Let's Make Forecast and Actual Comparisons Fair

JESSE SIMON

It should not suprise anyone working in the transportation field that inquiries about rail construction have become politicized. Positions have hardened and proponents holding opposite positions talk past one another. Nowhere has this been more in evidence than in the report *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs* (*1*) and in the response from the transit industry. The report was ostensibly a critique of rail modeling and forecasting methods, made with the constructive goal of improving them. The industry did not see it this way, as seen in the following response from the American Public Transit Association (2):

> APTA strongly questions the motives and intentions of the report. Indeed, many transit systems view the report as a remnant of the failed efforts by the Reagan Administration to discredit major transit investment projects and destroy the federal transit program.

Jesse Simon is Senior Planner with the Planning Department of the Southern California Rapid Transit District.

The report targeted early, outdated documents for criticism, those that had less to do with federal funding decisions than did later, more refined ones. It purported to focus on the earlier documents because they were crucial to local decision making, but it failed to explore or comprehend crucial, local decision-making criteria. Understanding the local uses made of the early documents would have made the author either change his research questions, or refocus on later projections. The report failed to account for significant changes in scope between early and full funding documents, manipulated cost and patronage data to exaggerate differences between projections and outcomes, chose inappropriate comparison years, and suggested reforms that would preclude further rail investment.

One rhetorical device employed in the report is noteworthy because it is commonly used by rail critics: targeting one document out of a series because its projections deviate furthest from outcomes and referring to it as the "official" or most crucial estimate. A typical sequence in developing a rail construction proposal starts with a Draft Environmental Impact Statement (DEIS), which lays out alternative rail projects, as well as one or more nonrail alternatives. After comment and refinement, a Final Environmental Impact Statement is prepared, followed (after alternatives are eliminated) by a full funding agreement supported by a Preliminary Engineering Report. The DEIS, which is labeled a draft document, is likely to contain estimates that deviate further from outcomes than the later versions. However, this does not undermine the purpose of comparing alternatives under the same assumptions. The decision to fund a project comes later with the full funding agreement, and most projects have performed as well as or better than was projected in these later documents.

Portland Project

One example is Portland's project. Built $7.5 million under budget, according to its final funding agreement, it was still over budget according to its earlier DEIS. Along the way, the project underwent changes in scope, including lengthening both ends of the line (including an expensive area in downtown Portland), double tracking, and adding brick sidewalks and amenities to Old Town (G.B. Arrington, presentation to American Public Transit Association Rapid Transit Committee, Vancouver, Canada, 1990). The Portland DEIS served its purpose in showing that the rail option would be competitive with a busway. The busway, a slightly less costly alternative, was rejected when it was found that it would generate more than 500 buses per hour in a downtown transit mall with a 260-bus capacity. The local leadership should be commended for building a rail system within the parameters stipulated in the federal agreement and for appropriately evaluating the alternatives.

An opposite impression of the Portland and other projects was presented in the UMTA report. It defended the practice of targeting early projections, pointing out that they were most crucial to local decision makers. Yet, along with many critiques of rail, the report ignored the actual decision matrices of local decision makers. Instead, it limited the investigation to carefully posed questions about expenditure and ridership. It stated that rail decisions might never have been made if the early projections had proved more accurate. Those involved in decision making on the local level disagree, as shown by a speaker at the 1990 APTA Rapid Transit Committee (J. Hoover, presentation to the APTA Rapid Transit Committee, Vancouver, Canada):

> Does anyone . . . seriously believe that Portland officials would have voted differently if they thought the Banfield project was going to be $210 million rather than $172 million as originally estimated? If polled, would decision makers anywhere be more concerned with ridership on opening day than with ridership, urban development, air quality, 10 or even 20 years later?

The misrepresentation in the UMTA report that resulted from ignoring decision-making criteria was compounded by the choice of inappropriate comparison years. Portland's second year of operation was used to test its seventh-year projection. Data from 1989 were used for the Buffalo and Sacramento 1995 and 2000 projections. Similar statements could be made about the year chosen for Atlanta and Detroit. No attention was paid to the growth in rail patronage in each project's corridor. For example, Buffalo's rail patronage grew annually at more than 10 percent from 1986 to 1989; at that rate patronage will have doubled by the projected year. In general, choosing too early a comparison year, and not placing the comparison in temporal context, guarantees that a mature system will not be the subject of inquiry.

Reconfiguring the Data

Comparisons of standard data were eschewed in favor of artfully manipulated constructions. In the report, certain kinds of cost (such as donated rights-of-way) were added to capital costs, although they were not calculated as costs in the official projections. Patronage data were also reconfigured. The report's conclusions would have been seriously weakened if boarding data had been compared with boarding projections. In Table 1, for example, the pre- and post-rail systemwide patronage for Washington, D.C., Atlanta, and Baltimore is compared with that for three transit systems in cities that have not constructed rail. [See author's response to the UMTA report for matching criteria and details (3).] Systemwide boardings for the three rail cities rose dramatically (96 percent), whereas they fell (8 percent) in the three comparison cities. National rail and bus patronage data from the 1980s confirm the relationship shown in the table. It would be difficult to present a convincing argument that doubling patronage—in a decade in which nonrail cities were finding it hard to keep patrons—is evidence of local leadership's poor judgment.

MARTA

SACRAMENTO REGIONAL TRANSIT DISTRICT

Above: **MARTA trains at Avondale Yard in Atlanta.**
Below: **Passengers prepare to board Sacramento Regional Transit trolley.**

Nevertheless, the UMTA report attempted to do so when it converted boardings to linked trips [see definition, page 5]. Like other critics of rail, the report chose a large transfer rate among rail patrons, thereby discounting the increase in boardings. The conversion allowed the report to change the 157 percent increase in boardings for Washington, D.C., to 68 percent, and Atlanta's 103 percent increase to 18 percent. This was a curious test of what was in the projections. The linked-trip data were not provided in the forecasts, collected by transit systems, or reported in Section 15 data. There is a compelling reason for this. Although operators can easily calculate passenger miles—all they need to do is count how many passengers are on board between any two stops and measure how far apart the stops are—they cannot so easily determine how many passengers transferred. Recordings of fare transactions are less reliable than simple counts and say nothing about real transfer rates when the system allows the use of passes and free transfers. The report estimated both forecast and actual linked trips to prove that transit systems had overestimated linked trips. This is one of several examples of estimated forecasts for which forecasts did not exist.

Significantly, the report's estimates of extremely high transfer rates do not coincide with operator experience. Portland and Sacramento reported a lowering of the transfer rate. The report translated Sacramento's 7 percent increase in boardings from 1986 to 1988 to a decline in linked trips, when, in truth, the increase in linked trips should have been greater than the increase in boardings.

There is one indicator of patronage change that is regularly reported and not subject to the assumptions and manipulation involved in converting to linked trips: passenger miles. For example, Atlanta showed a 57 percent increase in passenger miles. (Obviously, there were forced transfers on this system because boardings were up 103 percent, but the passenger mile increase was more than three times higher than the 18 percent increase in linked trips postulated in the report.)

TABLE 1 SYSTEMWIDE BOARDINGS

Year	Rail/Bus City	Boardings	Difference (%)	Bus-Only City	Boardings	Difference (%)
1975	Washington, D.C.	122,841,700		Minneapolis	77,291,600	
1986		315,906,400	157.2		74,455,100	−3.7
1979	Atlanta	73,708,200		Milwaukee	79,062,000	
1987		149,903,000	103.2		73,346,100	−7.2
1983	Baltimore	98,654,500		St. Louis	56,544,100	
1987		111,739,900	13.3		47,751,700	−15.5
Sample Total						
Before rail		295,184,400			212,897,700	
After rail		577,549,300	95.7		195,552,900	−8.1

TABLE 2 OPERATING COST PER PASSENGER MILE (cents)

	1984	1985	1986	1987	1988
Washington, D.C.	36 *(32)*	35 *(32)*	34 *(32)*	33 *(31)*	34 *(34)*
Bus Operators (≥500 vehicles)	32 *(29)*	35 *(32)*	39 *(37)*	39 *(38)*	41 *(41)*

Note: Unadjusted figures are in parentheses.

Using reconfigured patronage estimates also led the author of the UMTA report to the conclusion that the systems in question had high operating costs. This is a potentially devastating finding. Everyone in the industry knows that the high capital investment in rail start-ups must be mitigated by lower operating costs once systems reach maturity. Again, through the use of readily available data instead of reconfigured data, a different conclusion is warranted. A comparison of the Washington, D.C., operating costs per passenger mile with those of bus operations with 500 or more in-service vehicles is shown in Table 2. From 1984 to 1987, Washington's operating costs per passenger mile went down both nominally (32 to 31 cents) and in terms of inflation (36 to 33 cents). The increase to 34 cents in 1988 was entirely on the bus side; rail costs remained the same as the previous year (25 cents). As previously indicated, the year chosen for comparison is crucial: in 1984 the Washington, D.C., operating cost per passenger mile was higher than that of the bus-only systems, in 1985 it was the same, and after that the rail component of the system achieved the levels of patronage that made the overall system more efficient.

In the top portion of Table 3, costs per passenger mile and per boarding for Atlanta and Baltimore are compared with those for four comparably sized, all-bus systems. The all-bus systems' costs per passenger mile were 12 to 45 percent higher than Baltimore's and 42 to 85 percent higher than Atlanta's. The figures for cost per boarding show even greater rail economies. Also presented in the table are aggregate data for rail and bus operations in the 29 largest American cities. Bus operating costs were 35 percent higher than those of rail.

Need for Dialogue

Considering how differently each side presents its facts, it would be easy, but wrong, to infer a lack of integrity on the part of one side or another. Disagreement—bias in a strict construction of the term—is institutionally ordered by differential access to data and opinions, with different organizations choosing people with known views or predilections. On the psychological level, a process of involvement and identification often results in advocacy and selective perception (*4*). Matters get out of hand when

PAT TRANSIT

METROPOLITAN TRANSIT DEVELOPMENT BOARD, SAN DIEGO

Left: **Outbound Port Authority of Allegheny County Transit light rail vehicle leaves South Hill Junction.** ***Below:*** **San Diego Trolley riders board light rail vehicle.**

TABLE 3 OPERATING COSTS FOR COMPARABLE CITY TRANSIT SYSTEMS (500–999 vehicles)

City	System Type	Cost/Passenger Mile ($)	Cost/Boarding ($)
From 1988 Section 15 Data			
Atlanta	Bus & rail	0.26	0.99
Baltimore	Bus & rail	0.33	1.11
Denver	Bus only	0.46	1.92
Houston	Bus only	0.37	1.85
Minneapolis	Bus only	0.40	1.38
St. Louis	Bus only	0.48	1.95
From 1987 Regional Plan Association Data			
29 largest cities	Rail	0.27	
	Bus	0.36	

little respect and no quarter are given to proponents of contrary positions.

The only way to return to a dialogue or a conversation is to work at it. We can start by paying serious attention to the underlying assumptions and the orienting questions asked by the other side. We should open our work, in its earliest stages, to those with whom we have the greatest disagreement. There is no doubt that we will continue to disagree and see obvious bias on the part of others, but as long as we are striving for truth, a more open process is the best way to achieve it.

References

1. D. Pickrell. *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs.* Urban Mass Transit Administration, U.S. Department of Transportation, Oct. 1989.
2. *APTA Response to UMTA Report. Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs.* American Public Transit Association, Washington, D.C., 1990.
3. J. Simon. *A Response to the Pickrell Report on Ridership and Costs of Urban Rail Transit Projects.* Southern California Rail Transit District, Los Angeles, 1990.
4. J. Simon and J. Zusman. The Effects of Contextual Factors on Psychiatrists' Perceptions of Illness. *Journal of Health and Social Behavior,* June 1983, pp. 186–198.