CONSEQUENCES OF SERVICE REDUCTIONS IN MUNICIPAL TRANSIT: SAN FRANCISCO'S MUNI

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I. INTRODUCTION

Public transit has been in a secular decline in the United States over the past two decades, resulting from increasing costs and declining patronage. The San Francisco Municipal Railway, which runs the City's buses, streetcars, trolleys, and cable cars, managed to keep its ridership against the general trend for the better part of this period. This was suddenly changed in 1969, when the City decided to increase the fares, and reinforced in 1970 with another fare increase. Most recently, Muni attempted to consolidate its falling patronage by cutting back service, but the Board of Supervisors was unwilling to allow this to happen and eventually authorized the funds necessary to permit normal operation.

Very few of the important issues underlying the debate about reducing service have yet reached the surface. Perhaps the most immediate question is what will happen in the City if the quality of public transportation is lowered? Obviously there will be fewer Muni riders and more automobiles, but by how much, and what will be the costs? The evidence suggests that a small percentage loss in transit ridership will have substantial impacts on the transportation in the City. Another question is why the Board of Supervisors should counter the wishes of the Muni management, and one good reason appears to be that the decision to reduce service would cost the City more than it would save. Finally, there is the larger question of how a public transit agency

should be organized within the political and administrative structure of the City government, and what performance criteria should be held up against it as goals? It would seem in the case of Muni that the organizational structure and the performance criteria used are so inappropriate as to be perverse.

Cutbacks in service proposed by Muni were fairly uniform, being a combination of generally increased headways, later initial and earlier terminal runs, merging of some lines, and elimination of some night and weekend service. While there is no simple measure of service level analogous to price, it is reasonable to infer from the changes in schedules, headways, and vehicle utilization that the cutbacks amounted to approximately 10-to 15% reduction in service.* Although no statements were issued by Muni concerning the reasons for the cutbacks, it is evident that profitability was the criterion used, with primary emphasis on cost cutting. Thus, those runs which would reduce costs more than revenues if they were eliminated were trimmed first.

Analysis of public policy currently seems to be developing two notable characteristics. First, emphasis has shifted predominantly to the consideration of secondary impacts rather than direct effects, since the social costs or benefits in the long run appear to depend more on the former than on the latter. Second, policy analysis has become eclectic in its use of theory and methodology, drawing from diverse sources rather than a single well-developed discipline, and using seat-of-the-pants techniques rather than more powerful but less flexible analytic models. The study presented here is a typical example of this style. Components of the transportation system are highly interrelated,

*Information specially tabulated by Charna Staten of the San Francisco Department of City Planning was very helpful in estimating the extent of the cutbacks.

and policy regarding any particular mode must consider effects on other modes and their attendant secondary effects. The analysis is set within the framework of public economics, but synthesizes quantitative information derived from survey research and time series analysis. These tools are directed at evaluating a particular policy alternative, which means that inferences may be made that would not be justified from a purely research standpoint.

National and local historical trends in urban transportation will be described and assessed, along with a breakdown of the components of Muni's demand profile. This information will then be used to estimate the likely short and long run consequences of reducing Muni service levels. Finally, the probable impacts will be evaluated and recommendations made.

II. NATIONAL AND LOCAL TRENDS

Up until the turn of the century, urban transportation in the United States was dominated by transit--mostly on some form of rail--and urbanization patterns reflected that dominance. High fixed costs for starting up, a large minimum scale of operation, and little competition gave transit a natural monopoly in the urban transportation field. The industry was profitable enough that it could stand a good deal of regulation, including service requirements, and it could also support urban services both directly, such as for street maintenance, or indirectly through taxes. Many unique political and technological factors contributed to the success of transit, but of major importance was the fact that many companies were real estate developers as much if not more than they were transportation companies. When transit had to sustain itself solely by providing transportation, the profit picture began to change. Inertia and heavy disinvestment allowed transit to continue to dominate urban transportation until the mid-1920's, but then the competition from the auto became too great.

Transit's decline occurred in two phases. In the period between the two World Wars, fixed rail gave way to autos and buses, but after WW II, buses also lost out to the automobile. The secular decline of public transportation is simply a mirror of the growth in usage of the private automobile, as can be seen in Figure 1. Increased population and affluence have accelerated the growth in auto ownership, but much of this growth has been at the expense of public transportation. During World War II, the pattern was temporarily reversed because autos were built only in small numbers and gasoline was highly rationed, but when this artificial situation was removed, the secular pattern emerged once

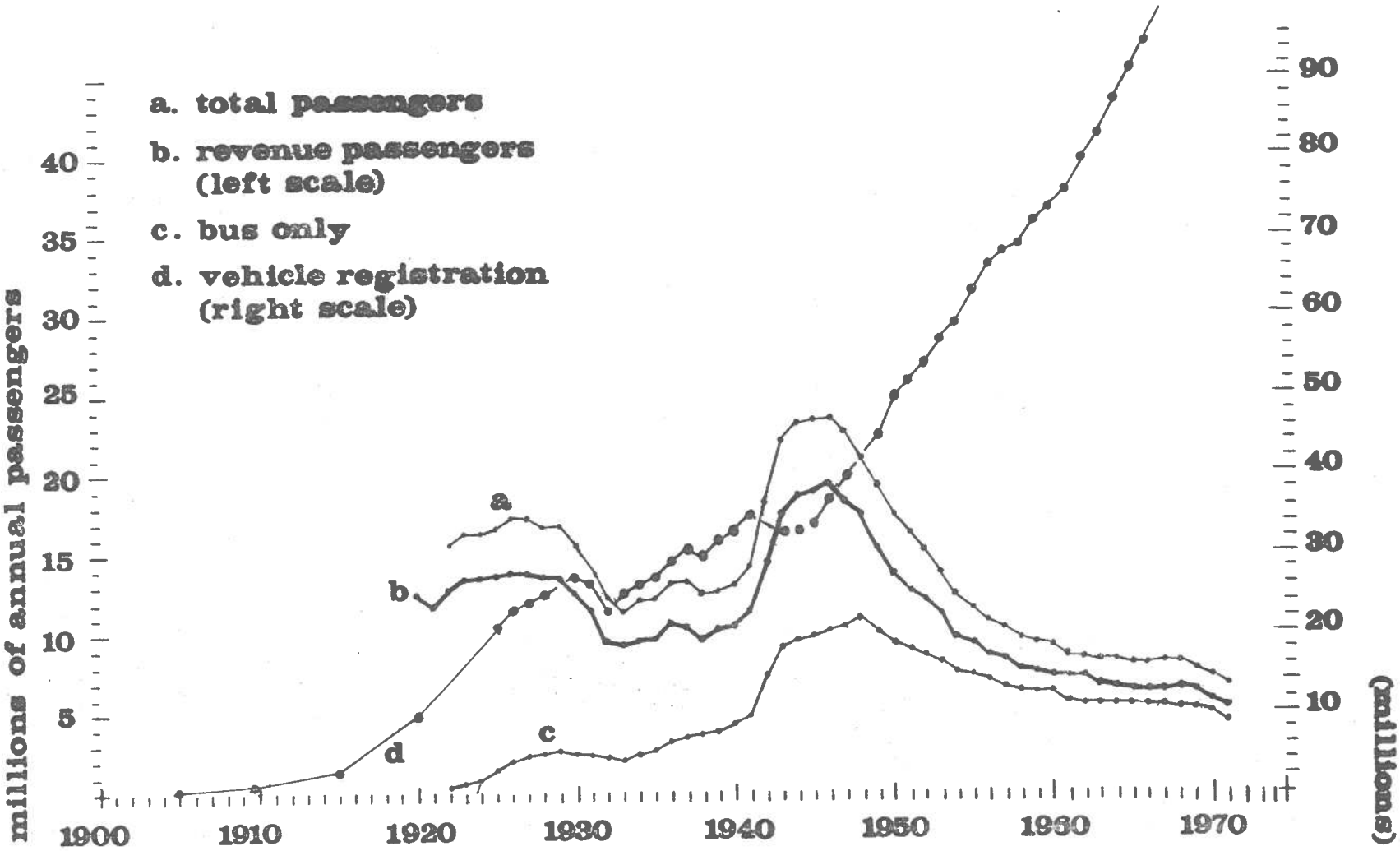


Figure 1. Transit Trips and Auto Ownership in the U.S., 1900-1970

more. From the peak in 1946, transit ridership declined precipitously up until 1955, at which time patronage was only slightly lower than it had been in the 1930's. From there it returned to the long run path of gradual but steady diminution.

Since World War II, transit revenues have held steady despite declining patronage as a result of increased fares. As can be seen in Figure 2, the only thorn in this picture is the sudden jump in costs that has occurred in the late 1960's. This cost increase has meant that most systems are now experiencing mounting deficits and increasing difficulty in finding revenue sources to cover the deficits. San Francisco is typical in this respect, and the problem is exacerbated by the fact that the major transit systems are in large central cities, which are themselves beset by severe financial pressures.

From Figure 3, it can be seen that the temporary growth in patronage during the War and the subsequent decline was felt much more heavily in cities of less than half a million, and that the hard core of transit patronage lies in the large central cities. Outside those cities, usage of public transportation is a minor component of the total transportation system.

Comparisons between San Francisco and other large cities with major public transportation indicates that San Francisco has done relatively well up until the last few years. Per capita patronage is high (the figure for Boston is inflated because the MBTA serves a much larger region than the City), as seen in Table 1. Since 1966, fares have risen in many cities besides San Francisco, and patronage declined accordingly. San Francisco's advantages seem to lie in a high average density, the relatively small number of automobile access points into the City, and

a. passenger revenues

b. operating expenses (including depreciation)

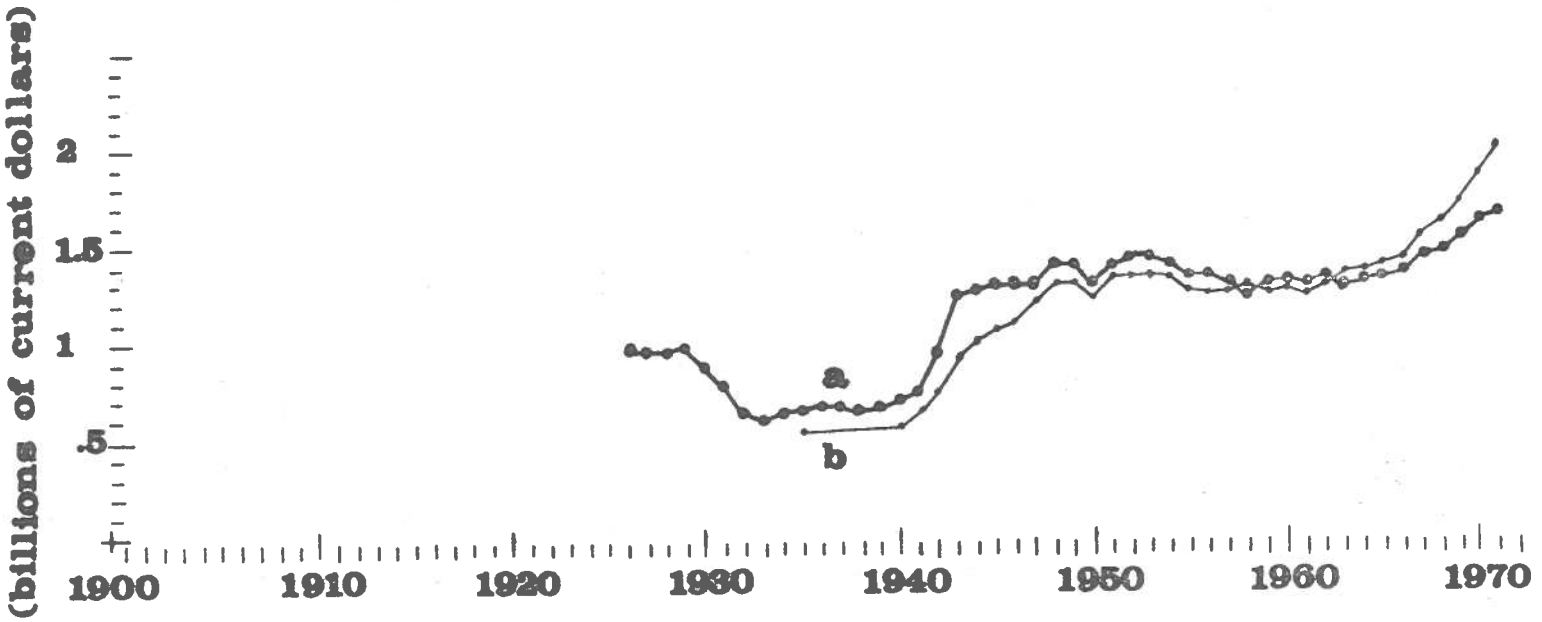
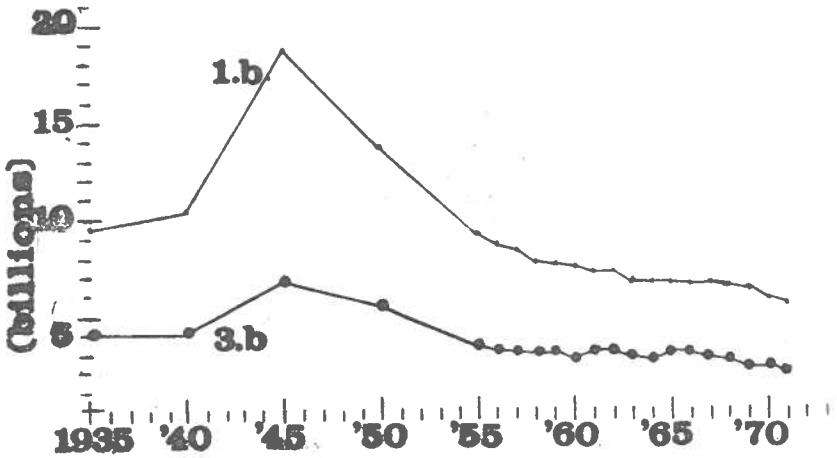


Figure 2. Transit Revenues and Expenditures in the U.S., 1900-1970

1.b total revenue passengers

3.b passengers in cities over 500,000[a]



(a) excluding rapid transit

Figure 3. Total Revenue Passengers and Passengers in Cities over 500,000, 1935-1971

TABLE 1: CHARACTERISTICS OF SELECTED CITIES IN U. S.

City	(a) City population	(b) Density	(c) Transit patronage	Per capita patronage	(d) Basic fare	(e) Income	(f) % Transit to work
Boston	641,056	13,936	172	274	20¢	5,921	38
Chicago	3,362,947	15,107	530	158	25¢	7,983	34
Los Angeles	2,815,998	6,073	138	49	30¢	7,511	9
New Orleans	593,467	3,011	87	147	10¢	5,572	30
New York	7,894,798	26,342	1750	222	20¢	7,679	60
San Francisco	715,673	15,764	145	203	15¢	6,765	35

(a) 1970 Census, General Social and Economic Characteristics

(b) areas from Statistical Abstract of the United States, 1971

(c) for 1966, revenue patronage on all modes, adapted from Urban Transit Development in Twenty Major Cities, Automotive Safety Foundation, March 1968. (millions of passengers annually)

(d) same source as (c)

(e) median income of families and unrelated individuals, 1970, from same source as (a).

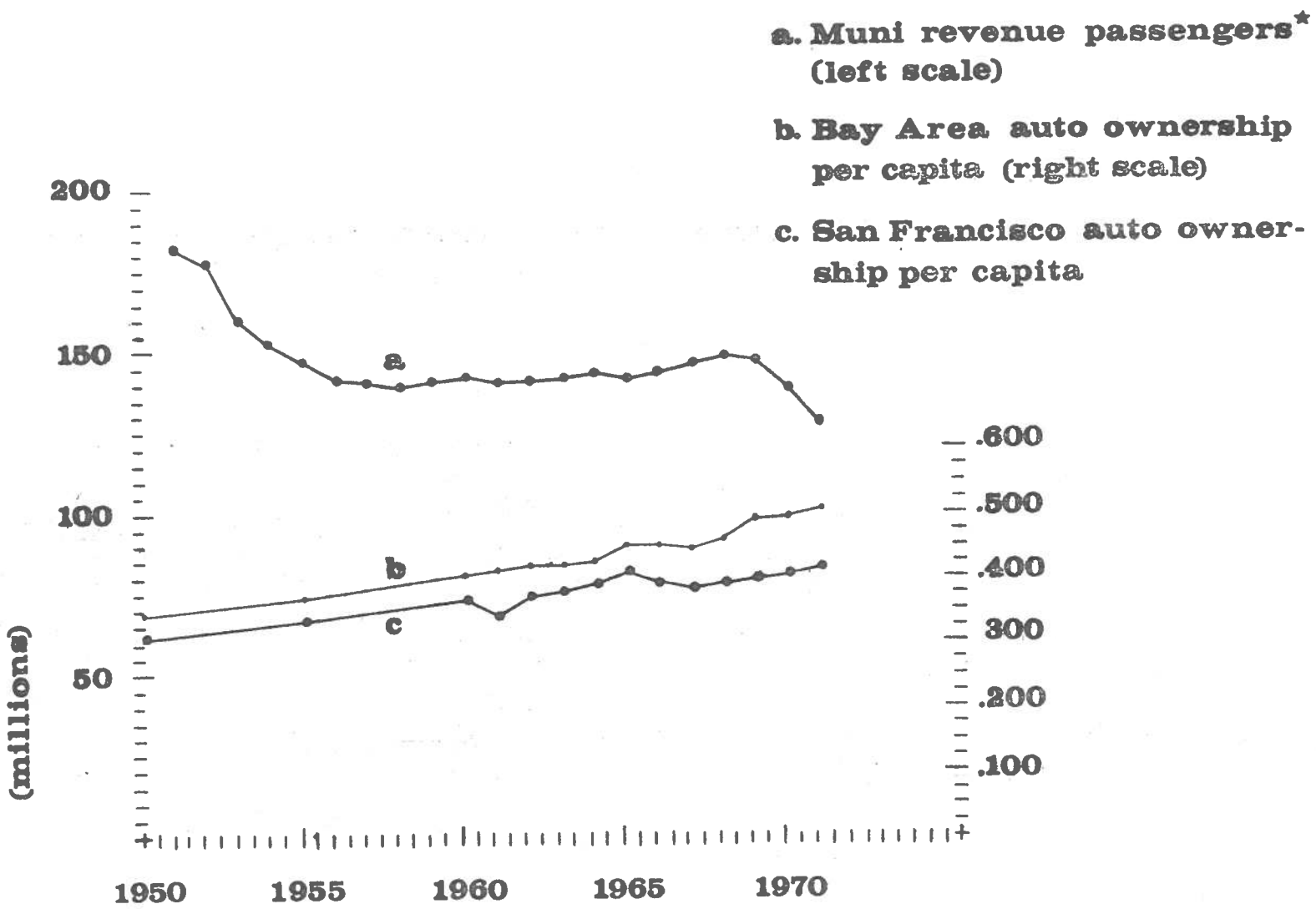
(f) % of workers who travelled to work by bus, streetcar, subway or elevated, 1970, from same source as (a).

citizen opposition to freeways.

San Francisco is unusual in several respects when its recent transit history (Figure 4) is compared to national trends. For one thing, Muni patronage actually increased from 1955 to 1968, showing a strong surge in the middle 1960's. Despite the 1969 fare increase and lower aggregate patronage, ridership per capita was slightly higher in 1970 (194) than it was in 1960 (192), accounted for in part by a loss of some 24,000 residents during the decade. Another feature of this city is that while Bay Area auto ownership has continued to rise along with national trends, San Francisco registrations are about the same as they were in 1965. Median income of families and unrelated individuals, in constant dollars, increased from 1960 to 1970, but auto ownership in the City has not kept pace with the increased incomes. Historical data do not reveal any tendency for San Francisco residents to abandon Muni in favor of automobiles.

San Francisco's divergence from Bay Area auto trends produces a conflict, unfortunately, for the City. As Figure 5 shows, cars entering and leaving the City have increased inexorably over the last decade, meaning that City streets are increasingly clogged with cars registered elsewhere. This has the effect of both reducing the service that Muni can offer and increasing the costs of the system.

Although patronage was rising for several years in the 1960's, the impending crisis could be seen in the cost-revenue pattern, which duplicated the national statistics. Figure 6 shows the mounting deficit. In response to this trend, the City raised fares by 5¢ in June of 1969 and another nickel a year later. Revenues from the higher fares more than offset loss of ridership, revealing a highly price-inelastic demand, but the drop in patronage appears ominous.



★ fiscal year

Figure 4. Muni patronage and Auto Ownership in San Francisco and the Bay Area, 1950-1971

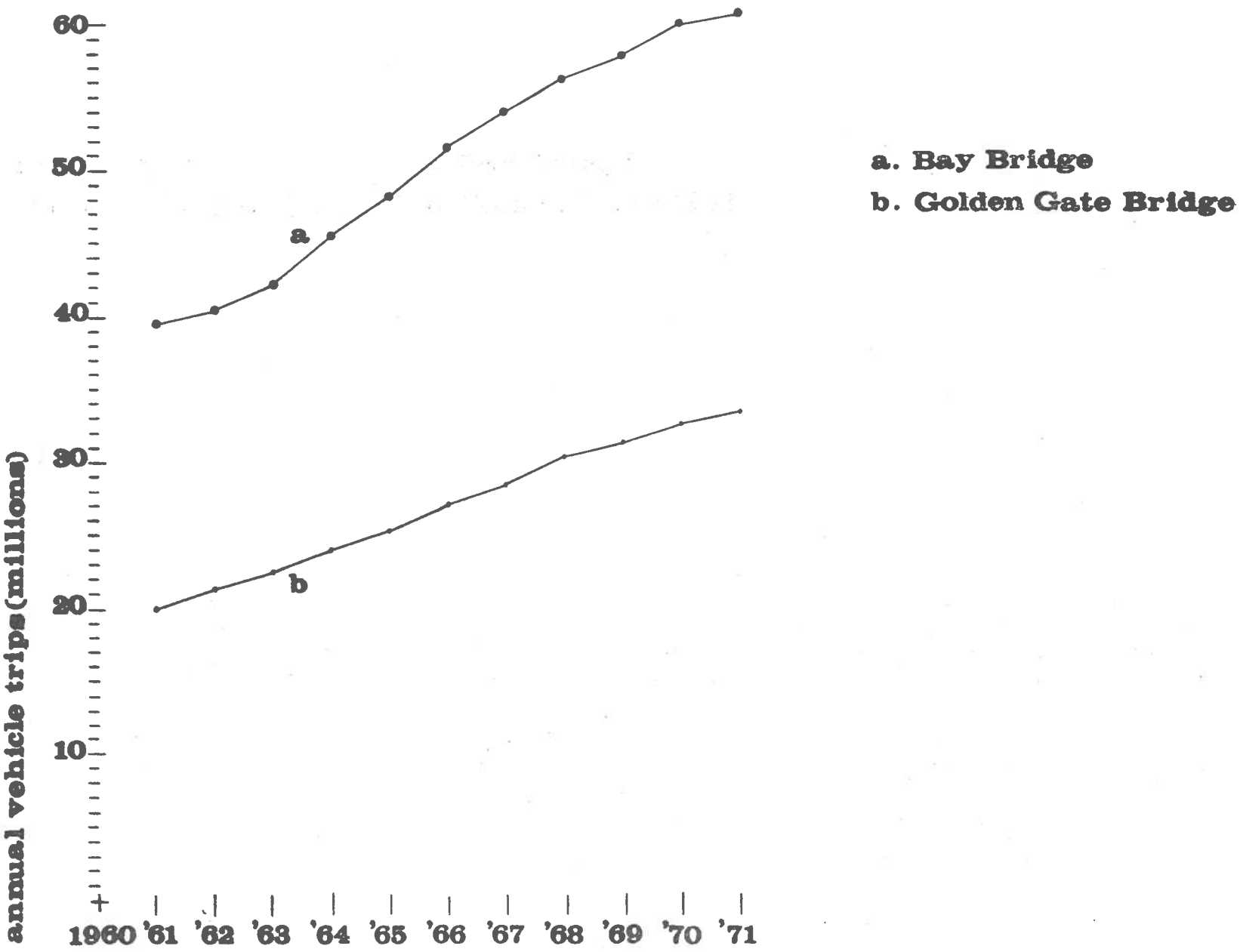


Figure 5. Bay Bridge and Golden Gate Bridge Traffic, 1960-1971

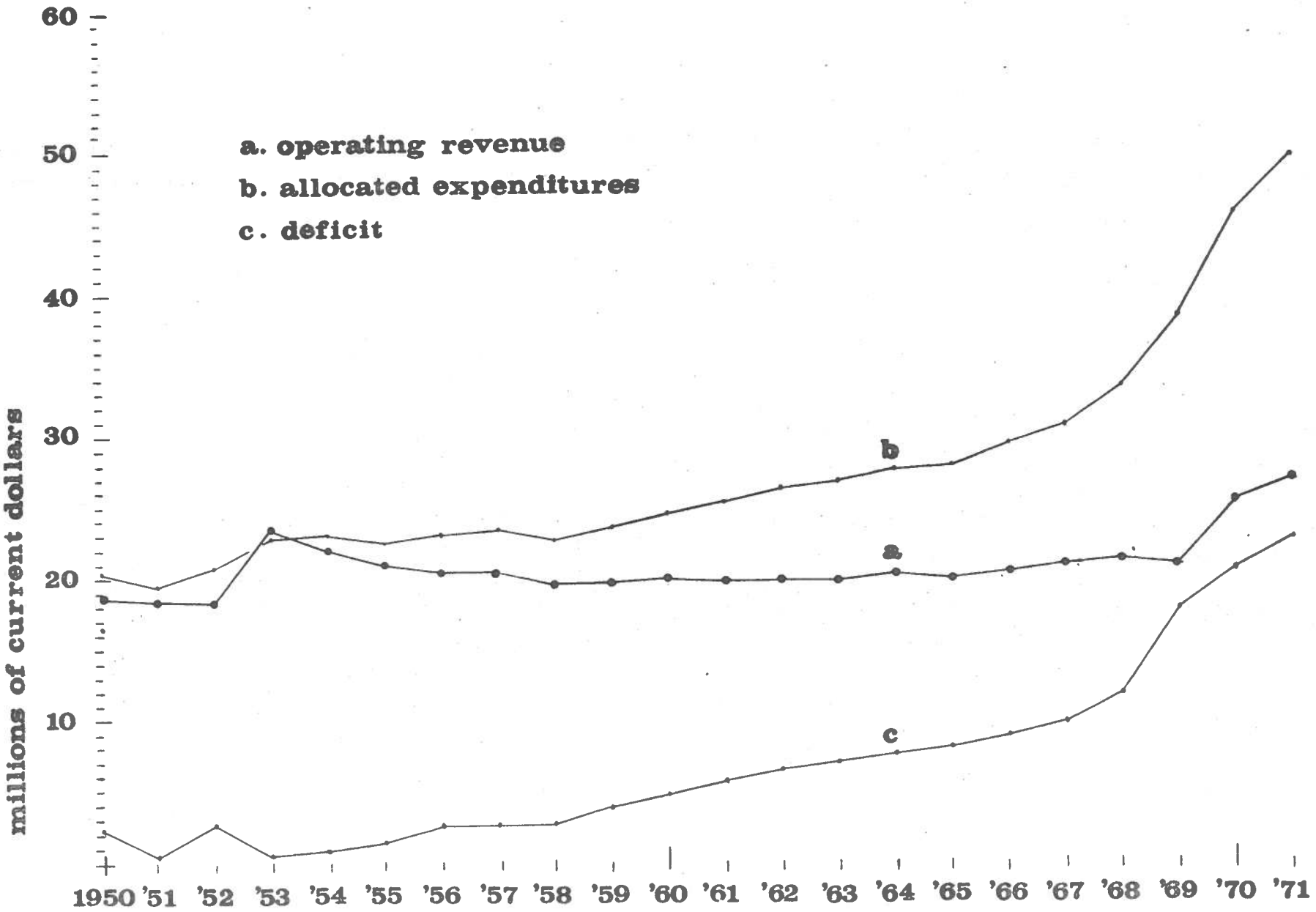


Figure 6. Muni Revenues, Expenditures, and Deficit, 1950-1971

III. COMPONENTS OF DEMAND

Price Elasticity of Demand

A discussion of demand for a public service can probably best begin by considering the relationship of quantity of service demanded to its price. In the context of public transportation, minor variations in demand can take place without a change in supply, simply because there is normally some excess capacity on any vehicle. The supply curve can be thought of as horizontal for some small region around the equilibrium point. Demand--the number of trips taken, or the number of revenue passengers--then adjusts to the given supply conditions, including price. A change in price, all other things being equal, then causes another level of equilibrium demand.

The measure of the responsiveness of quantity taken to price of the service is demand price elasticity, or the percent change in patronage over the percent change in price. Muni has changed its price explicitly three times in the last two decades: from 10¢ to 15¢ in 1953, to 20¢ in 1969, and to 25¢ in 1970. In addition, other prices have risen while the Muni fare has remained constant, making Muni fares relatively lower. By adjusting actual fares by the consumer price index, and matching these with patronage volumes, a series of points on a hypothetical demand schedule can be obtained, and price elasticities between different pairs computed.

It is well known that demand for public transit, given the existing market structure, is not very price elastic. The data presented in Tables 2 and 3 tend to confirm this; but they also explain, in a surprisingly clear fashion, fluctuations that have occurred in patronage and revenues. Correcting the three explicit price changes for inflation,

TABLE 2: MUNI PATRONAGE AND FARES 1963-1971

	1963	1964	1965	1966	1967	1968	1969	1970	1971
Revenue passengers[1] (millions)	141.4	142.7	141.7	144.5	147.7	148.7	146.3	138.7	129.0
Money fare (cents)	15	15	15	15	15	15	15	20	25
Consumer price index[2] (San Francisco)	91.5	92.9	94.7	97.1	100.0	104.5	110.2	115.8	120.2
Adjusted fare (cents)	16.4	16.1	15.8	15.4	15.0	14.3	13.6	17.3	20.8

KEY

1 Muni Annual Report; fiscal year figures have been used in order to coincide with fare changes.

2 Bureau of Labor Statistics

TABLE 3: MUNI OWN-PRICE ELASTICITIES, BASED ON AGGREGATE PATRONAGE

Time period	Revenue passengers			Adjusted fare			Elasticity		
t_1 t_2	Q_1	Q_2	ΔQ	p_1	p_2	Δp	e_a	e_b	e_c
1952-53	178.1	160.7	-17.4	14.0	20.8	6.8	.20	.26	.33
1963-68	141.4	148.7	7.3	16.4	14.3	-2.1	.40	.37	.33
1963-69	141.4	146.3	4.9	16.4	13.6	-2.8	.20	.18	.16
1969-70	146.3	138.7	-7.6	13.6	17.3	3.7	.19	.22	.26
1970-71	138.7	129.0	-9.7	17.3	20.8	3.5	.34	.39	.45

Elasticity = $-\%\Delta Q / \%\Delta p$

e_a : percentages based on Q_1, p_1

e_b : percentages based on average of Q_1, Q_2 and average of p_1, p_2

e_c : percentages based on Q_2, p_2

the price elasticity varies from .19 to .45, depending in part on whether the midpoint or an endpoint is used as the basis for computing percentage changes. This elasticity is both very low and unexpectedly stable. Low or inelastic demand means that raising prices will result in a relatively small loss of customers, and hence will increase total revenues (an elasticity of 1.0 is neutral between elastic and inelastic). Nonetheless, the dramatic declines in patronage are largely due to increased fares. In addition, by taking the period of the middle 1960's, during which significant inflation occurred, the implied price elasticity is also roughly the same.* These points are shown in Figure 7, presenting a small but consistent portion of Muni's demand curve.

In correcting for inflation, it has implicitly been assumed that competing modes of transportation--primarily auto--have followed the general price index. While prices faced by auto users have not risen as fast as the costs of some services, auto operating costs have not lagged far behind, making Muni's fare appear relatively lower through time. Thus price, although not the major determinant of the size of Muni's ridership, is an important element affecting demand.

User Groups

Muni riders are a mixed group of people. Some are teenagers, some are workers, some are elderly; some ride because they are too poor to afford a car, while others ride because they live in luxury apartments readily accessible to the financial district via Muni. Different user characteristics mean that all users will not respond in the same way to changes in price or service quality, so information about the sizes and demand patterns of user groups is necessary in estimating

*The 15¢ fare in 1953 turns out to be the same in real terms as the 25¢ fare in 1971, i.e., Muni's price has stayed constant when controlled for inflation.

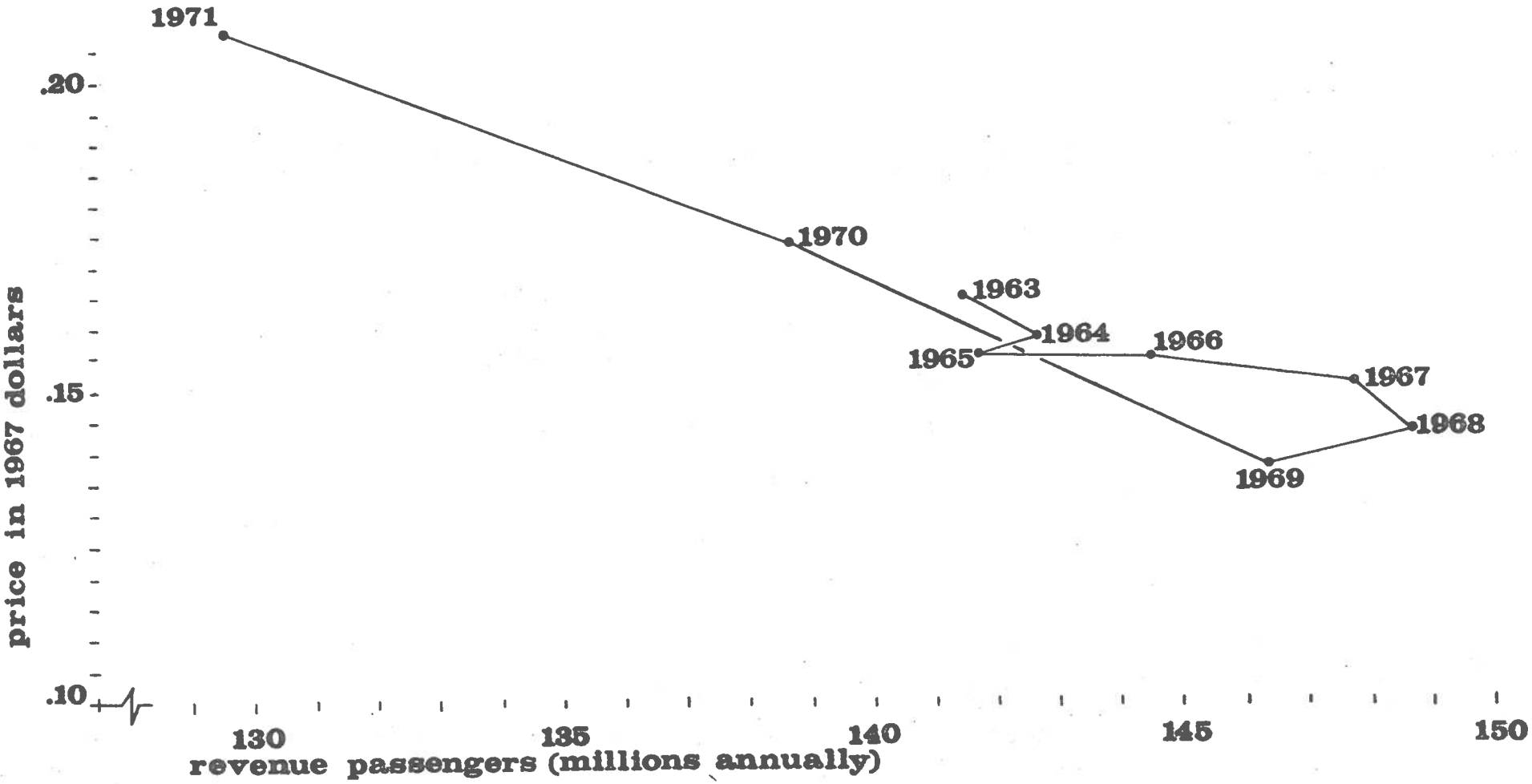


Figure 7. Partial Muni Demand Schedule

aggregate demand.

A special home interview survey was conducted in the summer of 1971, and access to this survey provided information unobtainable by other means.* Although the sample included respondents from five Bay Area counties, and the purpose of the survey was not limited to transportation demand estimation, enough detail was provided for San Francisco to make the information very valuable. Almost 400 City residents were interviewed.

Because the interviews were obtained at home, without respect to Muni ridership, patronage components must be reconstructed indirectly. This approach is probably preferrable anyway, since a population base is needed in the analysis of patronage rates, but it becomes somewhat more difficult to derive the actual mix of characteristics in Muni riders.

Table 4 presents two characteristics of San Francisco transit riders. The horizontal variable is the income of the household in which the respondent resides, divided into three classes by breaking at $4000 and $10,000. Rows in the table are ordered according to the degree of access to an automobile enjoyed by the respondent. Primary users are those with sole or first claim on a vehicle, secondary users are those who share or have residual use of a car, no vehicle comprises persons with drivers licenses but no vehicle, and non-drivers are persons not licensed to drive. An example in each category might be household head, housewife, poor adult, and elderly person, respectively.

In each cell of the table, the central entry is the percentage of respondents falling in the category, e.g., fourteen percent of the total were non-drivers living in households with income of less than $4000. The figure in the lower right of each cell is the percentage <u>of that cell</u> who said they rode transit daily, and the lower left

*Bay Area Survey No. 1, Survey Research Center, University of California, Berkeley.

TABLE 4: TRANSIT RIDERSHIP RATES FOR RESPONDENTS BY INCOME AND AUTOMOBILE ACCESS (S.F., 1971)

Auto Access	INCOME Low (0-4K)	Medium (4-10K)	High (10K+)	All Incomes
Primary users	33 6.7 30 4	27 16.5 1 26	16 23.6 3 13	22 46.8 6 16
Secondary users	100 1.5 0 100	42 3.0 33 8	62 4.0 0 62	62 8.5 12 50
Drivers without vehicle	50 1.0 50 0	53 4.2 6 47	100 .7 0 100	61 5.8 13 48
Non Drivers	54 14.0 11 43	62 18.5 7 55	77 6.5 15 61	63 38.9 10 53
All access levels	52 23.1 17 35	46 42.0 6 40	34 34.9 5 29	43 100.0 8 35

N=398

KEY:
(percentages)

daily & frequent Muni riders	respondents	daily Muni riders

percentage are those who said they rode transit frequently (more than once per week). The upper left percentage is the sum of the lower two.

From the table it is clear that Muni ridership is higher among those without access to autos, which states the obvious but sometimes overlooked concept: transit usage and auto ownership are related decisions, and at least partially substitutable. In addition, transit patronage increases with income for all groups other than those with primary access to an automobile. Because of the size of the latter group, its declining rate of transit ridership with income dominates the aggregate pattern. The implication is that people consume more transportation with rising income (since transportation is a complementary good), and they may do this by buying or using more autos, by shifting from non-ownership to ownership of an auto, or by using more public transportation. While auto is clearly the preferred mode among San Francisco residents, Muni is still heavily used by persons whose incomes are easily sufficient to buy a car, including those who do so. Another implication that can be extracted from these data is that at least some persons would ride transit more if they had more income, i.e., there is a latent demand for transit which is constrained by income. Whether this demand is tapped by income supplements or fare reductions, it is likely that some persons lack even a level of mobility that might be considered basic or minimally adequate.

In the sampling and interviewing, the household was the sampled unit and one person in the household was interviewed, but some information was collected for each member of the household sixteen years old or older. Respondents are thus a subset of the population of persons in sampled households. This relationship can be seen in Table 5. The central figure in each cell is the percentage of the total <u>persons</u>

TABLE 5: RESPONDENT RATES FOR PERSONS IN SAMPLE HOUSEHOLDS BY INCOME AND AUTOMOBILE ACCESS (S. F., 1971)

Auto Access	INCOME Low	Medium	High	Total
Primary users	4.1 [59]	11.0 [54]	16.2 [52]	31.4 [53]
Secondary users	0.9 [60]	4.8 [24]	5.7 [25]	11.5 [27]
Drivers without vehicle	11.0 [3]	13.6 [11]	5.0 [5]	29.8 [7]
Non Drivers	6.0 [83]	13.7 [49]	7.7 [31]	27.3 [51]
Total	22.1 [37]	43.2 [35]	34.7 [36]	100.0 [36]

N≈1108

KEY:
(percentages) persons

[respondents]

falling in the category, and the figure in brackets is the percentage of the cell total that were respondents. A high proportion of respondents, as in low income non-drivers, implies a predominance of small and single member households (probably elderly in this case). A low proportion of respondents, as is true for drivers without vehicles, means that the group is mainly found in larger households. While the variation in the respondent proportion across income groups is not particularly significant other than for non-drivers, the variation between persons according to automobile access is very large. It thus appears that several categories of persons with limited vehicle access are under-represented in the sample of respondents; for example, drivers without vehicles form almost 30% of the total persons 16 and over in sampled households, but only 6% of the respondents. These groups have high transit ridership rates, hence their importance to Muni is understated in the table of respondents.

On the other hand, primary vehicle users and poor non-drivers are over-represented in the respondents. Probably the former are more likely to be respondents when a household is interviewed, and the latter appear more often due to their small household size. Thus the table of persons more accurately describes the population of interest: namely, persons who might ride Muni.

Another subset of the persons in sampled households is household heads. While not the same individuals as the set of respondents, the set of respondents and the set of household heads overlaps a good deal and the two sets appear to have similar characteristics. Considering household heads specifically, however, focuses attention on the person who commonly has responsibility for the welfare of the household. Table 6 shows the distribution of household heads by income and age,

TABLE 6: AUTOMOBILE ACCESS OF HEADS OF HOUSEHOLDS

BY INCOME AND AGE (S. F., 1971)

AGE	INCOME Low (0-4k)	Medium (4-10k)	High (10k+)	All Incomes
Young (16-24)	2.2 [83]	9.9 [33]	2.6 [14]	14.6 [40]
Working age (25-64)	15.4 [52]	29.7 [47]	24.2 [8]	69.2 [33]
Old (65 +)	8.1 [63]	3.3 [77]	4.8 [8]	16.1 [50]
All ages	25.6 [57]	42.9 [45]	31.5 [8]	100.0 [37]

N≈273

KEY:

(percentages) heads of households

[no auto]
[non drivers]

with the percentage of each category totally lacking in access to an automobile (either no vehicle or non-driver). For working age heads, income seems to be an important determinant of auto access, with roughly half of the low and medium income heads not having access to a car. For medium income heads, age seems to have a strong effect on auto usage, with older heads enjoying substantially less auto access. Lowest access rates show up in the low income young, and low and medium income old. This suggests perhaps that either a car is necessary to get a job in San Francisco, or that only working people can afford cars, or both.

Labor force status as related to transit usage can be seen in Table 7. Daily transit riders are almost fully employed, and have a very high labor force participation rate, which is to say that the central component of Muni's patronage is working people. Frequent users enter the labor force in about the same proportion as the average of respondents, but are subject to a much higher unemployment rate. Whatever the cause of this disparity might be, Muni can only be passively involved, since transit patronage is an unlikely precondition for employment. Occasional users are similar to frequent users, with a slightly lower participation rate. Persons who seldom ride transit are a mixture of those who use automobiles for transportation and those who do not travel or work.

All the tabulations thus far have included only residents of the City and County of San Francisco, and to some extent this population differs in its characteristics from the population as a whole. It is from San Francisco residents, of course, that Muni must draw most of its patronage, but special attributes of this population ought to be identified if such attributes can be found. The distribution of persons and respondents in the San Francisco Bay Area is provided in Table 8, as a

TABLE 7: LABOR FORCE STATUS FOR RESPONDENTS BY FREQUENCY OF TRANSIT USAGE (S. F., 1971)

Frequency of transit usage	Employed	Unemployed [a]	Not in Labor Force	Total [b]
Daily	81.7	1.6 [1.9]	16.8	36.6
Frequent	49.6	13.4 [21.3]	37.0	8.1
Occasional	38.2	9.3 [19.6]	52.5	15.4
Seldom	53.1	2.8 [5.0]	34.8	39.9
Total	60.9	4.2	34.8	100.0

N=421

a [ ] indicates unemployment rate, i.e., excluding not in labor force.

b rows total to 100%; Total column adds to 100%, giving distribution across categories of transit usage

TABLE 8: PERCENTAGES OF PERSONS IN SAMPLED HOUSEHOLDS AND RESPONDENTS FOR THE FIVE-COUNTY SAN FRANCISCO BAY AREA BY INCOME AND AUTOMOBILE ACCESS (1971)

Auto Access	INCOME Low	Medium	High	Total
Primary users	3.6 [6.3]	11.1 [18.2]	29.9 [42.6]	44.6 [67.1]
Secondary users	.9 [1.2]	2.8 [2.7]	7.0 [7.0]	10.7 [10.9]
Drivers without vehicle	4.1 [.9]	6.0 [1.5]	4.2 [.4]	14.3 [2.8]
Non Drivers	3.0 [6.7]	9.2 [8.7]	18.2 [3.7]	30.4 [19.1]
Total	11.6 [15.1]	29.1 [31.1]	59.3 [53.7]	N= 5098 persons N= 1634 respondents

KEY:

(percentages) persons

[respondents]

basis for comparison. One notable difference is the lower affluence of the City relative to the Bay Area: 35% of the City respondents were in households earning over $10,000, whereas 54% of the Bay Area respondents fell in that category. Similarly, 47% of the San Francisco respondents had primary access to a car, while 67% of Bay Area residents enjoy that status. Not surprisingly, the City has a much higher proportion of low and moderate income persons who are drivers without access to a vehicle. Muni thus has, among its various qualities, a much larger captive ridership than could be obtained elsewhere in the Bay Area.

Using the information previously presented, estimates can be derived for the number and share of Muni users in each income-auto access category. Multiplying the percentage of regular riders from Table 4 by the percentage of persons 16 and over in each category, as found in Table 5, the first number in each cell of Table 9 is obtained. This is the percentage of the population 16 and over that both falls in the category and also rides Muni. The percentages sum to about 49%, indicating that almost half the City's population over 16 are regular Muni riders. The second number in each cell is the result of dividing the first by 49%, giving the share of Muni patronage coming from each category, combining in this way the relative size of the category and the rate of transit patronage. From this it can be seen that half of Muni's users come from the four categories of low and moderate income non-drivers and drivers without cars. The other half are reasonably well off, have autos, or both.

By making a few additional assumptions, patronage shares can be translated into rider equivalents or daily patronage volumes. If a daily rider makes five round trips per week for fifty weeks, his contribution to annual revenue patronage is 500 trips. Over 81% of the regular

TABLE 9: COMPONENTS OF TRANSIT DEMAND
BY INCOME AND AUTOMOBILE ACCESS (S. F., 1971)

Auto Access (%)	INCOME Low	Medium	High	Total
Primary users	1.35 2.77 8,000	2.97 6.09 17,000	2.59 5.31 15,000	6.91 14.18 40,000
Secondary users	.90 1.85 5,000	2.02 4.14 12,000	3.53 7.24 20,000	6.45 13.23 37,000
Drivers without vehicles	5.50 11.28 31,000	7.21 14.79 41,000	5.00 10.26 29,000	17.71 36.34 101,000
Non drivers	3.24 6.65 19,000	8.49 17.42 49,000	5.93 12.17 34,000	17.66 36.24 101,000
Total	10.99 22.55 63,000	20.69 42.45 119,000	17.05 34.98 98,000	48.74 100.00 279,000

KEY:

rider equivalents/population $\geq$ 16 (x 100)

% of Muni rider equivalents

rider equivalents/category

users are daily users, and it has been assumed that each frequent user contributes one daily rider equivalent by filling in the slack with occasional, seldom, and non-resident users. From the 1970 Census of Population, the population of San Francisco sixteen and over is 573,361. Multiplying this number by the first number in each cell of Table 9 yields the third number in the cell, which is an estimate of the number of daily rider equivalents from the particular category. Summing these and multiplying by 500 yields estimated annual Revenue Passengers of 140 million, reasonably close to the reported figures of 139 and 129 million for 1970 and 1971, respectively.

From an analysis of survey data and some helpful assumptions, it has been possible to reconstruct indirectly the number of riders in each of several population categories. Other categories could have been chosen besides income and automobile access, but these two variables seemed to represent the important variation in patronage across population groups in the most efficient two-dimensional form. The individual categories are still not homogeneous, of course, but they are workable for further analysis of the changes in demand that can be expected from changes in service characteristics. This will be completed in the next section.

IV. IMPACTS OF SERVICE REDUCTION

As has been known for some time, the urban system is complex. Changes in one place or one sector have effects in many places and many sectors, often in turn affecting the initiator of the change. Unfortunately, awareness of the complexity has not led to an understanding of structural interrelationships, nor has the complexity been adequately considered in public policy decisions. The case at hand is a typical example.

Since the impacts of a public policy decision often rebound and echo through the urban system quite extensively, it is difficult to know which effects are the most important and when they have come to an end. The approach taken here will be to start with the most specific, immediate, and best understood effects and proceed gradually to more global and harder-to-measure impacts.

The Municipal Railway

It must be assumed that Muni management expects to reduce costs by cutting service more than it will reduce revenues; presumably, the attempt is to eliminate unprofitable lines and drop some off-peak and weekend service. The criterion of profitability will be evaluated in more depth at a late stage, but there is reason to doubt whether even this simple standard is met by cutting back Muni service at this time.

A reduction in output (transportation services) will lead to an increase in profits only if the elasticity of demand for the output is less than one, i.e., a ten percent reduction in service will lead to a less than ten percent reduction in revenues. Output in the Muni case is awkward to measure, but some combination of headways, extent of coverage in time and space, and seat miles offered, might be sufficient.

As a temporary expedient, we will assume that the reduction in quality of service is proportionate to the reduction in costs. In fact, a ten percent cost reduction might reduce real quality by twenty percent or only five percent, but, lacking better information, we cannot say which. The other component of elasticity is then the percent change in paying customers, or annual revenue passengers.

Users of transit prior to the cutbacks can adjust their behavior in response to the service changes in a number of ways. They can spend more time in making the trip, shift the trip to a less preferred time, or use a detailed Muni time schedule, all of which increase the real cost to the user. Some persons will forego some trips entirely rather than face the extra costs. Users who have a readily available and competitive alternative--a car, most likely--will shift some or all of their trips to the other mode. Transit users with a high need for trips and no competitive alternatives have an inelastic demand (less than one) and are, in effect, captive riders. Users with low need for particular trips or good alternatives have an elastic demand, and will be more likely to stop riding Muni.

Referring to Table 8 again, the four categories of low and moderate income persons without auto access are the source of the most inelastic demand. Low income non-drivers have almost no choice and time is probably relatively cheap to them. Old people don't ride at night, anyway. Low income drivers without vehicles also have little choice. Moderate income non-drivers are likely to be reasonably well served by peak hour radial routes that are cut back the least, and they may tolerate some reduction in service; the same is probable for moderate income drivers without vehicles. In sum, Muni will lose fewer revenues from these customers than it will save in operating costs.

The remaining categories in the table can be expected to have demand elasticities in excess of one. Low income drivers with primary or secondary auto access are likely to switch because Muni service to non-central destinations would become intolerably slow. Moderate and higher income users with access to autos are very likely to use them because they value their own time more highly and they will not bother to wait for transit as headways go much above five minutes. High income persons without vehicles, and some moderate income persons too, will acquire cars and use them instead of transit, withdrawing substantial blocks of patronage. The net result is that patronage losses from Muni service reductions are likely to affect revenues by at least as much as the decrease in costs.

Other studies have found that transit patronage is much more sensitive to changes in quality of service--both in comfort and in frequency of service--than to changes in fares.* While the applicability of these studies may be questioned on a number of grounds, the consensus is clear that service elasticities in the aggregate are higher than price elasticities.

The Transportation System

It is in the nature of a complex system that it is adaptive, which is one reason why changes generated in one part are felt in other parts. In reducing service, Muni will lose a number of customers, many of whom will still make desired trips by an alternative mode. Some new trips may be on foot, some may be by bicycle, some by motorcycle, but the major shift will be from transit to automobile. If ten percent of Muni's

*see Meyer, Kain and Wohl [4], Moses and Williamson [5], and Domencich and Kraft [1].

passengers change to autos, over 20,000 additional vehicles would take to the City streets each day, at current load factors. If fifty percent of these trips are to the downtown area, this means an addition of roughly twenty-five cars per square block, or six per block face. A single traffic lane can carry about fifteen cars per block at the maximum.

Little doubt can exist that this situation would be intolerable. Not only would congestion approach saturation limits, but Muni buses would be subject to the same congestion and delay, thereby further reducing the quality of its service. Short run solutions would require such devices as very high parking taxes and charges, or physical limitations on the number of vehicles entering downtown, in order to enforce car pooling and spread out the peak periods. Longer range solutions would involve extensive expressway construction and the decentralization of employment to the suburbs. Many cities have accomplished just that.

Another impact on the transportation system would be felt by BART. In order to be successful, a regional rail transit system needs an extensive and reliable set of feeder subsystems that will allow easy access to and from the rapid transit stops. Muni is an important component of BART's feeder network, and the loss of feeder service would seriously jeopardize BART's viability.

The City Fisc

The Board of Supervisors of the City and County of San Francisco might wish to review a decision by Muni to curtail service on the rationale that the net effects of such a decision on the City treasury might be negative, even if it made money for Muni in the short run. An apparent paradox of this sort might arise because other city services would be

required to compensate for or adjust to the withdrawal of transit services. In other words, it may be cheaper for the City to subsidize Muni than to pay for the alternatives.

At present, the City budget supports services to automobile users by at least $13 million more than is collected in any form of revenue that might be labelled an automobile user charge.* The deficit is made up out of property taxes, which is a source of general revenues, and hence the deficit can be properly be regarded as a subsidy to auto users. Increasing the volume of traffic on City streets will certainly enlarge this deficit substantially, particularly since such costs as traffic control, accident and emergency services, auto-related court litigation, and impairment of services such as firefighting and transportation all increase more than proportionately at high levels of congestion. While the Muni deficit is already running over $20 million, it is very unlikely that cost savings from Muni cutbacks would offset increased costs of other kinds of services, particularly those to automobiles. Property taxpayers, then, are better off paying for Muni even if they never ride it.

Another effect on the City budget, of unknown magnitude, would be the burden of public assistance payments to persons who need the existing Muni service in order to maintain employment. It is likely that some proportion of the captive ridership would be unable to retain their jobs after the cutbacks, or would lack sufficient incentive to do so.

Jobs

It has been mentioned that some Muni riders would probably lose jobs if service were reduced; because of spatial segregation patterns in the City, many of these jobs might go unfilled or become underutilized.

*This figure is taken from Lee [3], p. 31.

Another and more important loss of employment would be in personnel working for Muni itself. Since the largest cost component in providing transit service is labor, cost reductions would be achieved primarily by employing them fewer hours. In the long run and in a global sense, many of these jobs could be made up in the form of gas station operators and attendants, mechanics, automobile construction workers, auto insurance adjusters, etc., but a large share of them would not be in the City of San Francisco. Thus, the City would lose on a regional basis. Muni drivers would need to move to Detroit if they still wished to work, for example.

Efficiency

Efficiency in economic terms is how well the system works as a whole. If the same transportation could be provided at less cost by changing the mix of modes to, say, ninety percent automobile, then the efficiency goal would be served by making the shift. As it happens, the optimal mix in any actual context cannot presently be determined; even if the optimum were known, it would require a centrally planned economy to implement the decision. For these reasons, we rely on a decentralized market-like economic system to achieve efficient resource allocation.

While many incentives are available to the public sector for influencing private market decisions, these have been incorrectly applied, for the most part, in transportation. The subsidized provision of services to auto users, for example, encourages over-usage of private autos, and the structure of the Highway Trust Fund encourages over-building of highways. Mostly, these decisions were made without considering their impact on transportation as a whole, but the net result is a quasi-market system that is highly distorted.

A concept gradually achieving acceptance in the public sector is that market distortions in one area should be balanced by compensating distortions in other areas, particularly those in direct competition with each other. This concept is often hard to apply in practice, but in transportation the prescription is fairly clear: efficiency is obtained by balancing underpricing (subsidy) in one mode with equivalent subsidies to other modes. Without dealing with the questions of how to measure the magnitude of the subsidies or what is equivalent underpricing, it is true that <u>given</u> the large subsidy to automobiles in San Francisco, Muni should also be heavily subsidized. It is incorrect to hold the criterion of profitability against Muni, since aggregate efficiency requires that it run at a loss. As long as one mode is subsidized, all modes should be subsidized. On this basis, Muni fares are probably too high.

It should be borne in mind that the issue is not whether to do away with Muni or automobiles, but whether the City should move from a transportation system that is roughly seventy percent dependent upon autos to one which is sixty percent or eighty percent. The change under consideration is a marginal one, and does not require massive shifts in employment or investment, but policy established now will have important repercussions in future years. Correcting the market distortions would permit information about actual market behavior to be used to guide investment in additional facilities. While information from current market behavior is difficult to interpret, what evidence is available strongly suggests that efficiency would not be served by increasing the share of auto travel in San Francisco's transportation mix.

Equity

The other side of the coin from efficiency is the question of who receives the benefits of a social program or a social system, as compared to who bears the costs. At present, it appears that the equity movement in this country is approximately neutral in the aggregate, i.e., the distribution of income is remaining about the same from decade to decade.

Independent of the existing distribution of income, one can ask whether a particular program will have a favorable impact (redistribute from rich to poor) or an unfavorable one. Reduction in Muni services would appear to have an unfavorable equity impact, in that those who would be hurt the most would be the low income captive riders, and those who would benefit the most would be middle and higher income auto users. Low income renters would be contributing to property taxes that would be used more to provide services to auto users and less for transit service. Since sources for general city revenues, such as property or sales taxes , tend to be regressive, user charges are preferred on equity grounds where possible, unless the users are predominantly low income.

Public Preference

Although not precisely in the category of an impact, it may be useful to consider whether there are any non-market signals that would appear to favor transit over autos or vice-versa. When dissatisfactions arise with the economic system, the legal system, or other aspects of society, they become manifest in the political arena. The individual preference for autos is strong, although not as strong in San Francisco as in other parts of the Bay Area or in other cities. Many poor people in the City, however, would rather own and use a car if they could afford it. On the other hand, social attitudes in the City are strongly anti-

automobile. The first major freeway revolt in the country centered on the Embarcadero in 1958; the City provided a healthy majority on the BART bond issue vote in 1962; a major citizen effort prevented a freeway from going through Golden Gate Park; at least part of the opposition to high rise buildings is on traffic generation grounds; City voters polled three to one against the construction of the proposed Southern Crossing; and Muni cutbacks proposed in the winter of 1972 were prevented largely by citizen action. These activities were often accomplished at substantial cost in terms of time and effort on the part of unpaid private citizens, while the opposition came from officials or paid private parties representing professional or corporate interests.

The apparent inconsistency of individual love and collective hatred is not particularly obscure. Since existing market distortions and incentives, along with prior investment, all tend to favor the auto as the dominant form of urban transportation, it is perfectly rational for individuals to prefer and use their own cars. At the same time, the severe social costs in noise, air pollution, neighborhood disruption, congestion, and inefficient land utilization are also apparent. In effect, San Francisco residents are saying that they will go along with less auto usage as long as everyone else does the same and adequate alternatives are provided.

In summary, it is likely that cost savings to Muni resulting from service cutbacks will be more than offset by revenue losses due to declining patronage plus increased costs of services to automobile users, paid for by City taxpayers. Negative external effects will be increased and transportation as a whole in the City will suffer heavily. There most probably will be a net loss of jobs and income, and the distribution of income will also be made worse. In short, both efficiency and equity would lose if Muni services deteriorate further.

V. CONCLUSIONS

In a perfectly functioning market, profitability would be a good criterion to apply to fares and service levels and also to provide a guide for investment. Because of the subsidies to autos, the external costs of the automobile system, and the extensive public investment in highways that has tended to reinforce the auto-oriented transportation pattern, the market is highly distorted. In this instance, different kinds of performance criteria are required.

The objective should be a balanced transportation system, which implies that it ought to be both efficient, in that it transports people where they want to go at least cost, and equitable, in that all persons enjoy the mobility to which they are reasonably entitled. Lacking an adequate market for urban transportation, planners and managers should seek out both better information and different instruments for achieving transportation goals. Pricing can be used as a means of allocating scarce transportation resources and also for obtaining needed information, if this information is properly interpreted. Investment in new facilities and capital equipment should reflect the aim of a balanced system rather than institutional biases, as should service levels.

Transportation policy need not operate on a particular mode directly. If the goal is to increase the market share carried by public transit, then instruments might include improved quality of service on transit, lower fares, increased parking costs for autos, higher bridge tolls, and lower investment in highway facilities. It makes little sense, for example, to try to encourage transit ridership when auto ridership is already being strongly encouraged. The best way to reduce the Muni deficit would be to increase the price faced by auto users.

Failing in that, a second-best solution would be to underprice Muni to a degree comparable to other modes. Some experts claim that the correct rule to follow is to make the subsidies per ride equal on all competing modes.* A fare of 10¢ is a plausible starting point, at least during off-peak periods; from the demand curve portrayed in Figure 7, such a fare (about 8¢ in 1967 dollars) would lead to roughly 155 million revenue passengers per year. Muni's total deficit would, of course, be increased.

With labor costs pushing transit deficits up dramatically, cities need to face their transportation problems in a comprehensive way or abandon public transportation by default. From the somewhat sketchy data presented above, this latter course clearly would be very destructive for San Francisco. On the other hand, if Muni stays in business it will operate at bigger and bigger losses. Handouts from the Federal Government will only delay the inevitable reckoning. There does not seem to be any way to avoid facing some hard decisions in the near future.

A problem of critical importance in urban transportation is the organizational structure of transit management within city government. In San Francisco, the Muni is one of several agencies under the San Francisco Public Utilities Commission, which in turn answers to the Board of Supervisors. Any operation under the PUC which shows a loss must have its budget approved, line by line, by both the PUC and the Board, the result being that Muni has almost no control over how its own budget is allocated. In practice, unless expenditures are essential for operations or create more revenues than costs, they are not approved. Transit promotion and maintenance suffer as a consequence.

Even when Muni decisions are reviewed by the Board of Supervisors,

*see Fitch [2] p.

the interests of the transportation system or the community as a whole are seldom of major importance. Not surprisingly, political considerations dominate, such as the consequences of increasing the property tax rate versus opposing pay increases for drivers. Thus, the wrong criteria are applied at each decision point: short-run profitability (loss minimization) is used by Muni, and political effects are considered by the Board. Neither efficiency nor equity get a hearing.

One approach would be to shelter Muni from the abuses of political ambitions while still assuring some responsiveness to community interests, and at the same time encouraging the Muni organization to behave in a socially productive way. This could be accomplished by forming a transportation department having jurisdiction over all forms of transportation, including automobile. Traffic control, street maintenance, traffic courts, bus operations, etc., could remain under the administrative control of existing agencies as long as budgetary control were exercised by the transportation department. Profitability would then be a reasonable criterion to use if sufficient value were attached to non-price externalities such as noise, pollution, disruption and congestion. An alternative, and perhaps more realistic, organizational change would be to assign Muni the goal of maximizing patronage or trip share within the constraint of a maximum subsidy per trip. In any event, the situation which now prevails is not likely to lead to a balanced transportation system for San Francisco.

APPENDIX A: TRANSIT TRIPS AND AUTO OWNERSHIP IN U.S., 1900-1970

YEAR	TRANSIT (millions of passengers annually) TOTAL (1a)	REVENUE (1b)	BUS ONLY (1c)	MOTOR VEHICLE REGISTRATION (1d)
1900				.008
1905				.079
1910				469
1915				2,491
1920		12,500		9,239
1921		11,900		
1922	15,735	12,600	404	
1923	16,311	13,200	616	
1924	16,301	13,200	989	
1925	16,651	13,400	1,484	20,069
1926	17,234	13,885	2,009	22,200
1927	17,201	13,873	2,300	23,303
1928	16,989	13,629	2,468	24,689
1929	16,985	13,604	2,622	26,705
1930	15,567	12,528	2,479	26,750
1931	13,924	11,207	2,313	26,094
1932	12,025	9,650	2,136	24,391
1933	11,327	9,106	2,075	24,159
1934	12,038	9,672	2,370	25,262
1935	12,226	9,782	2,618	26,546

APPENDIX A: TRANSIT TRIPS AND AUTO OWNERSHIP IN U.S., 1900-1970

(continued)

YEAR	TRANSIT (millions of passengers annually) TOTAL (1a)	REVENUE (1b)	BUS ONLY (1c)	MOTOR VEHICLE REGISTRATION (1d)
1936	13,146	10,512	3,179	28,507
1937	13,246	10,436	3,489	30,059
1938	12,645	9,985	3,475	29,814
1939	12,837	10,252	3,853	31,010
1940	13,098	10,504	4,239	32,453
1941	14,085	11,302	4,931	34,894
1942	18,000	14,501	7,245	33,004
1943	22,000	17,918	9,019	30,888
1944	23,017	18,735	9,646	30,479
1945	23,254	18,982	9,886	31,035
1946	23,372	19,119	10,199	34,373
1947	22,540	18,287	10,332	37,841
1948	21,368	17,312	10,728	41,086
1949	19,008	15,251	10,162	44,690
1950	17,246	13,845	9,420	49,162
1951	16,125	12,881	9,202	51,913
1952	15,119	12,022	8,878	53,262
1953	13,902	11,036	8,260	56,217
1954	12,392	9,858	7,624	58,505
1955	11,529	9,189	7,250	62,289

APPENDIX A: TRANSIT TRIPS AND AUTO OWNERSHIP IN U.S., 1900-1970
(continued)

YEAR	TRANSIT (millions of passengers annually) TOTAL (1a)	REVENUE (1b)	BUS ONLY (1c)	MOTOR VEHICLE REGISTRATION (1d)
1956	10,941	8,756	7,043	65,148
1957	10,389	8,338	6,874	67,125
1958	9,732	7,778	6,502	68,297
1959	9,557	7,650	6,459	71,354
1960	9,395	7,521	6,425	73,868
1961	8,883	7,242	5,993	75,958
1962	8,695	7,122	5,865	79,173
1963	8,400	6,915	5,822	82,714
1964	8,328	6,854	5,813	86,301
1965	8,253	6,798	5,814	90,361
1966	8,083	6,671	5,764	94,177
1967	8,019	6,616	5,723	96,945
1968	8,019	6,491	5,610	102,213
1969	7,803	6,310	5,375	105,098
1970	7,332	5,932	5,034	108,435
1971	6,847	5,497	4,699	112,010

Source:

Transit Fact Book

Automobiles of America, Automobile Manufacturers Association, 1968.

APPENDIX B: TRANSIT REVENUES AND EXPENDITURES IN THE U.S. 1925-1970

(billions of current dollars)

YEAR	(2a) PASSENGER REVENUES	(2b) OPERATING EXPENSES
1925		
1926	978.5	
1927	976.8	
1928	965.8	
1929	978.3	
1930	899.1	
1931	790.3	
1932	656.6	
1933	606.3	
1934	637.4	
1935	642.3	534.9
1936	685.5	
1937	689.7	
1938	662.9	
1939	681.5	
1940	701.5	598.0
1941	758.8	644.3
1942	979.1	769.4
1943	1,235.6	933.0
1944	1,296.9	1,012.1

APPENDIX B: TRANSIT REVENUES AND EXPENDITURES IN THE U.S. 1925-1970

(continued)

YEAR	(2a) PASSENGER REVENUES	(2b) OPERATING EXPENSES
1945	1,313.7	1,067.1
1946	1,331.5	1,129.4
1947	1,324.2	1,238.7
1948	1,416.8	1,343.7
1949	1,419.7	1,338.3
1950	1,386.8	1,296.7
1951	1,411.6	1,331.3
1952	1,438.1	1,369.6
1953	1,448.6	1,370.7
1954	1,410.0	1,337.3
1955	1,358.9	1,277.4
1956	1,351.1	1,271.4
1957	1,319.8	1,261.6
1958	1,282.2	1,265.9
1959	1,308.3	1,266.1
1960	1,334.9	1,289.9
1961	1,320.9	1,295.8
1962	1,330.2	1,306.0
1963	1,316.3	1,312.6
1964	1,326.0	1,342.6

APPENDIX B: TRANSIT REVENUES AND EXPENDITURES IN THE U.S. 1925-1970

(continued)

YEAR	(2a) PASSENGER REVENUES	(2b) OPERATING EXPENSES
1965	1,340.1	1,373.8
1966	1,385.4	1,423.8
1967	1,457.4	1,530.9
1968	1,470.2	1,625.3
1969	1,554.7	1,745.0
1970	1,639.1	1,891.7
1971	1,661.9	2,040.5

Source:

Transit Fact Book

Automobiles of America, Automobile Manufacturers Association, 1968.

APPENDIX C: TOTAL REVENUE PASSENGERS IN CITIES OVER 500,000, 1935-1971

(billions)

YEAR	(3a) TOTAL REVENUE PASSENGERS	(3b) PASSENGERS IN CITIES OVER 500,000
1935	9,782	4,050
1936	10,512	
1937	10,436	
1938	9,985	
1939	10,254	
1940	10,504	4,305
1945	18,982	6,969
1950	13,845	5,207
1955	9,189	3,478
1956	8,756	3,368
1957	8,338	3,274
1958	7,778	3,095
1959	7,650	3,057
1960	7,521	2,997
1961	7,242	3,089
1962	7,122	3,029
1963	6,915	2,990
1964	6,854	2,991
1965	6,798	3,000
1966	6,671	3,003

APPENDIX C: TOTAL REVENUE PASSENGERS IN CITIES OVER 500,000, 1935-1971

(continued)

YEAR	(3a) TOTAL REVENUE PASSENGERS	(3b) PASSENGERS IN CITIES OVER 500,000
1967	6,616	2,945
1968	6,491	2,886
1969	6,310	2,787
1970	5,932	2,610
1971	5,497	2,399

Source:

Transit Fact Book

APPENDIX C: TOTAL REVENUE PASSENGERS IN CITIES OVER 500,000, 1935-1971

(continued)

YEAR	(3a) TOTAL REVENUE PASSENGERS	(3b) PASSENGERS IN CITIES OVER 500,000
1967	6,616	2,945
1968	6,491	2,886
1969	6,310	2,787
1970	5,932	2,610
1971	5,497	2,399

Source:

Transit Fact Book

APPENDIX D: MUNI PATRONAGE AND AUTO OWNERSHIP IN SAN FRANCISCO AND BAY AREA, 1950-1971

YEAR	(4a) MUNI REVENUE PASSENGERS (millions)	(4b) BAY AREA AUTO OWNERSHIP PER 1000 POPULATION	(4c) SAN FRANCISCO AUTO OWNERSHIP PER 1000 POPULATION
1950		349	306
1951	183		
1952	178		
1953	161		
1954	153		
1955	148	374	333
1956	143		
1957	142		
1958	140		
1959	141		
1960	142	409	358
1961	141	407	348
1962	142	430	373
1963	141	432	378
1964	143	436	384
1965	142	452	405
1966	144	450	397
1967	148	448	388

APPENDIX D: MUNI PATRONAGE AND AUTO OWNERSHIP
IN SAN FRANCISCO AND BAY AREA, 1950-1971
(continued)

YEAR	(4a) MUNI REVENUE PASSENGERS (millions)	(4b) BAY AREA AUTO OWNERSHIP PER 1000 POPULATION	(4c) SAN FRANCISCO AUTO OWNERSHIP PER 1000 POPULATION
1968	149	468	392
1969	146	483	398
1970	139	488	403
1971	129	501	413

Source:

(a) San Francisco Municipal Railway, Annual Report

(b) Research Supplement, March 1972, Bay Area Council

(c) California County Fact Book, County Supervisors Association

APPENDIX E: BAY BRIDGE AND GOLDEN GATE BRIDGE TRAFFIC 1960-1971

(millions of vehicle trips annually)

YEAR	(5a) BAY BRIDGE	(5b) GOLDEN GATE BRIDGE
1960		
1961	39.8	20.0
1962	40.5	21.4
1963	42.1	22.5
1964	45.6	24.0
1965	48.1	25.3
1966	51.4	27.0
1967	54.0	28.4
1968	56.3	30.3
1969	57.8	31.3
1970	60.0	32.7
1971	61.3	33.5

Source:

Research Supplement, March 1972, Bay Area Council.

APPENDIX F: MUNI REVENUES, EXPENDITURES AND DEFICIT, 1950-1971

(millions of current dollars)

YEAR	(6a) OPERATING REVENUES	(6b) ALLOCATED EXPENDITURES	(6c) DEFICIT	
1970-71	26.880	49.674	22.794	----*fare change
1969-70	25.360	45.959	20.599	----*fare change
1968-69	20.944	38.352	17.409	
1967-68	21.242	33.195	11.954	
1966-67	20.930	30.612	9.682	
1965-66	20.351	29.256	8.905	
1964-65	19.905	27.896	7.992	
1963-64	20.054	27.331	7.277	
1962-63	19.891	26.709	6.818	
1961-62	19.900	26.043	6.143	
1960-61	19.826	25.150	5.324	
1959-60	19.941	24.567	4.626	
1958-59	19.818	23.485	3.666	
1957-58	19.842	22.714	2.872	
1956-57	20.269	23.231	2.962	
1955-56	20.492	23.033	2.541	
1954-55	21.112	22.456	1.343	
1953-54	22.173	23.065	.892	
1952-53	23.520	23.164	.355	----*fare change

APPENDIX F: MUNI REVENUES, EXPENDITURES AND DEFICIT, 1950-1971

(continued)

	(millions of current dollars)		
YEAR	(6a) OPERATING REVENUES	(6b) ALLOCATED EXPENDITURES	(6c) DEFICIT
1951-52	18.242	20.861	2.619
1950-51	18.029	19.493	.355
1949-50	18.575	20.863	2.288

Source:

San Francisco Municipal Railway, Annual Report

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