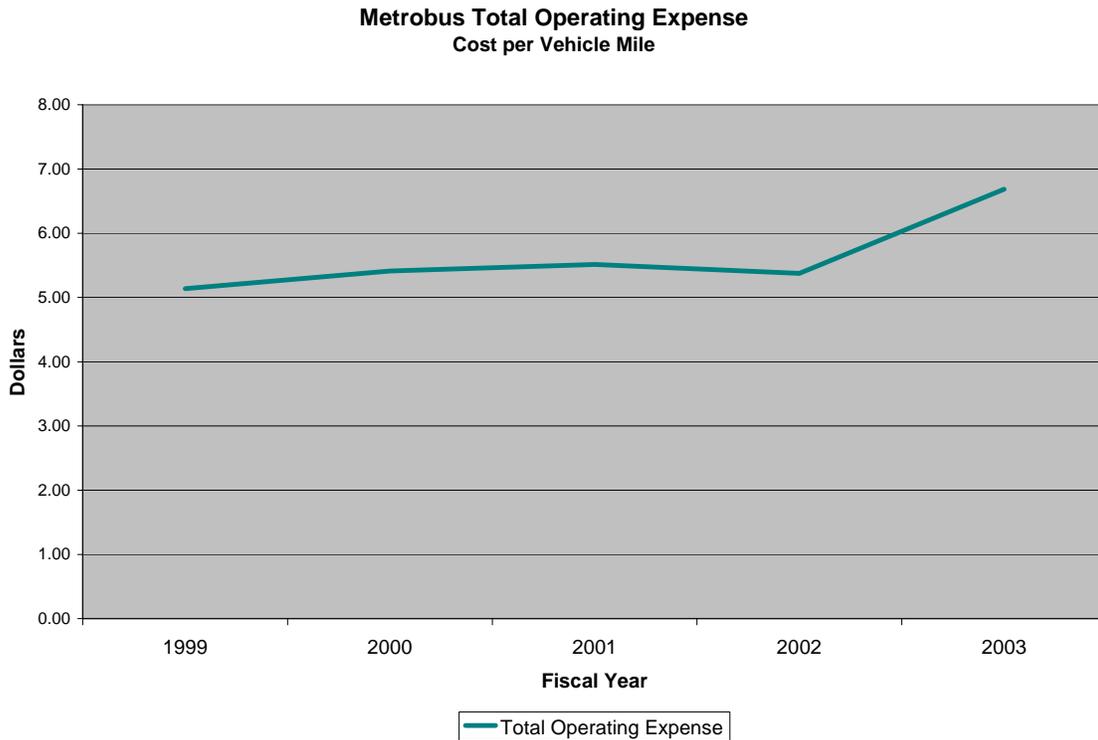
Vehicle Mile Basis

The following graphs summarize the Metrobus operating costs on a vehicle mile basis. The first looks at the cost components that make up the total operating costs.

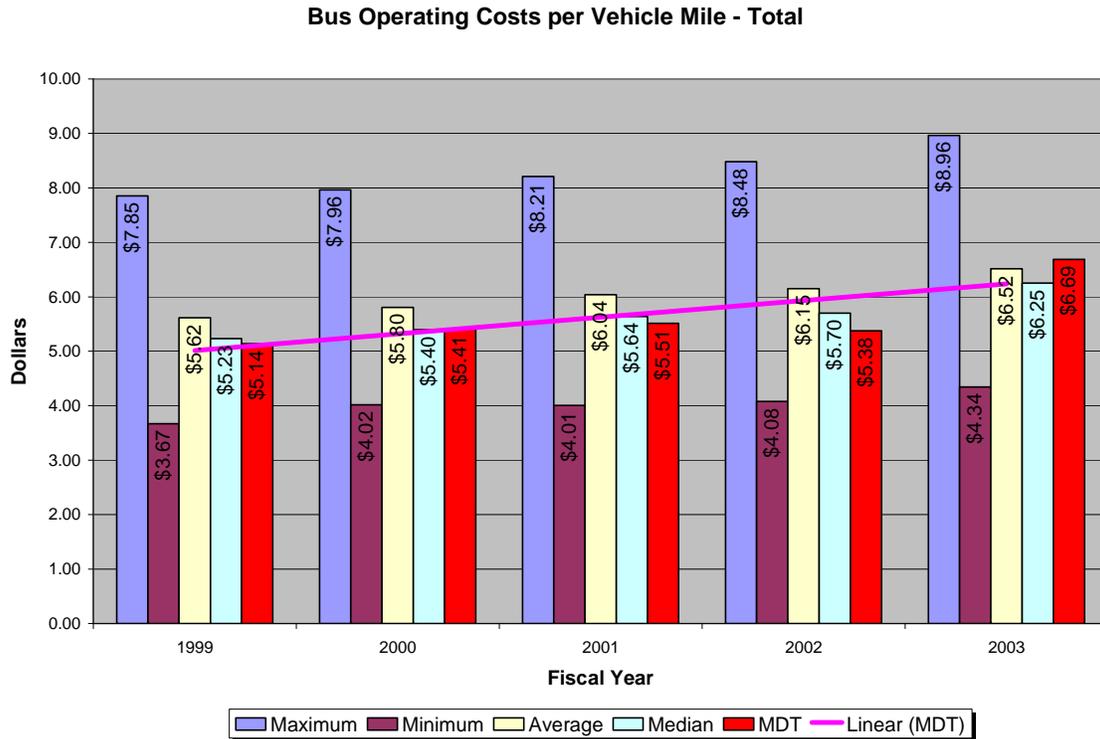


Vehicle operations make up the bulk of operating expenses. Unlike Metrorail, non-vehicle maintenance is a small portion of the Metrobus operating costs because of the absence of guideway and station infrastructure. The cost growth in three of the four factors was modest from 1999 to 2003. The most obvious trend on the graph presented above is the sharp increase in vehicle operations on a cost per vehicle mile basis. CUTR attributes this increase to the “ramp up” of operating personnel in anticipation of the additional service committed in the People’s Transportation Plan. The reported number of vehicles operated in maximum service did not change from 2002 to 2003, but additional bus operators were being trained as the fleet and bus service were about to increase significantly. In addition, rising fuel costs could have played a role in the increase for the last year analyzed.

On a total operating cost per vehicle mile basis, costs decreased from year 2001 to 2002. The 5-year Metrobus operating cost per vehicle mile trend is shown on the graph below.

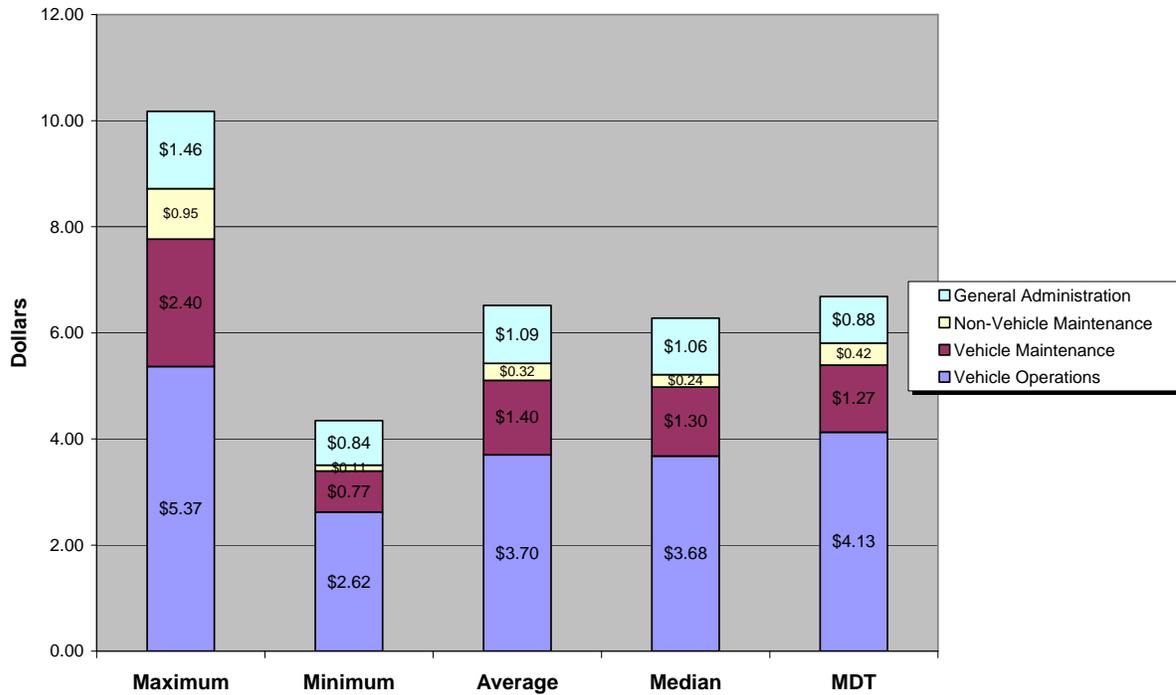


Miami-Dade Transit Metrobus operating costs per vehicle mile compare favorably against peer bus systems during the period of 1999 to 2003. The peer comparison is summarized in the next graph.



Measured in dollars per vehicle mile, MDT Metrobus was generally below both the average and the median cost of the 13 peer bus properties from 1999 to 2002. In 2003, the MDT cost was calculated at \$6.69 per mile—\$2.38 per mile lower than the highest peer agency, and 17 cents higher than the average.

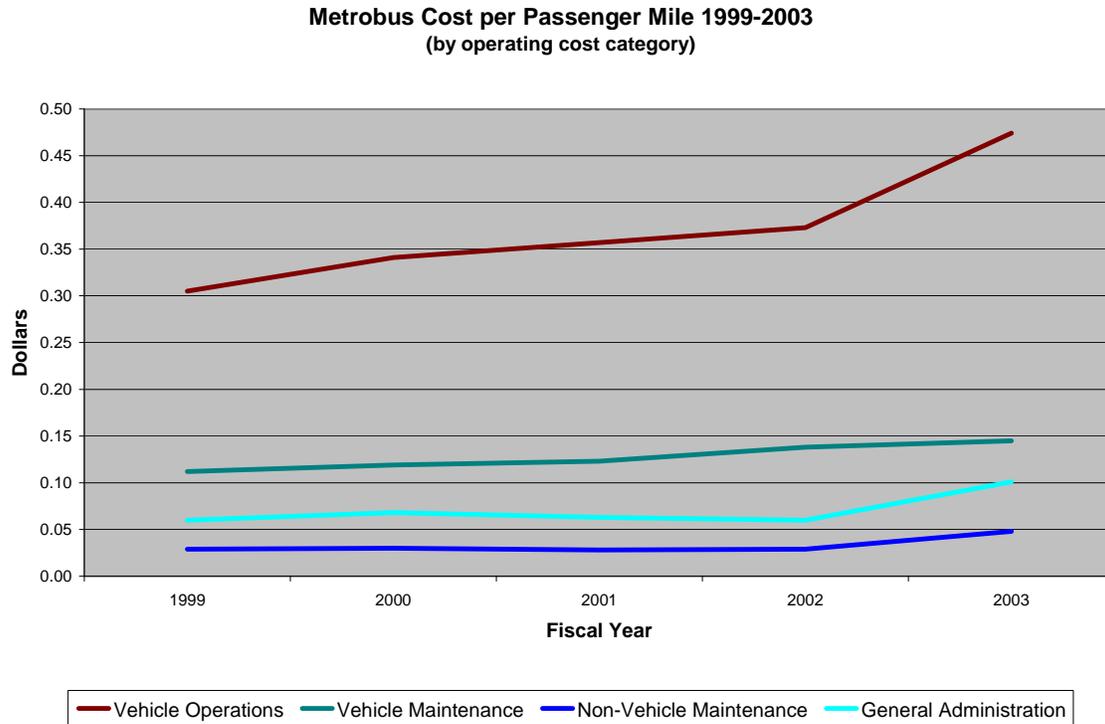
Bus Operating Costs per Vehicle Mile by Expenditure Type - 2003



When comparing MDT operating costs by expenditure type, the agency compares favorably on a vehicle mile basis to both the median and average costs reported by the peer bus systems for the year 2003.

Passenger Mile Basis

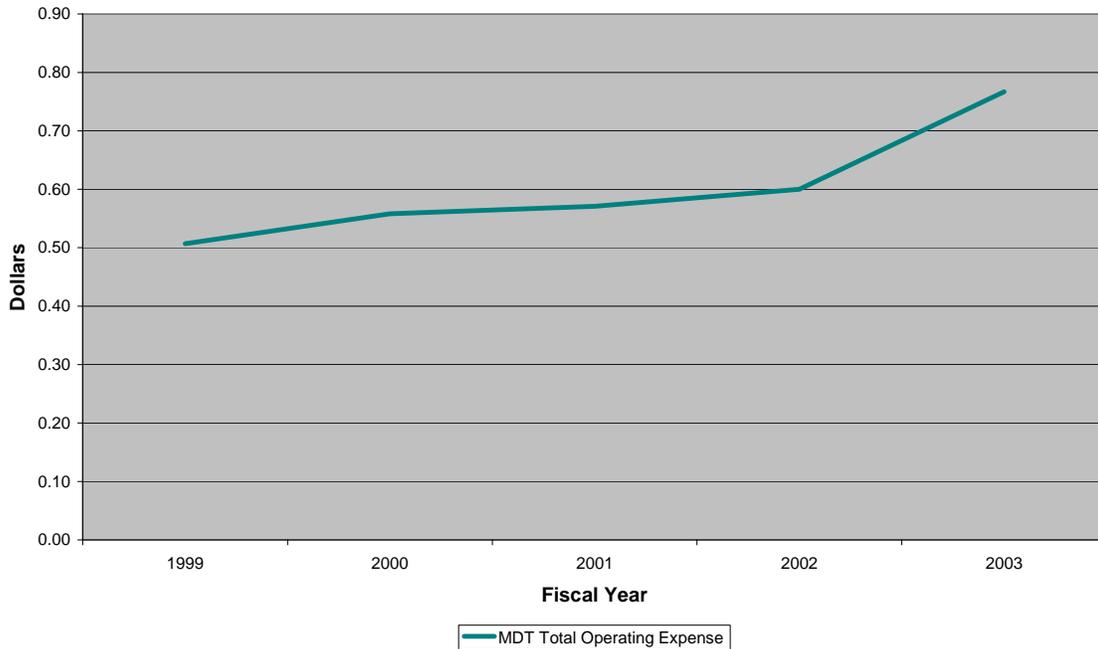
The next several graphs illustrate the Metrobus operating cost trends on a passenger mile basis. The first, by operating category, shows an almost identical picture to that of the vehicle mile calculation. Of the 77 cents per passenger mile, less than 5 cents was spent on non-vehicle maintenance and 10 cents on general administration in 2003.



The growth in the percentage and absolute cost of vehicle operations from 2002 to 2003 is apparent in the graph above. It is surmised that this increase is related to increased fuel and PTP costs that were incurred in the agency during that period. If a more detailed analysis is requested by the agency, the root causes of the increase will be included in future documents.

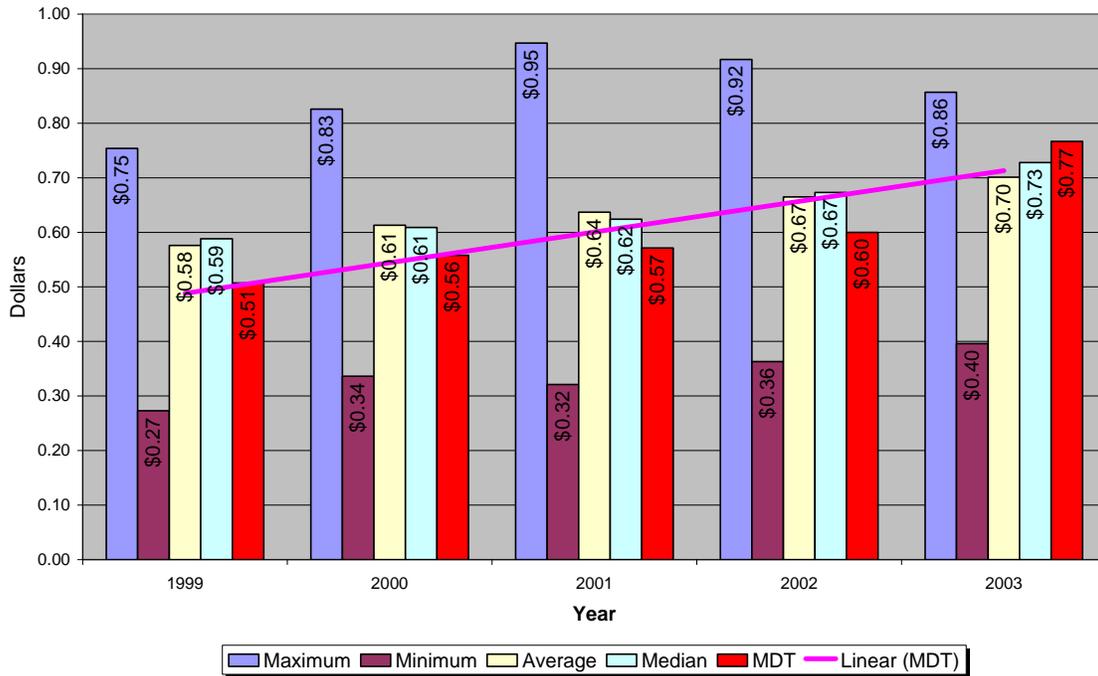
On a cost per passenger mile basis, Metrobus operating costs were 77 cents per mile in 2003. This compares with Metrorail for the same year at 60.3 cents per mile. The Metrobus operating cost per passenger mile increased from 51 cents per mile in 1999 to 60 cents per mile in 2002.

Metrobus Total Operating Costs
Cost per Passenger Mile, FY 1999-2003

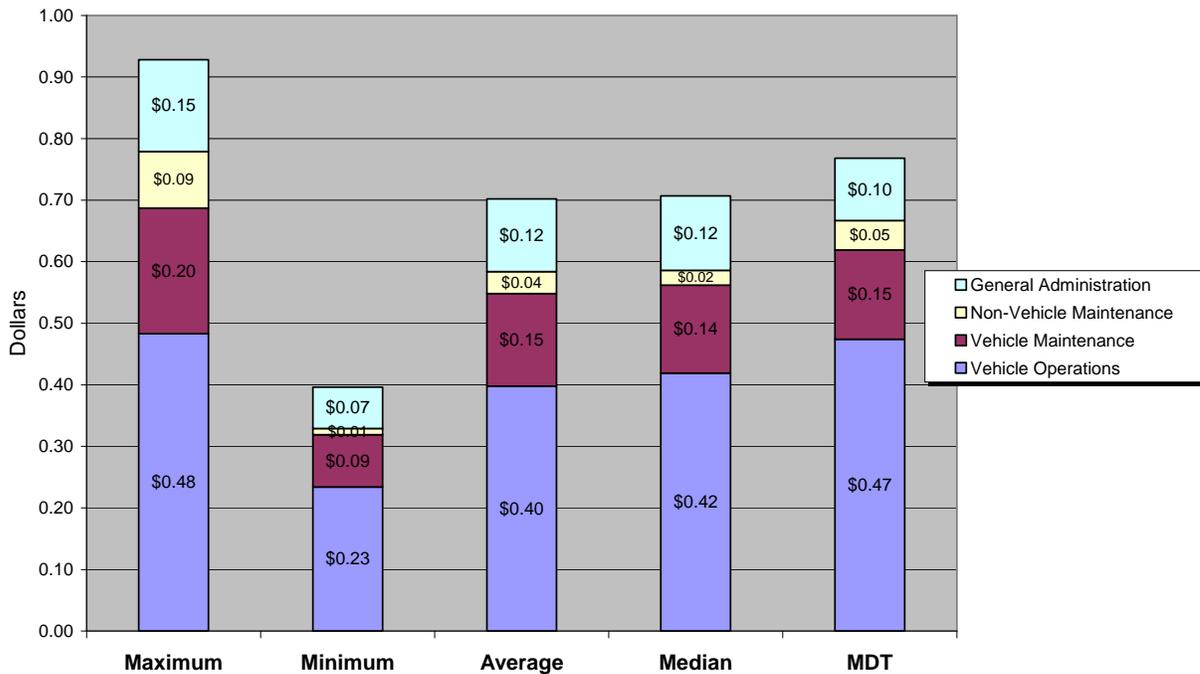


The graph below compares Metrobus operating costs on a passenger mile basis to the 13 peer transit agencies' costs. As with the vehicle mile comparison, MDT was below the median and average costs for the period of 1999 to 2002. The PTP ramp-up puts the agency slightly above the average in 2003 at 77 cents per passenger mile compared to the average of 70 cents per mile. The highest peer property was calculated at 86 cents per passenger mile and the lowest at 40 cents. It should be noted that the range in costs among peer agencies for the bus analysis would be expected to be narrower than for the rail analysis. The reason is that for the rail comparison, all heavy rail systems were used in order to analyze a substantial number of other agencies. For the bus analysis, systems of similar size and service were able to be selected for comparison.

Bus Operating Costs per Passenger Mile - Total



Bus Operating Costs per Passenger Mile by Expenditure Type - 2003



On a passenger mile basis, MDT's costs compare favorably to the average and median costs reported by the peer agencies for the year 2003 for general administration, non-vehicle maintenance, and vehicle maintenance. Vehicle operations at \$0.47 per passenger mile were 5 cents above the median and 1 cent below the maximum reported.

Attached to this memorandum, a series of graphs further detail the cost comparisons that are a product of this study.

Findings

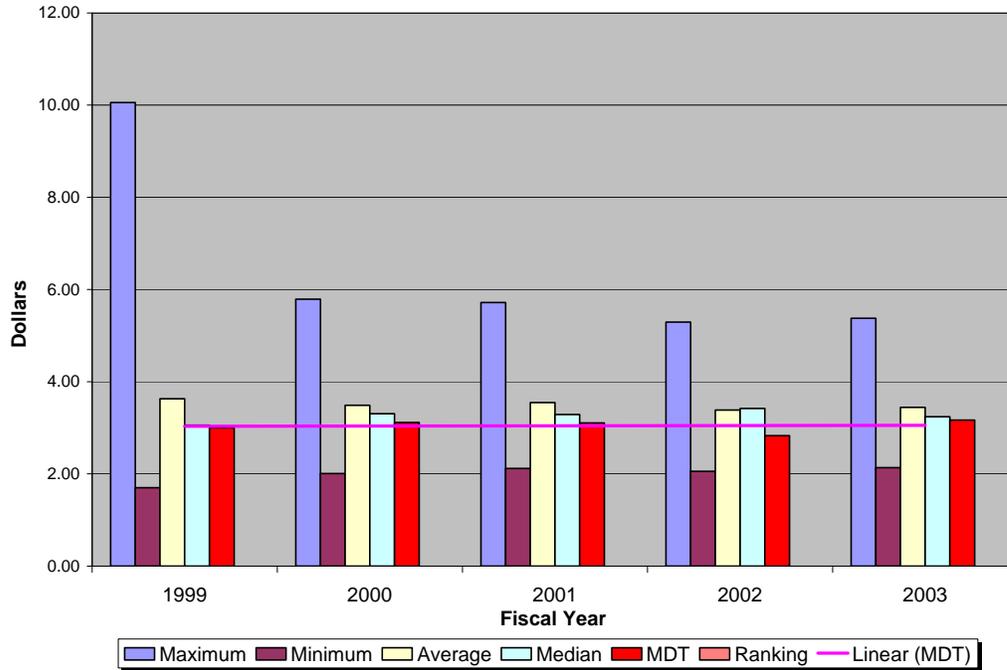
Based on a fairly quick review of operating costs for MDT Metrorail and Metrobus, CUTR has determined for the five-year period that:

- MDT did not report the highest cost in any of the expenditure categories examined
- On a vehicle mile basis, MDT's operating costs compare favorably to peer agencies' median and average costs for both bus and rail
- Metrorail operating costs on a vehicle mile basis have increased modestly from \$8.11 per mile in 1999 to \$8.38 per mile in 2003
- The rail cost per vehicle mile in 2003 was \$8.38 compared to median cost for peer agencies of \$8.34
- General Administration costs for rail are declining on a vehicle mile basis and flat on a passenger mile basis
- In 2003, the MDT bus operating cost per vehicle mile was \$6.69 per mile—\$2.38 per mile lower than the highest peer agency, and less than 17 cents higher than the average.
- Bus operating costs rose more from 2002 to 2003 than in the other years studied. This could be a result of the “ramp-up” for the PTP. When the 2004 data are available, the analysis should be repeated.
- MDT's operating cost profile looks better on a vehicle mile basis than on a passenger mile basis. The ability to more accurately account for every boarding will be improved with the acquisition of the automatic passenger counters.
- The majority of operating expenses in both rail and bus are attributable to vehicle operations and vehicle maintenance.

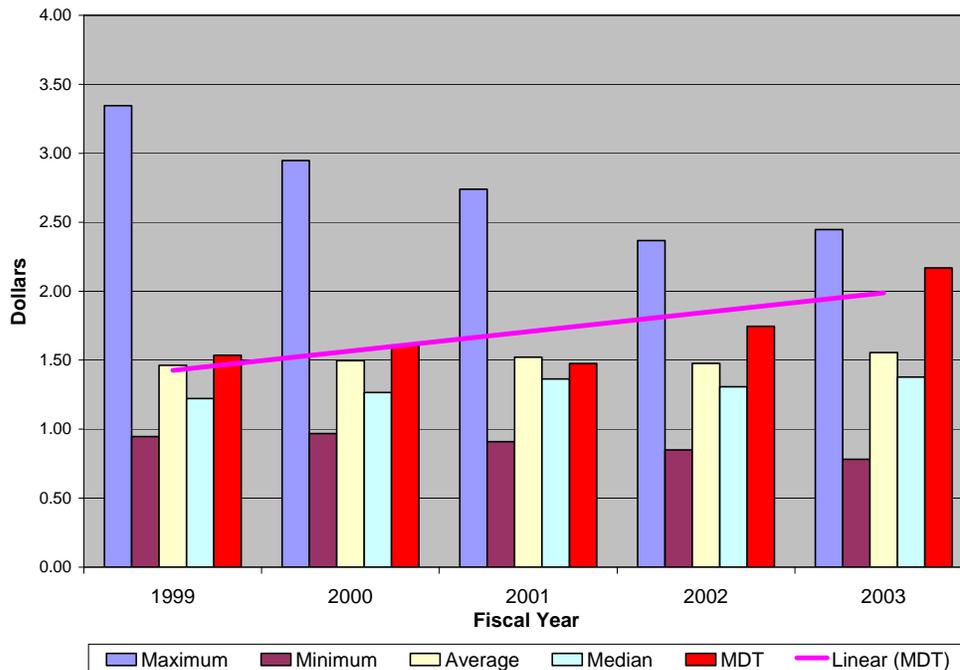
ATTACHMENTS

RAIL

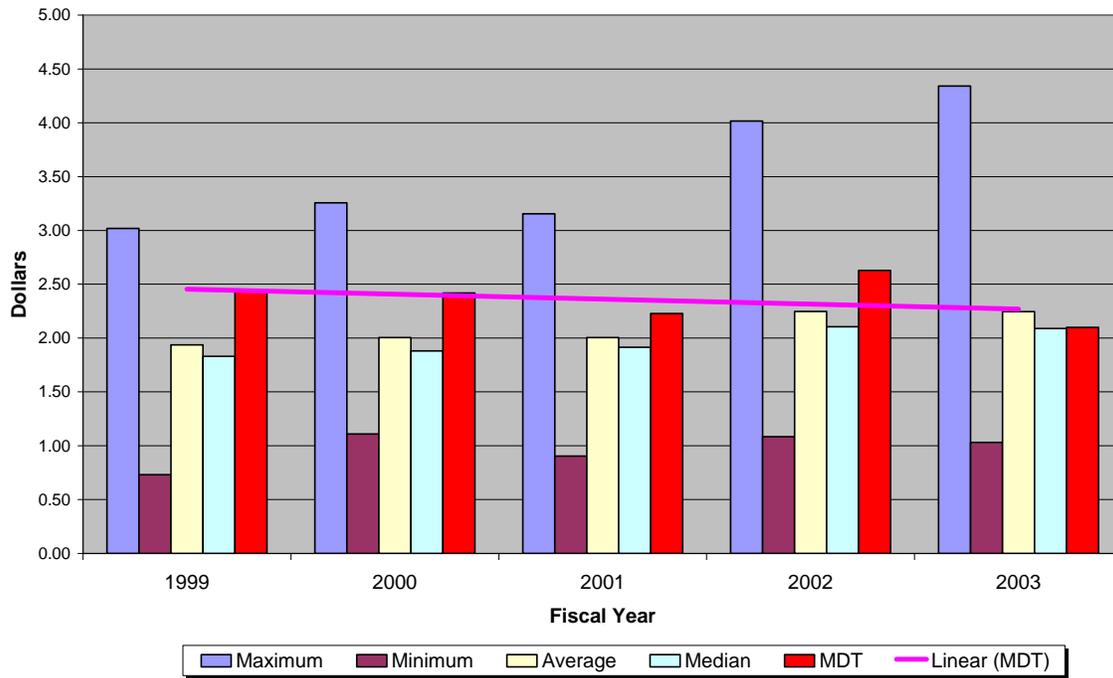
Rail Cost Per Vehicle Mile - Vehicle Operations



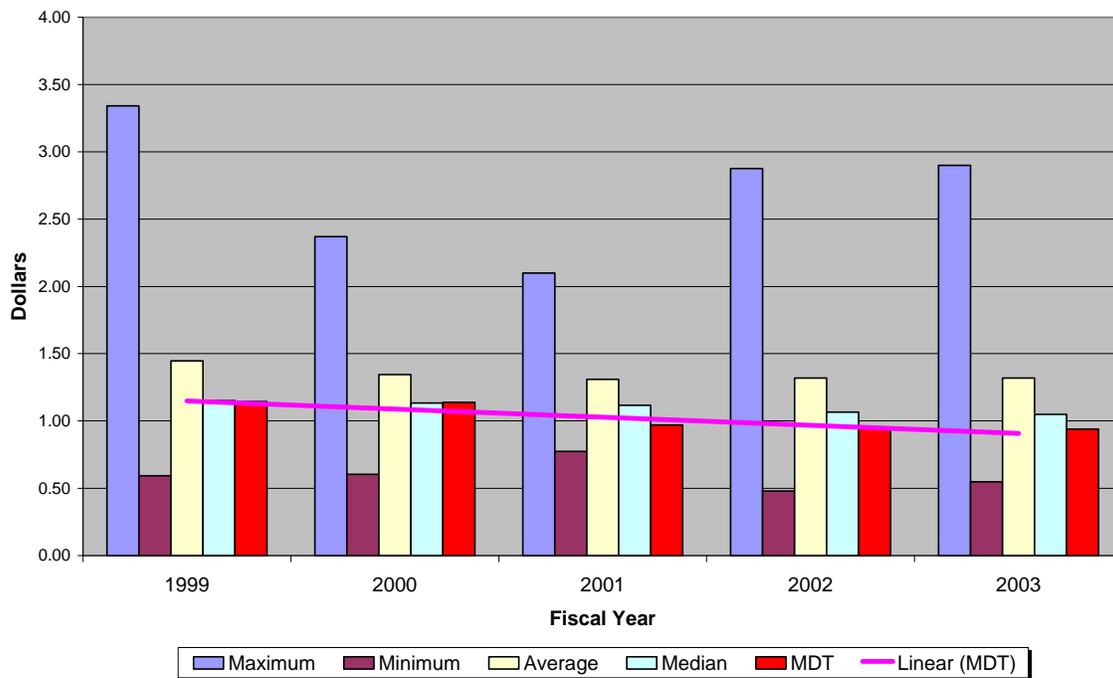
Rail Cost per Vehicle Mile - Vehicle Maintenance



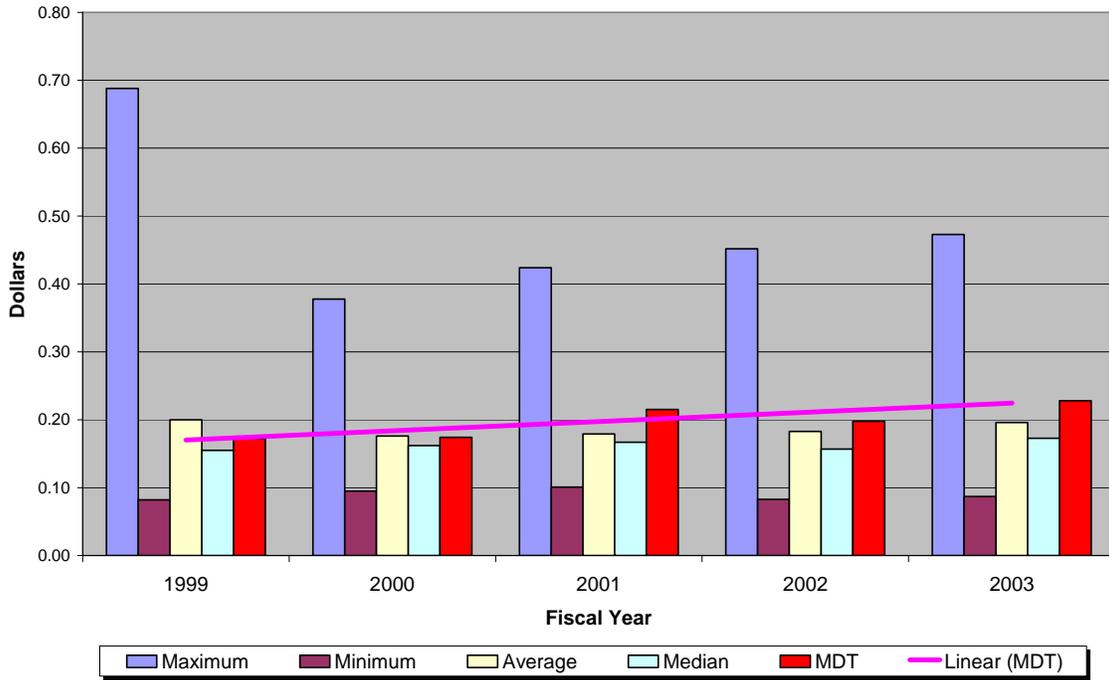
Rail Cost per Vehicle Mile - Non-Vehicle Maintenance



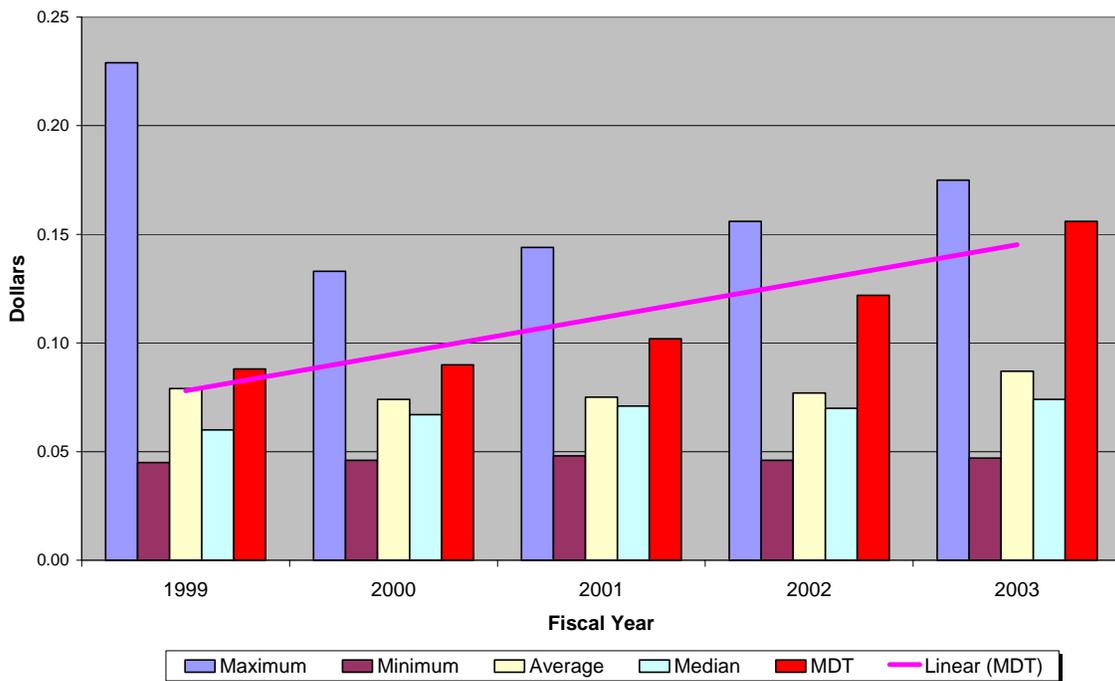
Rail Costs per Vehicle Mile - General Administration



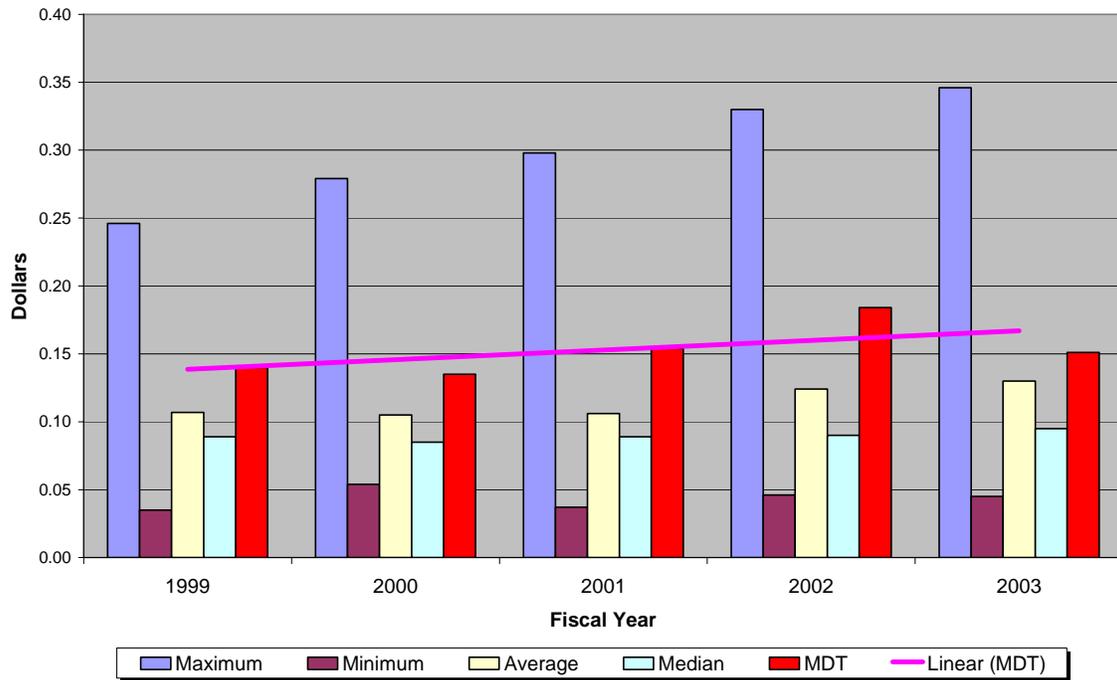
Rail Costs per Passenger Mile - Vehicle Operations



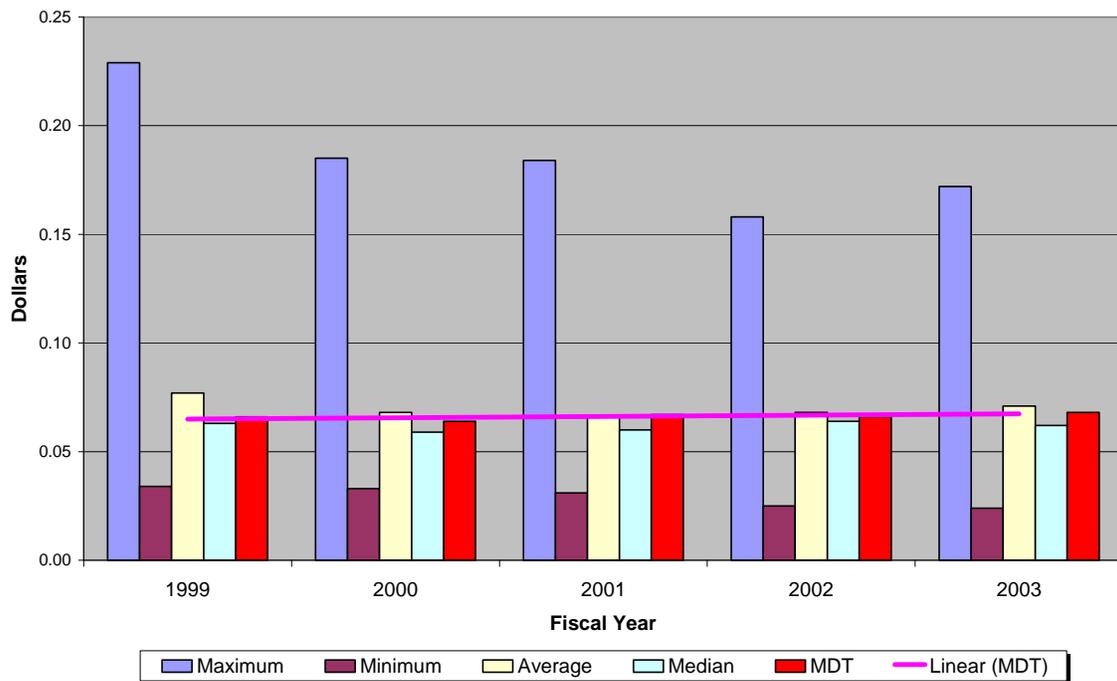
Rail Costs per Passenger Mile - Vehicle Maintenance



Rail Costs per Passenger Mile - Non-Vehicle Maintenance

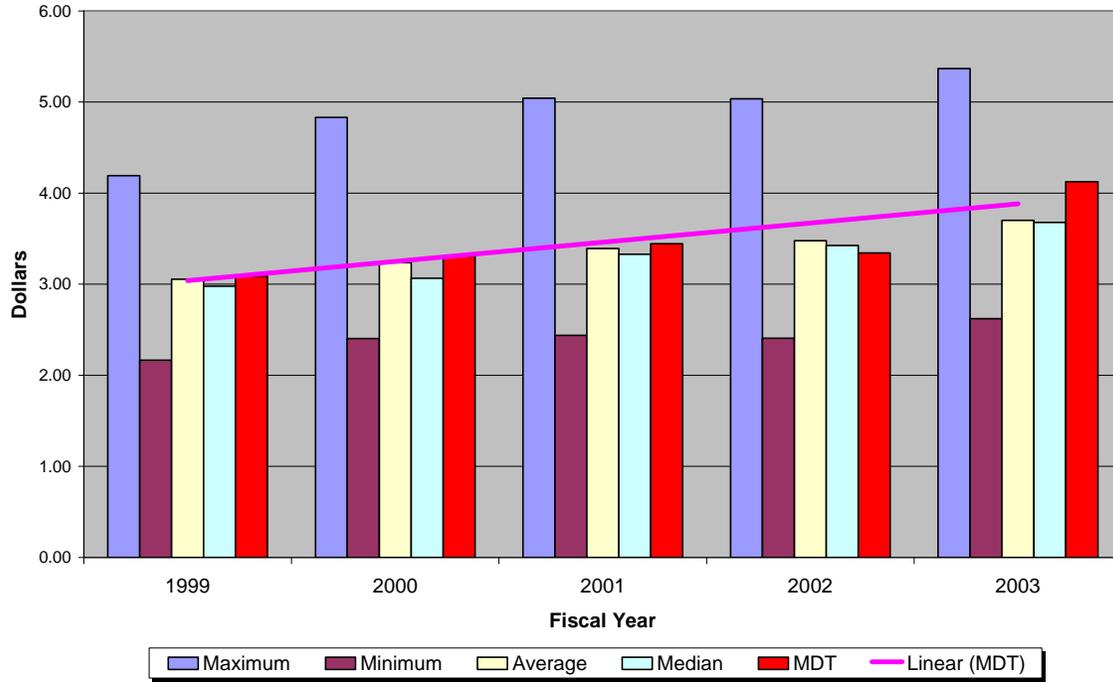


Rail Costs per Passenger Mile - General Administration

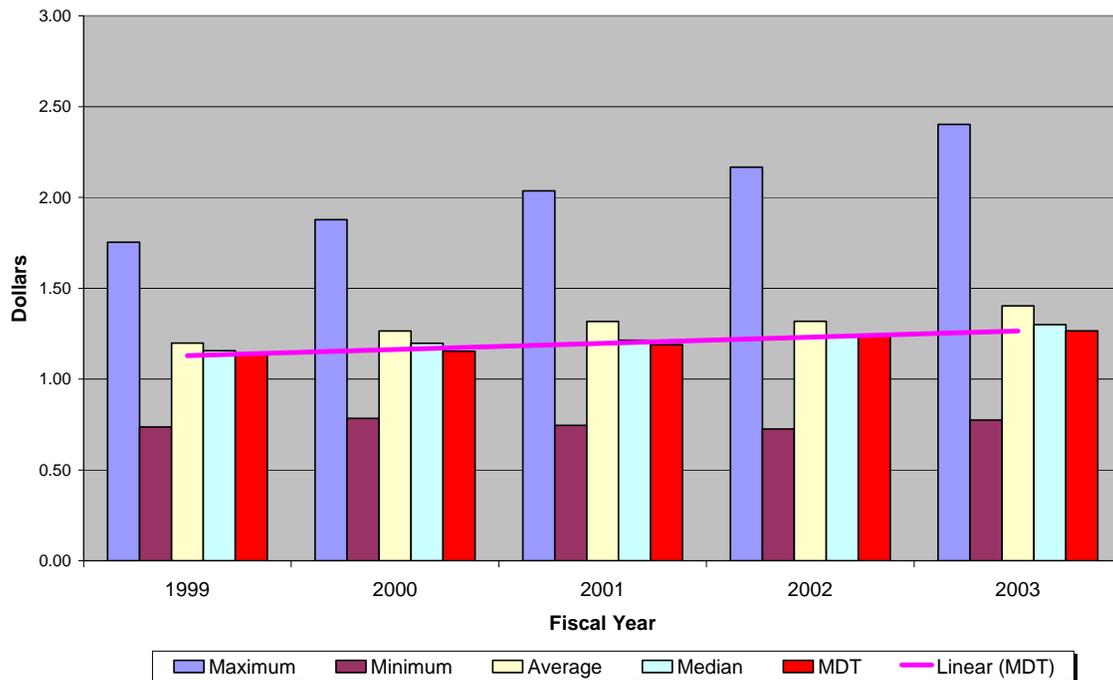


BUS

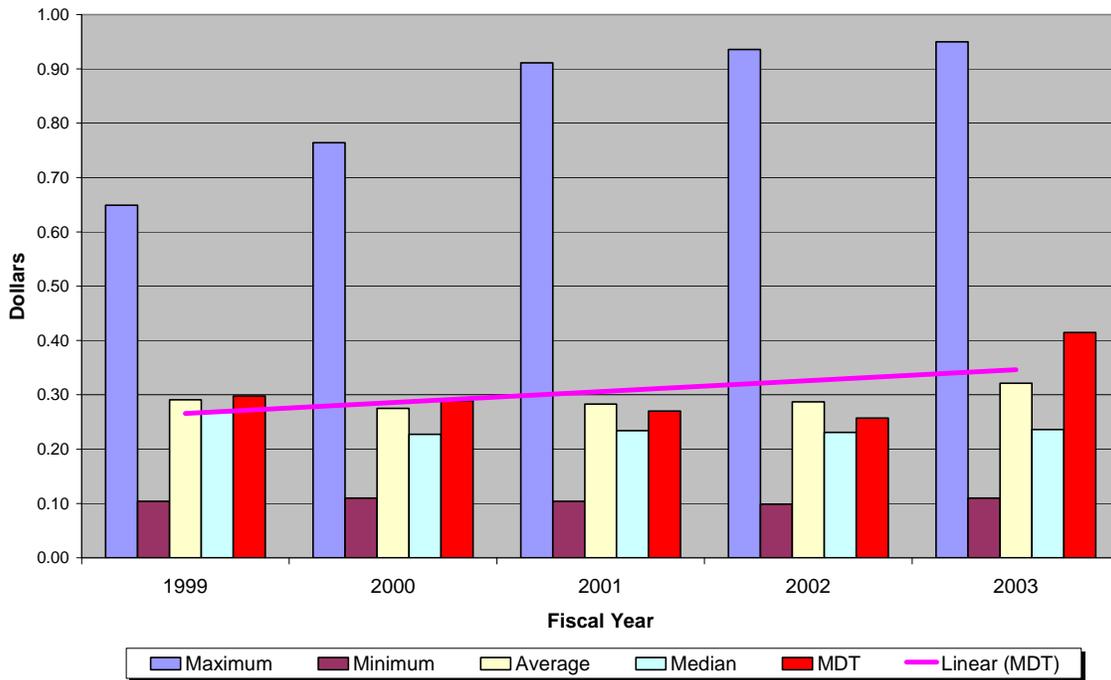
Bus Operating Costs per Vehicle Mile - Vehicle Operations



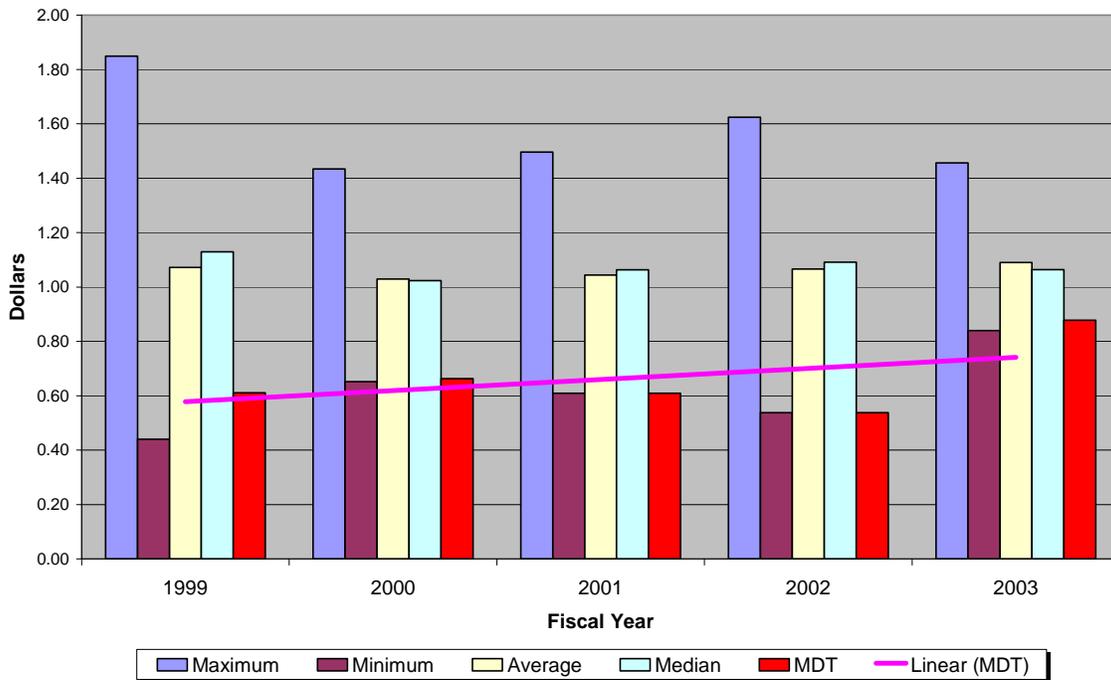
Bus Operating Costs per Vehicle Mile - Vehicle Maintenance



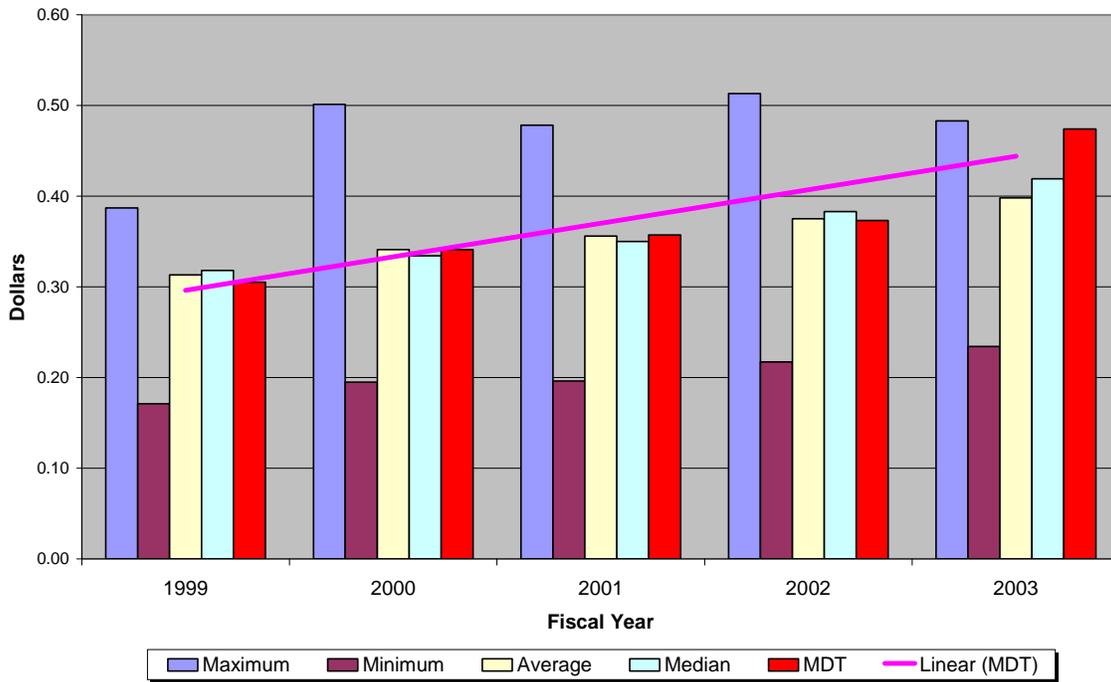
Bus Operating Costs per Vehicle Mile - Non-Vehicle Maintenance



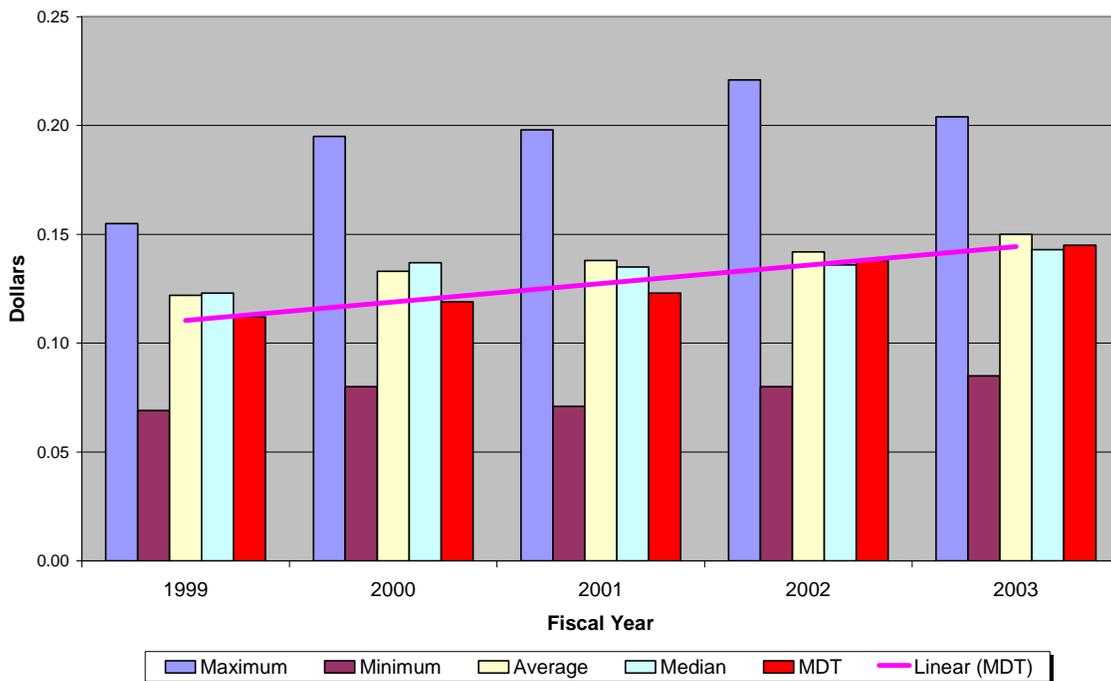
Bus Operating Costs per Vehicle Mile - General Administration



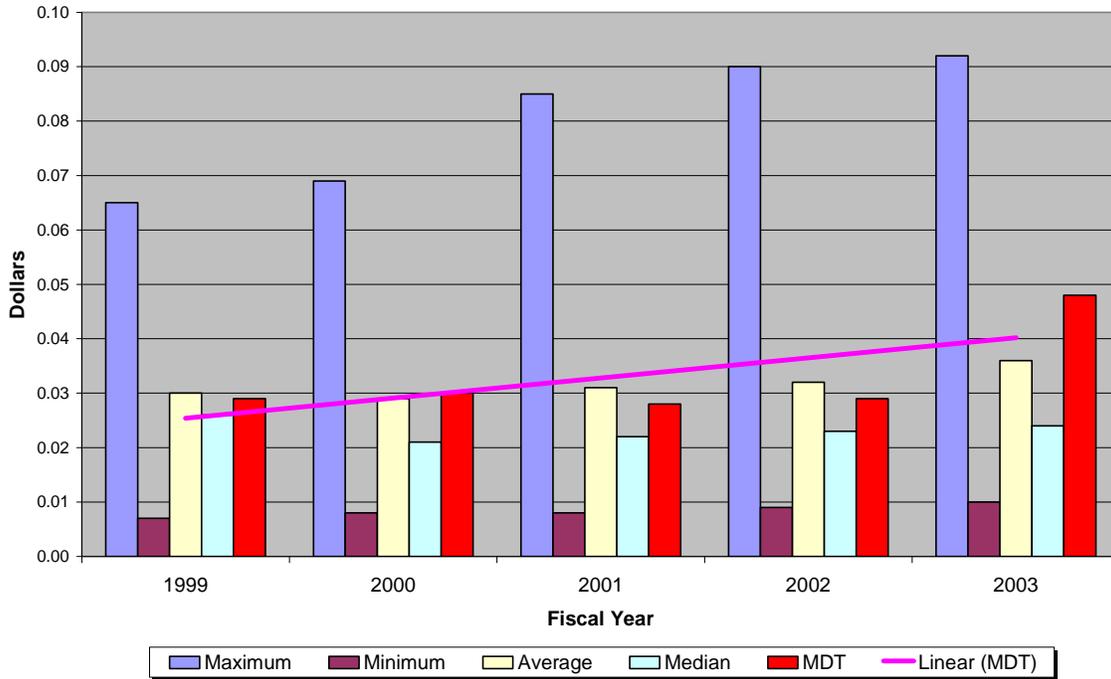
Bus Operating Costs per Passenger Mile - Vehicle Operations



Bus Operating Costs per Passenger Mile - Vehicle Maintenance



Bus Operating Costs per Passenger Mile - Non-Vehicle Maintenance



Bus Operating Costs per Passenger Mile - General Administration

