

# Effect of the Fare Increase of July 1966 on the Number of Passengers Carried on the New York City Transit System

WILLIAM LASSOW, Assistant to the Chairman, New York City Transit Authority

•IN July 1966, the basic subway and bus fare in New York City was increased from 15 to 20 cents. This paper explores the effect of the fare increase on the number of regular-fare passengers carried on the city-owned transit system during the year following the increase. It also examines the differential effects of the fare increase at varying times of day, by days of the week, and on different kinds of riders.

## CITY-OWNED TRANSIT FACILITIES

Two public Authorities operate the transit facilities owned by the City of New York:

1. The New York City Transit Authority (NYCTA) operates all the rapid transit lines in the city, all the local bus lines in Brooklyn and Richmond (Staten Island), approximately half of those in Queens, and a few lines in Manhattan.
2. The Manhattan and Bronx Surface Transit Operating Authority (MaBSTOA), a subsidiary of NYCTA, operates all the local bus lines in the Bronx and most of those in Manhattan.

There are also five private companies providing about half the local bus service in the Borough of Queens, and one small company in Manhattan. These companies carry about 10 percent of all local bus riders in the city. Fares were correspondingly increased on these lines at the same time as on the city-owned lines.

This paper deals only with the two Authorities. The magnitude of their operations is given in Tables 1, 2 and 3. For convenience, all the rail rapid transit lines are referred to as "subway" although there are long sections on elevated structures, in open cut, and on embankment.

The total number of revenue passengers and the number of regular-fare passengers carried in the year ended June 30, 1967, is given in Table 2. The difference is the number of children riding at reduced-rate school fare. Since the fare paid by school children was not changed, the analysis of the effect of the fare increase is based entirely on regular-fare passengers as determined by the number of passengers entering the subway turnstiles or paying regular fares on buses.

There are wide differences among the number of passengers carried on regular weekdays, Saturdays and Sundays (Table 3). In this paper the effect of the fare increase on riding is measured by comparing the number of regular-fare passengers carried during the year after the fare increase, July 1, 1966, to June 30, 1967 (fiscal 1967), with the number in the corresponding period of the prior year (fiscal 1966). No attempt has been made to adjust for any secular trend that may exist because, based on the last few years, this trend appears to have been very slight. During these years, changes in riding have been under 1 percent per year downward on the subway lines, and about the same percentage upward on the bus lines. These changes are so much less than the observed effects of the fare increase, and any extension of such small trends is so

TABLE 1  
NEW YORK CITY-OWNED TRANSIT FACILITIES  
AS OF JUNE 30, 1967

Operated by	Route Miles		Passenger Vehicles	
	Subway	Bus	Subway Cars	Buses
NYCTA	237	554	6,726	2,325
MaBSTOA	—	324	—	1,959
Total	237	878	6,726	4,284

TABLE 2  
NUMBER OF PASSENGERS, JULY 1, 1966, TO  
JUNE 30, 1967 (millions)

Operated by	Revenue Passengers			Regular-Fare Passengers		
	Subway	Bus	Total	Subway	Bus	Total
NYCTA	1,209	434	1,733	1,243	362	1,605
MaBSTOA	—	397	397	—	365	365
Total	1,209	831	2,130	1,243	727	1,970

speculative when there are so many other factors affecting transit riding, that it appeared to be an unnecessary refinement to adjust all the figures for trend for this study.

An adjustment based on the number of passengers using the World's Fair station and counts made on other stations and bus lines has been made in the fiscal 1966 data to eliminate the riding resulting from the New York World's Fair, which ran from April to October in 1964 and 1965.

### GROSS EFFECT OF FARE INCREASE

Comparing fiscal 1967 as a whole with fiscal 1966, after eliminating the month of January in both years because of the 13-day transit strike in January 1966, there was an annual loss in regular passengers of 2.4 percent on the subway lines, and 9.8 and 10.0 percent on the bus lines of the NYCTA and MaBSTOA, respectively. While there has been some recovery of the lost riders, the effect of the fare increase still persists. For the first six months of fiscal 1968 subway riding was about 1 percent more than fiscal 1967 and bus riding was about the same.

It is interesting to note that while for the bus lines the loss of passengers was close to the result that would be produced by a commonly used formula for predicting the effect of a fare increase, the actual result for the subway lines was quite different. This formula states that for every 1 percent increase in fare there will be a 0.3 percent decrease in riding. According to this formula, the 33.3 percent increase in fare should therefore result in a 10 percent decrease in riding. Since the gross loss in riding is the composite of losses which vary among groups of riders, it is obvious that in a system as large and as complex as New York City, a gross prediction based on a simple formula may be misleading.

The total percentage figures (Table 4) conceal very substantial differences in the effect of the fare increase on the different days of the week, particularly on the subway lines. These differences are significant in understanding the fare increase effects because total figures are affected by changes in the number of regular weekdays, Saturdays and Sundays, the incidence of holidays, and other calendar incidentals which distort monthly and annual comparisons.

It is tempting to speculate about the causes for the differences in the foregoing percentages. The lower percentage decreases in subway passengers may be explained by the greater preponderance of journeys to and from work and other longer and more important trips for which no substitute means of transportation is easily available. Bus trips are shorter, less work-oriented, and may be more casual. This permits easier postponement or elimination of trips (shopping, for example) and the substitution of

TABLE 3  
AVERAGE DAILY NUMBER OF REGULAR-FARE  
PASSENGERS, JULY 1, 1966, TO  
JUNE 30, 1967 (millions)

Operated by	Type	Regular Weekdays	Saturdays	Sundays
NYCTA	Subway	4.20	1.97	1.25
	Bus	1.14	0.81	0.49
MaBSTOA	Bus	1.15	0.85	0.50
Total		6.49	3.63	2.24

TABLE 4  
PERCENTAGE DECREASE IN REGULAR PASSENGERS,  
FISCAL 1967 UNDER FISCAL 1966<sup>1</sup>

Operated by	Type	Regular Weekdays (%)	Saturdays (%)	Sundays (%)
NYCTA	Subway	1.9	4.1	1.0
	Bus	9.4	11.6	10.8
MaBSTOA	Bus	9.7	10.5	9.5

<sup>1</sup>Excluding January both years.

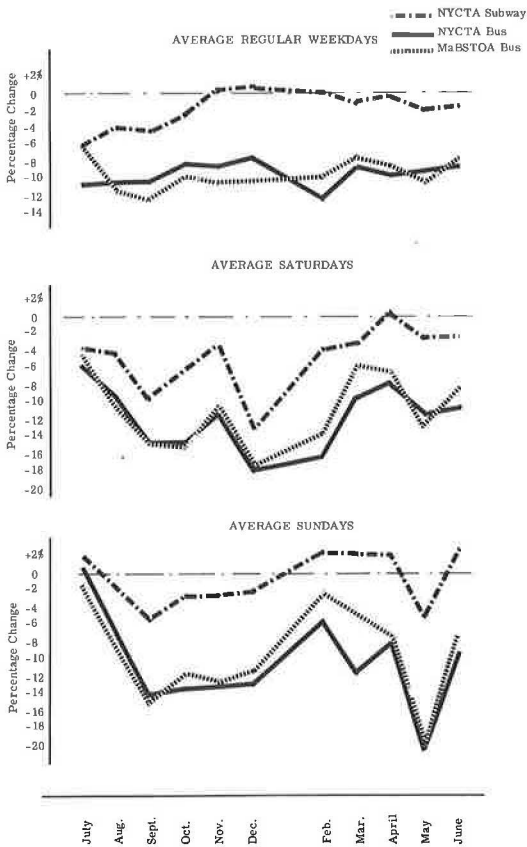


Figure 1. Percentage change in regular passengers by month (excluding January)—fiscal 1967 compared with fiscal 1966.

initial percentage reduction on weekdays and Saturdays and a gradual slow recovery. There is a similar though smaller recovery in bus riding on weekdays, but no such change is evident on Saturdays and Sundays.

The smaller loss on the MaBSTOA buses in the early months of 1967 is probably a result of the immediate sharp decline in riding on these buses following the establishment of one-way traffic on Fifth and Madison Avenues in Manhattan in January 1966.

The sharp drop in Saturday riding in December was caused by the difference in the days on which Christmas and New Year's Day fell in the two years, and the drop in Sunday riding in May by more rainy Sundays in 1967.

#### DIFFERENTIAL EFFECTS OF FARE INCREASE

In the following sections comparisons of the effects of the fare increase are based on a more limited body of data, but are nevertheless believed to be significant and indicative of what happened. Up to this point the data used have been based on the total fare collections of the entire transit system. The following data are based on hourly counts made on two days a year of the passengers entering the turnstiles at every subway station.

This count is produced by having the railroad clerk (token seller) at each station booth record each hour, on the hour, the reading on the meter on each turnstile under his control. These readings show the number of turnstile operations or passengers

walking, or taking a taxi, particularly when two or more people are traveling together.

A possible explanation of the 1 percent decrease in subway patronage on Sundays may be that Sunday riders are mainly workers in the extensive New York City service industries and round-the-clock operations, and people traveling for social and recreational purposes. The former have to travel, while the latter may be those who, for one reason or another, do not have a private car available and are not deterred by the higher fare because their trips may be in the nature of special occasions and may involve long trips by the entire family.

However, these are only speculations and "reasonable" explanations because there are no data that would provide a more accurate basis for explaining the differences in the percentages.

The percentage change in the average number of regular passengers on weekdays, Saturdays, and Sundays is shown in Figure 1 by months (except January) for fiscal 1967 and fiscal 1966. While there are wide variations among the months, in each month the percentage of loss of riding on the subways is less than on the buses on each of the three types of days.

The average weekday percentages of loss of passengers are, as could be expected, more stable from month to month. Subway riding shows a higher

TABLE 5  
 TURNSTILE REGISTRATIONS—ALL SUBWAY STATIONS—TWO REPRESENTATIVE  
 REGULAR WEEKDAYS 1966 AND 1965 (millions)

Day	Total Number of Turnstile Registrations
Wednesday, Oct. 20, 1965 (15-cent fare)	4.57
Wednesday, Oct. 5, 1966 (20-cent fare)	4.30
Decrease	0.27
Percent decrease	5.8%

entering the subway. Since turnstile meter readings are used primarily to account for the railroad clerk's receipts and are ordinarily recorded only at the start and end of each tour of duty, the collection and compilation of these hourly data for statistical and traffic analysis is a major additional task for the 4,000 railroad clerks who work in the 482 stations, with 835 change booths and 3,015 turnstiles.

There are some obvious problems in the use of these data. While the days selected are Wednesdays in May and October, which are as near to average or representative weekdays as can be selected, they are only two out of some 240 to 250 such days. Days without unusual weather or special events are selected, but there are normal statistical and other unanticipated and sometimes inexplicable daily variations in traffic. In addition, it is obviously unrealistic to expect each railroad clerk to read the turnstile meters precisely on the hour, particularly during busy periods. Instructions to do this are quite specific; supervisors do their best to enforce them, and at very busy stations other personnel assist, but at individual stations there are many occasions when the reported hourly figures are not correct. However, when station and hourly totals are combined there is a balancing of discrepancies, and totals are quite accurate enough for the following comparisons.

To check the reliability of the figures in Tables 5 through 9, which are based on the riding on these two typical days, a comparison was made with similar data derived from the average number of revenue passengers per weekday for both fiscal years. While the actual percentages showing the change from the prior year varied somewhat in the two sets of figures the rank order of the effects of the fare increase on the four groups studied in Tables 7 through 9 remains the same. Therefore, the absolute values of the percentages of decrease or increase in riding resulting from the fare increases shown in these tables must be used with extreme care. However, the general conclusions on the effects of the fare increase on different groups of riders are believed to be valid.

The analyses in Tables 5 through 9 are based on the counts made on the Wednesdays, October 20, 1965, and October 5, 1966. Counts made in March 1966 and 1967 were reviewed but were found to be distorted because the Easter holidays, with their effect on shopping, employment, and school holidays, fell in April in 1966 and in March in 1967. There are no comparable data available for the buses. Table 5 gives the traffic on the two days studied.

These figures differ from the average regular weekday figures given in Tables 3 and 4, which are based on the average of all regular weekdays for the entire year, while the figures in Tables 5 through 9 are based on one day in each year. However, it is believed that these two days are sufficiently representative of normal weekday riding patterns to permit their use to make valid comparisons to determine whether there were different effects of the fare increase on different kinds of riders. The following results were obtained by this method of analysis.

#### EFFECT OF FARE INCREASE BY TIME OF DAY

A comparison of the losses in subway riding by time of day is given in Table 6. As might be expected, the smallest effect of the fare increase is shown during the hours with the greatest number of work-based trips, that is, during the morning and evening rush hours and the midnight and early morning hours. Midday trips which probably have a smaller proportion of work-based trips and more shopping trips were more

TABLE 6

PERCENTAGE DECREASE IN TURNSTILE REGISTRATIONS  
BY TIME OF DAY—TWO REPRESENTATIVE REGULAR  
WEEKDAYS, 1966 AND 1965

Hours	Distribution of 1965 Turnstile Registrations (%)	Decrease (%)
7 a. m. -10 a. m.	31	2.4
10 a. m. -4 p. m.	21	8.0
4 p. m. -7 p. m.	30	5.0
7 p. m. -11 p. m.	10	14.6
11 p. m. -7 a. m.	8	3.7
Total—24 hours	100	5.8

TABLE 7

PERCENTAGE DECREASE IN TURNSTILE REGISTRATIONS  
AT 11 STATIONS IN LOWER MANHATTAN FINANCIAL  
DISTRICT—TWO REPRESENTATIVE REGULAR  
WEEKDAYS, 1966 AND 1965

Hours	Distribution of 1965 Turnstile Registrations (%)	Decrease (%)
7 a. m. -10 a. m.	7	1.8
10 a. m. -4 p. m.	20	6.1
4 p. m. -7 p. m.	62	3.4
7 p. m. -11 p. m.	8	27.9 <sup>a</sup>
11 p. m. -7 a. m.	3	2.5
Total—24 hours	100	1.0

<sup>a</sup>Increase

seriously reduced. The greatest loss of riding was in the evening hours, which probably have the highest proportion of social and recreational trips for an evening's entertainment.

### EFFECT OF FARE INCREASE ON JOURNEY TO WORK

The stations in the financial district of Lower Manhattan are used almost solely for work-oriented trips inasmuch as practically no one lives in this area. Therefore, there are very few people entering these stations in the morning hours and the turnstile registrations show the high concentration of riders entering the stations in the afternoon on their journey home from work. Table 7 gives the hourly distribution of the turnstile registrations for 11 stations in this area with a total of 243,000 riders on a Wednesday in October 1965, and the change from the prior year in the number of passengers.

The percentage of loss of riders was significantly lower at these stations than for the subway system as a whole—a total 1 percent decrease compared with 5.8 percent for all stations. The increase from 7 a. m. to 10 a. m. may reflect changes in the number of people working in these hours and is worthy of further study. It is not believed that the total number of workers in the area changed enough to account for the lower percentage of loss of riders for the 24 hours.

### EFFECT OF FARE INCREASE ON RIDERS OF DIFFERENT ECONOMIC STATUS

The effect of fare increase on riders of different economic status is difficult to measure from the data available for this study. It is fairly easy to select stations in the depressed areas of the city, and 13 stations in Harlem, Bedford-Stuyvesant, and the South Bronx were selected and examined. It is difficult to select subway stations that serve mainly high-income residents. Therefore, comparison was made with 10 stations which are adjacent to the commuter railroad and bus terminals and are therefore used by large numbers of work-bound commuters, presumably of higher economic status, during the journey-to-work hours. These data are given in Table 8. On the October 1965 day studied, the stations in the low-income areas had 149,000 entering passengers, while the "commuter" stations had 449,000. Since the "low income" stations are in residential areas there is a concentration of entering passengers in the morning rush hour. The "commuter" stations are in the midtown area and entering passengers are therefore most numerous in the afternoon rush hour; but the influx of the commuters is shown by the high percentage of passengers entering in the morning rush hour—a much higher percentage than that given in Table 7 for the financial district for the same hours.

The greater impact of the fare increase on the lower income areas in every period of the day is evident from a comparison with the entire subway system as given in Table 6. The effect is even more pronounced when the low-income area stations are compared (Table 8) with the stations used by suburban commuters entering the subway system during the morning hours. The low-income-area figures are consistent with

TABLE 8  
 PERCENTAGE DECREASE IN TURNSTILE REGISTRATIONS AT 13 STATIONS IN  
 LOW-INCOME AREAS AND 10 "COMMUTER" STATIONS—TWO  
 REPRESENTATIVE WEEKDAYS, 1966 AND 1965

Hours	Low Income		"Commuter"	
	Distribution of 1965 Turnstile Registrations (%)	Decrease (%)	Distribution of 1965 Turnstile Registrations (%)	Decrease (%)
7 a. m. -10 a. m.	42	4.5	22	3.7 <sup>a</sup>
10 a. m. -4 p. m.	21	9.3	20	1.3 <sup>a</sup>
4 p. m. -7 p. m.	14	8.0	41	7.9
7 p. m. -11 p. m.	10	19.1	11	6.4
11 p. m. -7 a. m.	13	13.1	6	2.5 <sup>a</sup>
Total—24 hours	100	8.6	100	2.7

<sup>a</sup>Increase

those for the entire subway system in showing the lowest effect of the fare increase during the daytime hours when people go to work.

### EFFECT OF FARE INCREASE ON RIDERS PAYING MORE THAN ONE FARE, OR HIGHER FARES

It could be expected that passengers who pay more than one fare for a single trip, or a higher rate of fare, would be affected more seriously by the fare increase, with a resulting greater loss of subway riders. This was confirmed by study of the effect of the fare increase in three situations where riders paid more than one basic fare.

#### Feeder Bus Line Stations

The effects of the fare increase at ten stations in the outlying areas of the city where a large proportion of the 225,000 riders on the October 1965 average weekday entered the subway from feeder buses on their morning rush hour journey to work are given in Table 9.

The greater loss of riders among those paying two fares than among subway riders as a whole is evident. The percentage decrease is greater for the entire day, and for every hourly period except from 11 p. m. to 7 a. m.

#### Rockaway Line

A double fare is charged on the Rockaway Line. A comparison of the riding for fiscal 1967 shows a decrease of 6.8 percent. On the entire subway system the comparable figure is 2.4 percent.

#### Aqueduct Race Track Specials

Special trains are run to the Aqueduct Race Track at a fare that was raised from 50 to 75 cents. It is possible to make the trip on the regular trains, which take much longer, at the regular 20-cent fare. Comparing the average number of special train riders per racing day for each of the four months, March through June, in 1966 with the same months in 1967 shows a monthly loss of riding ranging from 19 to 30 percent.

TABLE 9  
 PERCENTAGE DECREASE IN TURNSTILE REGISTRATIONS  
 AT 10 STATIONS WHERE A LARGE PROPORTION OF  
 PASSENGERS COME FROM FEEDER BUS LINES—TWO  
 REPRESENTATIVE REGULAR WEEKDAYS,  
 1966 AND 1965

Hours	Distribution of 1965 Turnstile Registration (%)	Decrease (%)
7 a. m. -10 a. m.	58	6.4
10 a. m. -4 p. m.	17	20.7
4 p. m. -7 p. m.	11	6.2
7 p. m. -11 p. m.	5	22.3
11 p. m. -7 a. m.	9	10.1 <sup>a</sup>
Total—24 hours	100	7.3

<sup>a</sup>Increase

### CONCLUSIONS

While the actual percentage of decline in riding may include minor effects of factors other than the 5-cent increase in the basic transit fare, there is no doubt about the profound effect of the fare increase in reducing riding. Based on the



analysis in this paper the following general conclusions can be drawn with a high degree of confidence:

1. As a result of the fare increase, transit riding in the 1967 fiscal year declined nearly 2.5 percent on the subways and nearly 10 percent on the buses below the level of the 1966 fiscal year. This represents a decrease of about 100,000 trips per week-day on the subways and more than twice that number on the buses.
2. The effect of the fare increase is persistent because, while these percentages are the average for the year, the percentage of loss at the end of the year was only a little lower than earlier in the year.
3. The effect of the fare increase was not the same on all classes of riders. For example, (a) weekday rush-hour trips, which are predominantly journey-to-work trips, were affected least; (b) weekday midday and evening trips and Saturday trips were affected most—these have a higher than average proportion of shopping, social, and recreational trips; (c) there was a greater than average decline in riding among lower income groups; and (d) the greater the amount of the fare increase, the greater the effect, i. e., the decline in riding among those who pay more than one fare for a trip, or who pay a higher rate of fare, was greater than the average for all riders.

A fundamental question that should be studied further is: what is the effect on the city as a whole of the reduction in the number of mass transit trips caused by the fare increase? We do not know how many, if any, of these trips were made by auto or taxi or other means of transportation, with perhaps an increase in downtown traffic congestion, or how many were not made at all, with a decline in the number of people shopping in the city, or just visiting, or attending a movie or concert, thus diminishing the city's attraction as a shopping, cultural, and recreational center. While we note and count the decrease in transit riding resulting from the fare increase, we have no measure of its broad social and economic significance.

### *Discussion*

EUGENE L. GRANT, Professor of Economics of Engineering, Emeritus, Stanford University—Total revenue requirements of privately owned regulated public utility companies in the United States include operation and maintenance expenses, property taxes, depreciation, income taxes, and a fair return on a rate base that is related to the capital assets of the system. However, it is an accepted fact of life in the United States in the 1960's that no schedule of passenger fares in an urban mass transit system can be designed to cover all revenue requirements as they are defined today in our regulated gas, electric, telephone, or water utilities. The time when passenger revenues were able to cover all such "costs" is long since past.

The change from private to public ownership eliminated the property tax and income tax components from passenger revenue requirements in urban mass transit. Moreover, part or all of the capital costs (such as bond interest and repayment) now often are covered from general taxation; in some publicly owned systems, even part of the operation and maintenance cost is paid from general tax revenues. The total revenue objectives that are considered in setting passenger fares differ greatly among the various publicly owned mass transit systems. They are not necessarily the same in, say, the San Francisco Bay area and the New York City area.