

CHAPTER 10 – FARE POLICY

Background

For any transit property, passenger fare policy represents an ongoing balancing act between recovering sufficient revenue for service operated and offering customers a payment structure that is considered affordable, convenient, and equitable. CAT's current fare structure is convenient for customers in that the structure is easy to understand and the number of different fare categories and payment media is limited. The base cash fare of \$1 is in line with (or lower than) many peer systems, however without a free or reduced price fare for transfers, many passengers' one-way trips become substantially more expensive.

This question of whether or not to introduce free transfers or to re-introduce low-cost transfers is critical in establishing a fare structure that meets the needs of CAT's customer base and attract potential customers. On-board surveys conducted as part of the TDP process indicate that roughly half of all CAT passengers transfer from one bus to another at least once a day, while one third of passengers surveyed said they would transfer two or more times in a day. For any passenger, multiple transfers in one day can mean daily round trip costs of more than \$4. For passengers with children (of fare-paying age), this burden can double or even triple. Feedback from CAT customers and stakeholders throughout the Transportation Development Plan process has reinforced the idea that an alternative to the current \$1 per person, per ride is necessary.

Existing Fare Structure

Chatham Area Transit's fare structure is based on a cash fare is \$1.00, with half fare for elderly and disabled patrons. Both weekly and monthly unlimited ride passes are available for frequent riders. Children under 41 inches tall may ride for free when accompanied by a fare paying adult. Transfers are not provided; when passengers transfer to another bus they have to pay the full fare on the second bus. The following table presents the fare levels charged by CAT for fixed route services.

Figure 10-1
Current CAT Fare Policy

Fare Category	Fare
Base Cash Fare (one-way)	\$1.00
Book of Ten Cash Advance Tickets	\$10.00
Weekly CAT Card (unlimited ride)	\$12.00
Monthly CAT Card (unlimited ride)	\$48.00
CAT Shuttle	Free
Elderly & Disabled Fare	\$0.50
Elderly & Disabled Tokens (20 Tokens)	\$10.00

Source: CAT Ride Guide

In addition to unlimited weekly and monthly swipe cards, CAT offers pre-paid tokens for half-fare customers. These tokens are sold at the same price as the cash fares (i.e., no bulk discount) and are offered as both a convenience to customers and a service for organizations that provide transportation to their clients but wish to do so in a controlled fashion rather than simply offering cash for members to purchase their own bus trips. Finally, the CAT Shuttle and Liberty Parking Shuttle are fare-free, subsidized in part by the City of Savannah. The fare-free Savannah Belles Ferry System is subsidized in part by the Savannah International Trade and Convention Center. This fare study excludes the Teleride fare, given the distinct nature of that service.

Approach and Methodology

Evaluating potential changes in fare policy requires an analysis not only of current ridership by fare category, but a more detailed understanding of the number of passengers who make each type of trip possible within the current fare structure. For example, for a base fare of \$1.00, a total number of passengers will be recorded paying that fare. However, some riders will make their trip on one bus, while others will transfer once, twice, or even more often. Similarly, a senior citizen paying the \$.50 half-fare might also transfer once or twice, reflecting a different trip than a simple one-bus ride.

Establishing a Baseline

The table below presents revenue reported by fare type for FY 2005. This table shows that over 70% of fare revenue is from passengers paying the full fare, consistent with responses to that effect in the On-Board Survey.

Figure 10-2
Revenue by Fare Type (FY 2005)

Revenue Type	FY 2005 Amount	Fare Percent
Full Fare	\$2,316,729	78%
Elderly/Disabled	\$157,545	5%
Cash Advance Tickets	\$229,915	8%
Weekly Card	\$246,552	8%
Monthly Card	\$38,412	1%
CAT Shuttle ¹	n/a	n/a
Total	\$2,989,153	100%

Source: CAT 2005 Financial Report

The revenue figures shown above are used to generate a baseline ridership figure for the year by dividing each revenue category by the actual fare in the case of cash fares, or estimated per-

¹ Operating assistance is paid to CAT from a contract with the City of Savannah for the CAT Shuttle and Liberty Parking Shuttle

trip fare in the case of unlimited passes. For weekly passes, customers are assumed to travel seven days, whereas monthly pass users average six days of travel per week; weekly pass users are less likely to forego a day of pass value.

**Figure 10-3
Estimated Ridership by Fare Type (Based on FY 2005)**

Rider Type	Payment per Linked Trip (One-Way)	Annual Revenue	Annual Ridership
Full Fare	\$1.00	\$2,316,729	2,316,729
Half-Fare	\$0.50	\$157,545	315,090
Cash Advance Ticket	\$1.00	\$229,915	229,915
Weekly Card	\$0.57	\$246,552	432,547
Monthly Card	\$0.53	\$38,412	72,475
CAT Shuttle	--	--	102,955
Total		\$2,989,153	3,469,712

Using this table as a guide, the next step is to develop an estimate of the number of individual customers riding according to each fare type. Whereas ridership figures in most annual calculations are based on the number of passenger boardings, this number is greater than the number of individual passengers since many transfer to other buses or make several trips in one day. With an estimate of the number of passengers riding by fare type, a baseline can be established, against which various scenarios for change can be tested according to specific expectations of how each customer type will react (elasticities). This baseline appears in Table 10-4 on the following page.

The number of customers will not match annual ridership totals, however it is important that the annual revenue in the following table matches CAT's reported revenue, as revenue is the 'control' figure for subsequent calculations. Results from the on-board surveys indicate that roughly half of CAT's frequent passengers transfer from one bus route to another. Thus, each fare category is divided according to the estimated percentage of passengers transferring once or more than once. Users of unlimited cards are more likely to transfer at least once, given the inherent value of the cards for frequent travel, thus the relative percentage of transfers is higher than for full fare/cash categories.

Figure 10-4
Baseline Revenue and Ridership by Fare Type (Based on FY 2005)

Rider Type	Payment per Linked (One-Way) Trip	Annual Revenue	Passengers by Fare Type	Fare Type Distribution
Full Fare – no transfer	\$1.00	\$1,390,037	1,390,037	60%
Full Fare – 1 transfer	\$2.00	\$695,019	347,509	30%
Full Fare – 2 transfers	\$3.00	\$231,673	77,224	10%
Subtotal – Full Fare		\$2,316,729	1,814,771	
Half Fare – no transfer	\$0.50	\$94,527	189,054	60%
Half Fare – 1 transfer	\$1.00	\$47,264	47,264	30%
Half Fare – 2 transfers	\$1.50	\$15,755	10,503	10%
Subtotal – Half-Fare		\$157,545	246,821	
Advance Ticket – no transfer	\$1.00	\$137,949	137,949	60%
Advance Ticket – 1 transfer	\$2.00	\$68,975	34,487	30%
Advance Ticket – 2 transfers	\$3.00	\$22,992	7,664	10%
Subtotal – Advance		\$229,915	180,100	
Weekly Card – no transfer	\$0.86	\$211,330	246,552	57%
Weekly Card – 1 transfer	\$0.43	\$31,514	73,533	34%
Weekly Card – 2 transfers	\$0.29	\$3,708	12,976	9%
Subtotal – Weekly		\$246,552	333,061	
Monthly Card – no transfer	\$0.92	\$30,105	32,614	45%
Monthly Card – 1 transfer	\$0.46	\$7,593	16,452	45.4%
Monthly Card – 2 transfers	\$0.31	\$714	2,319	9.6%
Subtotal - Monthly		\$38,412	51,385	
CAT Shuttle	n/a	n/a	102,955	
Total		2,989,153	2,729,093	

Fare Elasticity

To estimate future ridership and revenue as a result of each fare policy scenario, an elasticity is applied to each customer group (fare type). This elasticity reflects the likely increase or decrease in both ridership and revenue as a result of behavioral shifts in system usage. For example, customers who ride infrequently and do not make transfers may react negatively to an increase in the base cash fare, and as a result may choose alternatives for their transportation. The lower the elasticity, the less choice a customer is seen to have when reacting to a fare change.

A generally accepted fare elasticity of -0.43 is frequently used in similar studies. This represents the all-hour elasticity for cities with a population below one million and is outlined in *Fare Elasticity and Its Application to Forecasting Transit Demand*, available from the American Public Transportation Association (APTA). A -0.43 elasticity means that for every 10 percent increase in fares, ridership will decrease by 4.3 percent. This value is an update from the long-standing Simpson-Curtin formula, which did not account for peak vs. off-peak variability or differences between large and small cities.



For the purposes of this study, a lower range of elasticities is used relative to APTA’s values, primarily based on an understanding of the demographics of CAT’s customer base and information gleaned from the On-Board Survey pertaining to household income of CAT users, ridership habits, and transfer patterns. For customers paying the base cash fare of \$1.00, an elasticity of -0.35 is used, indicating that these riders are more dependent on CAT as their primary mode of transportation and may not have abundant alternative choices available to them. Senior citizens paying half-fare are generally assigned a lower elasticity, in this case - 0.25 for the cash fare of \$0.50.

Recognizing the role transfers play in both the economics and attractiveness of transit usage, progressively lower elasticities are applied to customers who make one or more transfers, as this pattern indicates greater transit-dependency and thus less ability to shift to other modes in the event of a fare increase. Thus, all-hour elasticities are applied as follows:

All Full Fare Customers		Half-Fare Customers	
Fare type – no transfer	-0.35	Fare type – no transfer	-0.25
Fare type – 1 transfer	-0.20	Fare type – 1 transfer	-0.20
Fare type – 2+ transfers	-0.15	Fare type – 2+ transfers	-0.15

Customer Shift

The elasticities outlined above determine how many customers are expected to be gained or lost as a result of fare changes, i.e., fare decreases tend to maintain or add ridership while fare increases result in a loss of riders. Beyond this calculation, however, it is important to understand that some customers will also make changes within the CAT system if they recognize the value of using a different fare media. For example, a customer who transfers at least once each day and rides the system more frequently may see financial savings through free transfers and continue to pay cash, or he/she may switch from cash payment to the purchase of a weekly or unlimited pass.

To account for this shift, certain assumptions are made regarding the likelihood of specific groups to seek alternative fare payment methods yet remain CAT customers despite a fare increase. The primary shift is expected from full-fare passengers. These passengers, particularly those that do not make frequent transfers, will see their costs increase most dramatically, such as in the example of an increase from \$1.00 to \$1.50 for the base cash fare.

Of the total base fare (no transfer) passengers considered lost due to a fare increase, 50% are expected to recognize the value of unlimited swipe cards, which offer substantial discounts over cash payment even with the introduction of free transfers. Therefore, these 50% are not lost, rather they are shifted to a new fare category. In addition, 50% of those who were not lost (i.e., 50% of the ridership after elasticities are applied) will also recognize the value of the

unlimited pass, not leaving the system but switching fare categories. The combined effect is a mitigation of total ridership lost, however because even retained customers now experience better economy through the use of unlimited ride passes, CAT also collects less revenue.

For all such calculations, riders are shifted to weekly passes, as this represents the more likely choice given the small percentage of current CAT customers who recognize this value or consider themselves able to pay for their transportation as a lump sum each week. Similarly, riders are shifted to weekly passes according to their transfer category in the base cash fare: full-fare passengers who don't transfer move to the weekly swipe card/no transfer category, full-fare passengers who transfer once move to the weekly swipe card/one transfer category, and full-fare passengers who transfer two or more times are moved to the equivalent category for weekly swipe cards.

Calculations for anticipated customer shifts, which represent a more refined determination of the ultimate effect of a fare change, are performed only for the two most promising alternatives presented below. Other scenarios are shown to be less attractive due to either combined revenue and ridership loss, or extremely modest revenue gain that would likely become a loss after customer shifts are applied.

Fare Policy Alternatives

Given the inherent simplicity in CAT's current fare structure, relatively few scenarios for a new fare policy are necessary. Two basic types of fare changes are considered: an increase in the base fare price combined with the introduction of free transfers, and an increase in the base fare price with a low cost (\$0.25) transfer fare. For each approach, two levels of increase in the price of weekly unlimited passes are tested. The first is a proportional increase in the pass prices, while the second is an increase in pass prices at a lower proportion than the base fare, designed both to minimize loss of ridership from current pass users, as well as provide as much incentive as possible to users who may switch from cash fares to the weekly or monthly swipe cards.

The following alternatives are considered to have the greatest potential for continued ease of use (simplicity) from a customer standpoint, potential for stable or increased revenue, and modest ridership loss due to elasticities. Tables detailing ridership and revenue changes for each alternative are provided in *Appendix: Fare Policy Alternatives*.

Alternative 1

Base Fare:	\$ 1.25
Transfer:	free
Half-Fare:	\$ 0.60
Cash Advance Ticket Booklet:	\$12.50
Weekly Card:	\$15.00
Monthly Card:	\$60.00

This alternative raises the base cash fare from \$1.00 to \$1.25 and introduces free transfers to the system. Advance tickets mirror the cash fare, and weekly and monthly swipe cards increase proportionally to the base fare (25%).

The anticipated result after first-round analysis is an annual ridership decrease of -2.5% and a revenue loss of -2.2%. In this case, the introduction of free transfers does not counter-balance the potential loss of ridership. Further analysis factoring in a shift of passengers from the base cash fare to weekly unlimited passes would mitigate the ridership loss, however CAT would lose additional revenue. This alternative is not recommended.

Alternative 1a

Base Fare:	\$ 1.25
Transfer:	free
Half-Fare:	\$ 0.60
Cash Advance Ticket Booklet:	\$12.50
Weekly Card:	\$14.00
Monthly Card:	\$55.00

Alternative 1a features the same basic fare structure as Alternative 1, but with lower relative increases in the price of weekly and monthly fares (17% and 15% increases, respectively). Compared to the Alternative 1, the lower weekly and monthly pass prices mitigate the ridership loss (-2.2%), however additional revenue is lost as a result (-2.7%). This alternative is not recommended.

Alternative 2

Base Fare:	\$ 1.50
Transfer:	free
Half-Fare:	\$ 0.75
Cash Advance Ticket Booklet:	\$15.00
Weekly Card:	\$18.00
Monthly Card:	\$72.00

Alternative 2 includes a higher increase in the base cash fare, from \$1.00 to \$1.50, along with the introduction of free transfers. As in all alternatives, the advance ticket price mirrors the base cash fare. Similar to Alternative 1, this option increases the weekly and monthly pass

prices in proportion to the base fare increase. After first-round analysis, this alternative shows a more dramatic decrease in ridership (-7.8%) due to the higher fare increase, but also shows considerable revenue gain (10.9%). Further analysis to factor in customers shifting to weekly unlimited ride passes would mitigate this ridership loss but also lessen revenue gains. The 50% increase in weekly and monthly pass prices is considered too high for customers, therefore this alternative is not recommended.

Alternative 2a

Base Fare:	\$ 1.50
Transfer:	free
Half-Fare:	\$ 0.75
Cash Advance Ticket Booklet:	\$15.00
Weekly Card:	\$16.00
Monthly Card:	\$60.00

Alternative 2a follows the same fare structure as Alternative 2 but with a less dramatic increase in the price of weekly and monthly swipe cards (increases of 33% and 25%, vs. 50% increase for base cash fare). By reducing the proportional increase in weekly and monthly passes, Alternative 2a becomes more attractive than Alternative 2, and thus is advanced to further analysis to incorporate anticipated customer shift from cash to unlimited ride fare media. After first-round analysis, the ridership loss expected for Alternative 2a is -7.3%, while revenues would increase 9.9%.

The increase in base cash fares will prompt certain users to seek other means of transportation, thus accounting for the initial ridership loss. However, it is also reasonable to assume that of those who reject the fare increase and are 'lost' riders, a certain percentage will actually remain faithful to CAT by recognizing the value of the unlimited ride passes. In addition, a similar proportion of passengers who remain CAT customers despite the fare increase will see the value in the weekly unlimited pass, and therefore switch from paying the base cash fare to buying swipe cards.

In this instance, because elasticities are relatively low and given the nature of riders who currently prefer to pay cash on a daily basis (yet ride frequently), all shifts are made to weekly swipe cards as opposed to monthly. This also provides CAT a "worst case scenario" in terms of revenue loss, as the weekly cards generate the lowest revenue per trip.

For customers who currently pay the full fare and do not transfer when they ride, 50% of retained riders are expected to shift to the weekly swipe card, along with 50% of those who were counted among the "lost" riders. For customers who pay cash and transfer once, 25% are expected to shift to weekly passes, along with 25% of those who pay cash and transfer twice. These groups show a lower percentage shifting because the majority may see that their per-trip

expense (one-way trips including transfers) is already lower than what they pay under the current fare structure.

For example, a customer who travels to and from work and must make one transfer in each direction would pay \$4 for a day's travel under the current structure. With a \$1.50 base fare and free transfers, this customer would pay only \$3 for the day. Despite the fact that the per-trip expense would be lower still with weekly swipe card (\$0.57 per trip for those who transfer one time in each direction), many passengers will be content with the immediate cash savings afforded by free transfers.

Thus, by applying these passenger shifts through a second round of analysis for Alternative 2a, the ridership loss is minimized at -3.9%, while the revenue gain is reduced to 2.3%. Ultimately, the introduction of free transfers in conjunction with a more significant increase in the base cash fare shows great potential to generate a modest increase in revenue system-wide while minimizing the number of customers lost. In time, some of these riders would be expected to return to the system, however to keep estimates conservative, this calculation is not performed.

Alternative 3

Base Fare:	\$ 1.25
Transfer:	\$ 0.25
Half-Fare:	\$ 0.60
Cash Advance Ticket Booklet:	\$12.50
Weekly Card:	\$15.00
Monthly Card:	\$60.00

Unlike the previous alternatives, Alternative 3 introduces a small transfer fare of \$0.25 to accompany increases in the base cash fare. This reduces the amount of ridership lost due to the base fare increase, while also showing a modest revenue gain in the first-round analysis (unlike Alternatives 1 and 1a which lost both ridership and revenue). Weekly and monthly swipe cards increase proportionally to the base fare (25%). This alternative prompts a considerable increase in the use of unlimited ride passes as customers who make transfers begin to shift away from increased base fares. However, this alternative is not recommended because of the substantial increase in the prices of these passes.

Alternative 3a

Base Fare:	\$ 1.25
Transfer:	\$ 0.25
Half-Fare:	\$ 0.60
Cash Advance Ticket Booklet:	\$12.50
Weekly Card:	\$14.00
Monthly Card:	\$55.00

To provide a more attractive fare structure and encourage the use of unlimited ride fare media, Alternative 3a follows the fare structure of Alternative 3 while only raising the weekly and monthly swipe cards 17% and 15%, respectively. The \$0.25 charge for transfers helps maintain system revenue (2.3% increase), while the increase to \$1.25 for the base cash fare prompts only a modest loss in ridership (-3.9%) after first-round analysis.

This alternative is thus advanced to more detailed analysis to determine the effects of customers shifting from cash to weekly swipe cards, as well as 'lost' customers switching to weekly passes instead of abandoning the system. The same percentages of customers shifting to the weekly swipe cards are applied as it was for the advanced analysis of Alternative 2a. The result is a ridership loss of only -1.5%, however instead of a small revenue gain, CAT would now experience a -6.2% drop in revenue as more passengers take advantage of unlimited ride fare media.

Alternative 4

Base Fare:	\$ 1.00
Transfer:	free
Half-Fare:	\$ 0.50
Cash Advance Ticket Booklet:	\$10.00
Weekly Card:	\$12.00
Monthly Card:	\$48.00

As a point of comparison, Alternative 4 highlights the likely outcome of a fare policy change that offers free transfers but makes no other changes to the base fare or unlimited pass prices. Not surprisingly, ridership increases somewhat (4.3%), but the negative impact on revenue is clear. Without an increase in the base fare, the introduction of free transfers leads to a -15.8% decrease in system revenues. This alternative is not recommended.

**Table 10-5
Summary of Alternatives and Impacts (First-Round Analysis)**

Alternative	New Base Fare	Transfer Fare	Weekly Swipe	Monthly Swipe	Ridership Change	Revenue Change
1	\$1.25	Free	\$15.00	\$60.00	-2.5%	-2.2%
1a	\$1.25	Free	\$14.00	\$55.00	-2.2%	-2.7%
2	\$1.50	Free	\$18.00	\$72.00	-7.8%	10.9%
2a	\$1.50	Free	\$16.00	\$60.00	-7.3%	9.9%
3	\$1.25	\$0.25	\$15.00	\$60.00	-3.7%	2.1%
3a	\$1.25	\$0.25	\$14.00	\$55.00	-3.4%	1.6%
4	\$1.00	Free	\$12.00	\$48.00	+4.3%	-15.8%

**Figure 10-6
Advanced Alternatives (Second Round Analysis)**

Alternative	Ridership Change	Revenue Change
2a (Preferred)	-3.9%	2.4%
3a	-1.5%	-6.2%

Recommended Alternative

Based on the analysis of the alternatives presented above, Alternatives 2a and 3a show the greatest potential in first-round analysis to address customer concerns about transfers and fare policy while minimizing lost ridership and keeping revenues intact. After the second-round analysis, however, Alternative 2a is clearly the more viable choice. Furthermore, given the simpler fare structure of a base cash fare of \$1.50 and free transfers, Alternative 2a is easier for customers from a user standpoint, and also provides more favorable return for system revenue.

Additional Policy Considerations

The alternatives presented represent the simplest, most effective ways in which CAT can change its fare policy while addressing the need to allow customers a more cost-effective means to travel and make transfers, yet maintaining or even increasing system revenue. Scenarios involving intermediate fare increases of \$0.10 to \$0.35 could be considered, however cash fares based on the use of dollar bills and quarters are typically the easiest for customers, particularly since CAT fareboxes cannot make change for customers paying with cash.

Other alternatives, such as providing a discount for cash advance tickets, were not pursued as they were seen to conflict with the goal of encouraging greater use of the weekly and monthly swipe cards. These cash advance ticket books fill a need for organizations wishing to provide transportation to their constituents, however they are not quite as critical to the general public.

Similarly, an unlimited-ride day pass is not considered a priority within the fare structure, except as a possible marketing effort designed for visitors to Savannah or occasional CAT users. As with all non-cash fare media, these passes would have to be made readily available to the public at numerous ticket outlets to provide a viable and convenient alternative to paying cash. Customers who wish to see financial savings for repeated travel should be encouraged to purchase the weekly or monthly swipe cards.

Finally, the CAT Shuttle represents a special case relative to the rest of the fixed route bus network. Currently fare-free, the CAT Shuttle is funded in part by payments from the City of Savannah to support travel for both downtown residents and visitors alike. Similar shuttle

services in other systems have introduced low-cost fares such as a quarter to ride, however this is primarily a policy decision.

Initial calculations show that the introduction of a small cash fare for the CAT Shuttle would significantly reduce ridership while showing only a modest gain in revenue. Elasticities among users of the shuttle would vary (residents vs. visitors, trip purpose, etc.). Charging a fare for the shuttle would only serve to limit habits such as extended, consecutive rides on vehicles by some customers, cited as a problem by both CAT operators and customers responding to the On-Board Survey.

Implementation

For any change in fare structure, particularly one involving an increase in the base fare, customer education is of critical importance. In this case, fare increases are designed to work hand-in-hand with the introduction of free (or reduced fare) transfers, rather than across the board cost increase to all users. Given that roughly half of CAT's customers make transfers on a regular basis, these fare changes are designed to provide a cost savings to the customer, despite the appearance of the reverse. Furthermore, all regular CAT customers stand to save money by taking advantage of weekly and monthly swipe cards. Relatively few customers use these passes at present, however educating the public on the value of these passes will be even more important when proposing a base fare increase, as will making these passes available for purchase throughout the CAT service area.

Finally, while some transit systems have used a phase-in approach to fare increases, it is recommended that CAT approach any change in fare structure in one installment. Successive fare increases, even if relatively small and part of a long-term plan, will most likely receive a negative reaction on each occasion. It is better to undertake a thorough public outreach and education campaign to implement one fare change than subject the public to more frequent changes.

Updates to CAT's farebox system may be necessary to allow for the introduction of transfers, whether through electronic coding or paper "tear" tickets. Transfer tickets would list the originating bus route, the route to which a passenger will transfer, the time of the transfer issue, and time of its expiration. Administrative costs to CAT are expected to be relatively small, pertaining primarily to public education and advertising, distribution of fare media such as weekly and monthly passes, and updated farebox reporting.