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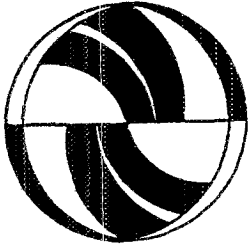
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UCTC
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The University of California
Transportation Center

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**The University of California
Transportation Center**

The University of California Transportation Center (UCTC) is one of ten regional units mandated by Congress and established in Fall 1988 to support research, education, and training in surface transportation. The UC Center serves federal Region IX and is supported by matching grants from the U.S. Department of Transportation, the California Department of Transportation (Caltrans), and the University.

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UNLIMITED ACCESS

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by

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For Comments Only

Abstract

“Unlimited Access” is the name that several universities have given to programs where their student identification cards serve as transit passes. University transit pass programs increase mobility and reduce vehicle trips. They increase mobility by giving students free access to all public transportation. They reduce vehicle trips by shifting some travelers from cars to public transportation. A survey of American universities revealed that the transit pass programs have many benefits but a low cost. The transit pass programs reduce the demand for parking, improve transit service, attract and retain students, aid low-income students, and increase equity. The programs’ average cost per student is \$36 per year.

TABLE OF CONTENTS

I. A SURVEY OF UNIVERSITY TRANSIT PASS PROGRAMS	1
II. THE BENEFITS OF UNIVERSITY TRANSIT PASS PROGRAMS.....	2
REDUCING THE DEMAND FOR PARKING	3
INCREASING STUDENTS' ACCESS	4
IMPROVING TRANSIT SERVICE	4
ATTRACTING AND RETAINING STUDENTS	5
REDUCING THE COST OF A COLLEGE EDUCATION	6
INCREASING EQUITY	7
III. THE COST OF UNIVERSITY TRANSIT PASS PROGRAMS	9
BUYING AT THE PASS RATE	9
USING EXCESS TRANSIT CAPACITY	9
AVOIDING ADVERSE SELECTION	10
IV. OPERATIONAL ISSUES IN UNIVERSITY TRANSIT PASS PROGRAMS	11
WHO IS ELIGIBLE TO RIDE?	12
HOW IS ELIGIBILITY VERIFIED?	12
WHAT GEOGRAPHIC AREA IS COVERED?	13
WHAT IS THE UNIVERSITY CHARGED?	13
WHO SHOULD PAY FOR THE PROGRAM?	15
V. INCREASING TRANSIT RIDERSHIP	17
GROUP DYNAMICS	17
INCREASED KNOWLEDGE ABOUT TRANSIT SERVICE	19
RESIDENTIAL RELOCATION	19
REDUCED AUTOMOBILE OWNERSHIP	20
VI. CONCLUSION	21
APPENDIX: COMPARING COSTS: A TRANSIT PASS PROGRAM VERSUS A CAMPUS SHUTTLE SERVICE.....	22
REFERENCES.....	22
NOTES	24

Table 1 A Survey of Transit Pass Programs at Twenty-three Universities

University	Who is Eligible to Ride Free?	Number Eligible to Ride Free (1)	Annual Cost of Program 1997-1998 (2)	Annual Number of Rides (3)	Annual Cost Per Eligible Person (4)=(2)/(1)	Annual Number of Rides per Eligible Person (5)=(3)/(1)	Cost per Ride (6)=(2)/(3)	Year Program Began (7)
University of California, San Diego	students, faculty, staff, emeritus	35,200	\$177,700	296,600	\$5	8	\$0 60	1969
University of Montana	students, faculty, staff	14,000	\$83,600	190,100	\$6	14	\$0 44	1991
University of Georgia at Athens	students	30,000	\$275,000	600,000	\$9	20	\$0 46	1977
Cal Poly State University, San Luis Obispo	students, faculty, staff, emeritus	17,500	\$169,000	531,700	\$10	30	\$0 32	1985
University of Wisconsin at Eau Claire	students, faculty, staff	11,600	\$125,000	195,700	\$11	17	\$0 64	1997
Appalachian State University, NC	students, faculty, staff	13,200	\$251,000	361,800	\$19	27	\$0 69	1980
Colorado State University	students	20,000	\$375,400	462,900	\$19	23	\$0 81	1975
University of Pittsburgh, PA	students, faculty, staff	31,200	\$650,000	1,536,900	\$21	49	\$0 42	1995
University of California, Santa Barbara	students	17,400	\$400,200	584,800	\$23	34	\$0 68	1986
Santa Barbara City College, CA	students	12,000	\$277,000	525,500	\$23	44	\$0 53	1995
University of Massachusetts at Amherst	students, faculty, staff	39,000	\$972,300	807,500	\$25	21	\$1 20	1969
Ohio State University	students	48,300	\$1,400,000		\$29			1997
University of Wisconsin at Madison	students	39,000	\$1,200,000	1,653,000	\$31	42	\$0 73	1996
Virginia Polytechnic Institute and State University	students, faculty, staff	32,000	\$1,100,000	1,400,000	\$34	44	\$0 79	1983
Auraria Higher Education Center (UC Denver)	students	31,500	\$1,204,000	1,965,000	\$38	62	\$0 61	1994
University of California, Davis	students	18,500	\$719,000	2,021,900	\$39	109	\$0 36	1990
San Jose State University, CA	students	25,500	\$1,020,000	1,150,300	\$40	45	\$0 89	1993
University of Colorado at Boulder	students	24,500	\$1,000,000	1,500,000	\$41	61	\$0 67	1991
Marquette University, WI	students	6,700	\$400,000		\$60			1995
University of Wisconsin at Milwaukee	students	20,200	\$1,247,400	2,300,000	\$62	114	\$0 54	1994
University of Illinois at Urbana-Champaign	students	30,400	\$2,200,000	5,800,000	\$72	191	\$0 38	1989
University of Texas at Austin	students	49,000	\$4,300,000	7,400,000	\$88	151	\$0 58	1988
University of California, Santa Cruz	students, faculty, staff	12,220	\$1,203,800	1,253,047	\$99	103	\$0 96	1972
	AVERAGE	26,170	\$902,191	1,414,639	\$36	62	\$0 58	
	MEDIAN	24,500	\$719,000	1,150,300	\$29	44	\$0 61	

UNLIMITED ACCESS

Jeffrey Brown, Daniel Hess, and Donald Shoup

“Unlimited Access” is the name that several universities have given to programs where their student identification cards serve as public transit passes. Students simply present their university identification to board the bus. For every student on any day, a bus ride to campus or anywhere else in the community is free.

Universities contract with their local transit agencies to provide the transit service. To finance the program a university typically pays the transit agency an annual lump sum based on previous or expected student transit ridership. By purchasing transit service at a bulk rate, universities can secure transit service for students at a low price.

Why do universities provide unlimited access? Transit pass programs increase student mobility and reduce vehicle trips. They increase students’ access, reduce the demand for parking, attract and retain students, and aid low-income students. The transit pass programs also reduce traffic congestion, improve air quality, and conserve natural resources.

We have surveyed campus transit programs throughout the United States, and have found twenty-three universities where students can ride public transit without paying a fare. In this paper, we (1) present the results of our survey, (2) discuss the benefits and costs of the programs, (3) examine important practical issues in the programs’ operation, and (4) explain the reasons for the large transit ridership increases associated with these programs.

I. A SURVEY OF UNIVERSITY TRANSIT PASS PROGRAMS

Our survey found twenty-three universities whose transit pass programs meet two criteria. First, the transit passes are for use on regularly scheduled public transit service, the programs are *not* campus shuttle-bus operations. Second, the pass programs automatically give all students the right to ride public transit without paying a fare, in most cases by showing their university identification when boarding. The sample does not include universities that provide only campus shuttle-bus operations, or that sell transit passes to students at a discounted rate.¹

We asked both university administrators and local transit agencies about the benefits, costs, and mechanics (eligibility, verification, geographic coverage) of their transit pass programs.

Table 1 presents the results of the survey ² For each university, Column 1 shows the number of persons eligible to ride transit without paying a fare, Column 2 shows the university's annual cost of the program, and Column 3 shows the annual number of transit rides taken at the university Column 4 shows the resulting annual cost per eligible person, Column 5 shows the annual number of rides per person, and Column 6 shows the average cost per ride The universities are ordered in the table by their programs' annual cost per eligible person

The best way to explain the cost of a university transit pass program is to describe a typical program Consider, for example, the program at the University of Wisconsin at Madison (in the middle of Table 1) The cost per ride (73¢ a ride) multiplied by the number of student rides (1,653,000 rides) gives the university's total cost of the program (\$1.2 million a year) The university's total cost divided by the number of students (39,000) gives the cost per student (\$31 a year)

Among the universities, variation in the number of *rides per student*, not in the *cost per ride*, accounts for most of the variation in the *cost per student* For example, the cost per student at UC Santa Cruz (\$99 a year) is nearly 20 times that at UC San Diego (\$5 a year) Although Santa Cruz appears to pay much more than San Diego, most of the cost difference results from the greater student ridership at Santa Cruz The cost per ride at Santa Cruz (96¢ a ride) is only 1.6 times that at San Diego (60¢ a ride), but the number of rides per student at Santa Cruz (103 rides a year) is nearly 13 times that at San Diego (8 rides a year) ³

The twenty-three transit pass programs serve a total population of 579,000 eligible riders, about 4 percent of the 14 million students currently enrolled in American colleges and universities The programs range in size from 6,700 students at Marquette University to 49,000 students at the University of Texas The average cost of transit service is 58¢ a ride, the average transit ridership is 62 rides per student per year, and the average cost per student is \$36 per year

II. THE BENEFITS OF UNIVERSITY TRANSIT PASS PROGRAMS

University transit pass programs simultaneously increase students' access to a wealth of destinations throughout any community while reducing total vehicle trips Because the transit pass programs have these two effects, they are able to (1) reduce the demand for parking, (2) increase students' access to housing and employment, (3) improve transit service, (4) attract and

retain students, (5) reduce the cost of a college education, and (6) increase transportation equity
The following sections consider each of these benefits

Reducing the Demand for Parking

The philosophy behind starting our program in 1989 was a cost avoidance measure to keep from building more campus parking University of Illinois at Urbana-Champaign

The bus program has reduced parking demand by about 750 spaces, and has reduced political pressure to expand the parking supply University of Colorado at Boulder

Because some students switch from cars to transit for their trips to campus, university transit pass programs reduce the demand for parking on campus. Some universities have quantified this reduction in parking demand. At Pittsburgh, the transit pass program has reduced campus parking demand by 250 to 400 spaces. At Boulder, the transit pass program has reduced campus parking demand by about 750 spaces.

Providing transit for students who arrive by bus can cost far less than providing parking for students who arrive by car. For example, the six parking structures built on the UCLA campus between 1977 and 1991 cost an average of \$25,600 per space added (in 1998 \$)⁴. In comparison, at the twenty-three universities with transit pass programs, the average cost of providing transit passes for all students is only \$36 per person per year. If the cost of a transit pass program at UCLA were only \$36 per student per year, debt service for 375 new parking spaces in the next proposed parking structure at UCLA could pay the full cost of a transit pass program for all 35,000 UCLA students for 27 years⁵.

Quantifying the reduction in parking demand is difficult, because not all transit trips reduce parking demand. Not all new transit riders are former automobile drivers since some students will switch from bicycling or walking to riding transit. Many students will also use transit for trips other than commuting to campus. Giving students an alternative to travel by automobile may also increase walking and bicycling because transit can serve as a form of insurance for bicyclists and pedestrians in the case of inclement weather.

Reduced parking demand is not the sole reason to offer a transit pass program, yet many universities accord a disproportionate weight to the strength of this benefit. Reduced parking demand is only one of many benefits of university transit pass programs, as shown below.

Increasing Students' Access

Students love the program It gives them tremendous freedom at an acceptable cost

Marquette University

Students can live in better neighborhoods and get free rides to the university They can also get to movies, shows, sports, and shopping

University of Pittsburgh

University transit pass programs increase students' access to a variety of social, cultural, educational, and recreational opportunities throughout the region This mobility is particularly valuable in large cities that have many museums, theaters, and libraries that students should visit as part of a liberal education

Several universities reported that the programs offered students access to less expensive housing in better neighborhoods Increased mobility also gives students greater access to jobs, internships, student teaching assignments, and volunteer opportunities

Several universities also mentioned the greater safety of public transit when compared to walking or bicycling at night or in bad weather An important safety benefit cited in the early years of the transit pass programs established in the 1960s was to reduce hitchhiking to campus

Improving Transit Service

With the fare-free program, the entire transit system can carry more passengers and provide the city with a better level of transit service

Santa Cruz MTD

We can offer more efficient and productive service to the entire county thanks to the pre-paid fares from the University of Georgia

Athens Transit

Universities and their local transit agencies tailor their programs to meet the specific transit needs of each campus The programs have improved the quality and increased the quantity of transit service to the universities in several ways more frequent buses, more routes, and services that extend later at night and on weekends The transit agencies can afford to improve service to the campus because they carry more riders and earn more revenue, both from the university and systemwide

In Pittsburgh, the transit agency's "cultural shuttle bus" provides students with access to museums and theaters⁶ In Milwaukee, the transit agency offers expanded evening bus service as part of the UPASS program at the University of Wisconsin All transit riders--not just students--benefit from the increased frequency, expanded hours, and new routes associated with the

improved service. In Columbus, service quality improvements brought about by the transit pass program at Ohio State University have significantly increased non-student ridership at full-fare.

The transit pass programs help public transit as an institution by offering transit agencies a way to reverse declining ridership trends. Between 1988 and 1996 the federal government spent \$25 billion to subsidize capital investment in mass transit in the United States, and yet mass transit ridership declined by 8 percent during this period. Transit now accounts for just 2 percent of all trips nationwide.⁷

University transit pass programs offer a low cost way to counter passenger losses. They are a demand-side subsidy that complements the federal government's existing supply-side subsidies. University transit pass programs provide a new ridership source and they offer transit agencies a means to nurture lifelong transit riders, without recourse to expensive service expansions.

Attracting and Retaining Students

We advertise the pre-paid transit program during student recruitment open houses

University of Wisconsin-Milwaukee

The transit pass program is very popular, especially among students and environmentally conscious groups on campus

UC San Diego

University transit pass programs can attract students who are choosing which college to attend because they provide increased access at a low cost. When students think of transportation, some universities' only image is a notorious parking problem. For example, Bob Hope once said, "It takes four years to get through UCLA, or five if you park in Lot 32."

In allocating parking permits, many universities give a low priority to first-year students--the very students the university is trying to attract. A transit pass program improves transportation for new students, by offering alternatives to the automobile and by making more parking spaces available on campus.

Transit pass programs also help a university to retain students. In a survey of students at the University of Wisconsin-Milwaukee, 15 percent said that the transit pass program had a major effect on their decisions to continue attending the university, and another 21 percent said that it had a minor effect (Meyer and Beimborn 1996).

A transit pass program can reduce parking problems and address the transportation needs of all students. A transit pass program can also attract “green” students because it shows the university’s support for alternatives to the automobile. At the same time, a transit pass program can make it easier for students who continue to drive to campus to find a parking space. Whether attracting new students or retaining current students, a transit pass program increases a university’s competitive advantage.

Reducing the Cost of a College Education

With the transit pass program, we feel we are serving the needs of students who come to the university without a car, including low-income and international students

Virginia Polytechnic Institute and State University

Transit pass programs aid low-income students by providing affordable transportation

Milwaukee County Transit System

University transit pass programs can significantly reduce the cost of a college education. The cost of transportation can be a significant share of the cost of an undergraduate education. For example, Table 2 shows the financial aid budgets for undergraduates at UCLA. These budgets represent a typical student’s annual expenses, and they form the basis of the financial aid packages offered by the university. Students who live off-campus spend 13 percent of their income on transportation if they live independently, and spend 24 percent of their income on transportation if they live with their parents.⁸ Students who live in their parents’ homes spend more for transportation than they do for anything else except university fees. These data suggest that if a transit pass program delays a student’s need to buy a car, it can significantly reduce the cost of a college education.

Because a transit pass program reduces the financial aid needs of some students, a university’s financial aid budget can serve more students. Therefore, a transit pass program will increase the university’s ability to aid needy students.

TABLE 2 FINANCIAL AID BUDGET FOR UCLA UNDERGRADUATES

<u>Cost</u>	<u>On-Campus Housing</u>	<u>Off-Campus Housing</u>	
		<u>Independent</u>	<u>Parents' Home</u>
Books & Supplies	\$930	\$930	\$930
Living	\$6,490	\$7,101	\$1,812
Personal	\$1,201	\$954	\$1,836
Transportation	\$172	\$2,007	\$2,777
Fees	<u>\$4,050</u>	<u>\$4,050</u>	<u>\$4,050</u>
Total Cost	\$12,843	\$15,042	\$11,405
Transportation as % of Total Cost	1%	13%	24%

Source "Report on the University of California 1996-97 Cost of Attendance Survey, Appendix J"
Office of the President, University of California Oakland, 1997

Increasing Equity

Our program treats everyone fairly Every student is assessed the same fee, every student receives the same transportation service, and every student is eligible to board any bus without paying a fare using their BluGold card
University of Wisconsin at Eau Claire

All students are provided with an alternative to the expense and additional responsibilities associated with auto ownership
Milwaukee County Transit System

Universities typically lead society in advocating social and economic equity, but many university parking policies create invidious inequalities among administrators, faculty, staff, and students In academia, you are not what you drive but where you park With 175 different kinds of parking permits, UCLA's parking hierarchy makes the *Titanic* look like a one-class ship

UCLA attempts to allocate student parking permits according to each student's "need" for parking, but even this "need-based" allocation has undesirable consequences A study of how UCLA allocates parking permits among students found that, among undergraduates who apply for a parking permit, minority students were significantly less likely than other students to receive a parking permit (see Table 3) For example, 60 percent of white students who applied for a parking permit received one, while only 46 percent of Hispanic students who applied for a permit received one Although the survey was conducted in 1983, no subsequent analysis of parking

permit allocation by ethnicity has been made, and no changes have been made in the parking permit allocation system that would remedy the disparity of outcomes. UCLA is seeking to maintain a diverse student body, but its student parking allocation unintentionally works against this goal. A transit pass program open to all students can help to recruit disadvantaged students and maintain diversity.

Ethnicity	Applied for Parking	Received Parking	Percent of Applicants Who Received Parking
White	6,348	3,791	60%
Asian	1,721	896	52%
Other	445	232	52%
Foreign	281	135	48%
Black	506	239	47%
Hispanic	619	286	46%

Source: UCLA Student Affairs Information Research Office (1983)

University transportation policies can also create inequities among students who arrive on campus by different modes. Under-priced parking provides a subsidy to students who drive to campus, but students who walk, bike, or ride transit to campus usually receive no subsidy. By contrast, university transit pass programs give *all* students the same access to public transportation, and therefore increase transportation equity among students.

An additional benefit of university transit pass programs is that they are a more flexible approach to meeting changes in student travel demand than building parking structures. Transit service can be added to accommodate increased demand (or service can be reduced when demand is low), and routes can be reconfigured and headways adjusted to accommodating changing student travel preferences. These service changes can be made relatively quickly and easily. For example, the Santa Barbara Metropolitan Transit District added a transit pass program. A parking structure by contrast often takes years to build and has a rigid capacity limit, a parking structure can not respond to sudden changes in demand. A parking structure also takes up valuable campus open space while a transit pass program protects these valuable recreational spaces.

III. THE COST OF UNIVERSITY TRANSIT PASS PROGRAMS

At a very low cost, university transit pass programs provide free public transit for all students. Table 1 shows that the average cost per transit ride at the twenty-three universities is 58¢ and the average cost per person is \$36 per year, less than one-tenth what it would cost to give all students a conventional public transit pass. Buying transit service at the pass rate and using excess transit capacity explain the low cost *per ride*. Avoiding the problem of “adverse selection” explains the low cost *per person*. Together, these three factors explain why university transit pass programs are much less expensive than buying conventional transit passes for all students.

Buying at the Pass Rate

The transit pass programs’ average cost is only 58¢ per ride. Universities achieve this low cost per ride by purchasing transit service for all students at a “pass rate,” which is usually much lower than the regular cash fare per ride. For example, the cash fare on the Los Angeles County Metropolitan Transportation Authority (MTA) is \$1.35 per ride and the price of a monthly transit pass is \$42. Because passholders make an average of 109 rides per month, the MTA’s average pass rate is only 41¢ per ride ($\$42 \div 109 \text{ rides per month}$).

Transit agencies can offer a low price per ride because the bulk purchases by university programs reduce the transaction costs of selling transit passes. A transit agency saves the administrative expense of printing and selling many individual transit passes every month, and these savings can be passed on to the university. Using the university identification card as a transit pass also eliminates many small transactions for individual cash fares as riders board the bus. The transit pass programs achieve the low pass rate per ride for even occasional riders.

Using Excess Transit Capacity

The transit pass programs also achieve a low cost per ride when they attract riders at off-peak hours and on routes that have excess capacity. If transit agencies do not have to increase their system capacity to participate in the programs, they have a very low marginal cost per new rider, and can pass the low cost on to the university. Transit systems that do not have excess capacity during peak hours can still take advantage of university transit pass programs by using the additional off-peak revenues generated by the program to subsidize the increased peak period.

expenditures. These systems might also consider implementing peak and off-peak rate differentials to encourage students to shift to the off-peak period.

The University of Colorado at Boulder, for example, reports that most students travel at off-peak hours and that they are largely filling empty seats. Similarly, San Diego Transit reports that its program with UC San Diego is filling unused capacity on buses. In addition, many student trips are non-commute trips at off-peak hours. Serving these new trips is nearly cost-free for the transit agency because the trips take advantage of previously unutilized capacity.

Avoiding Adverse Selection

The concept of adverse selection was developed in the context of insurance coverage. Adverse selection describes the tendency for persons with a greater potential of loss to purchase more insurance. This tendency leads to higher loss payments, and then to higher insurance premiums for everyone who is insured.

Similarly, adverse selection increases the cost of conventional transit passes sold to the public. Because frequent transit riders often buy monthly passes, transit agencies must price these passes on the assumption that passholders are frequent riders. As mentioned above, regular passholders of the Los Angeles County MTA make an average of 109 rides per month. Because transit agencies must price their passes high enough to cover the cost of serving frequent riders, infrequent riders will not buy them.

Table 4 shows the three coverage options available in university transit pass programs--opting in, opting out, or universal coverage.⁹ At the University of California, Irvine, students can opt into the transit pass program. At the University of Washington, students are automatically enrolled in the transit pass program but can opt out. At the University of Colorado, students are automatically enrolled in the program and cannot opt out.

Partial-coverage programs are necessarily priced higher because of adverse selection--students who are frequent riders will seek to participate in the program and will thus drive up the cost per person. Only a program with universal coverage fully avoids the problem of adverse selection, and this is reflected in the significantly lower per-person cost of the program at the University of Colorado. Only programs with universal coverage are included in Table 1.

TABLE 4 UNIVERSITY TRANSIT PASS COVERAGE OPTIONS

	Partial Coverage		Universal Coverage
	Opt In	Opt Out	Cannot Opt Out
Example	University of California Irvine	University of Washington Seattle	University of Colorado Boulder
How program works	The university buys bus passes from the Orange County Transit Authority for \$33.50 per month and sells the passes to students for \$13 per month	Students, faculty, and staff are automatically enrolled but can opt out and not pay the fee. Students pay \$28 per quarter and faculty and staff pay \$37.50 per quarter	Students are automatically enrolled and cannot opt out. Students pay a mandatory transit fee of \$19.52 per semester
Percent who participate	1% of students	74% of students, faculty, staff	100% of students
University's cost per participant	\$246 per year	\$130 per year	\$41 per year

The cost per student is lowest with universal coverage, as at the University of Colorado, because some students rarely ride transit. These students may complain that requiring them to pay for something they rarely use is unfair. The benefits of a transit pass to an individual are greater if everyone he or she knows also has a transit pass, and this justifies the choice of a universal coverage program. These group dynamics may explain why many students who will not buy a conventional transit pass will vote for a mandatory transportation fee to finance a pass program, as shown by the high approval rates in student referenda.

In summary, the low cost per ride and the modest number of rides keep the university's cost low, and this low cost is spread among all students, so the cost per student is far below the cost of a regular transit pass.

IV. OPERATIONAL ISSUES IN UNIVERSITY TRANSIT PASS PROGRAMS

Twenty of the twenty-three surveyed universities made their program contracts available for us to review. The lengths of the contracts ranged from one page to ten pages and the contracts varied greatly in their attention to detail.¹⁰ Most contracts set out to define the

population that is eligible to receive the passes, the transit service included in the agreement, the cost of the program and the payment arrangements. Many of the contracts also describe the administration of the program and the insurance arrangements, and include an indemnity clause to protect each of the parties. The term of most contracts is one to two years, with provisions for extension or renewal of the agreement. In contracting for a transit pass program, the university and the transit agency must decide (1) who is eligible to ride, (2) how eligibility is verified, (3) what geographic area is covered, (4) what the university is charged, and (5) who should pay for the program.

Who is eligible to ride?

All twenty-three universities allow students to ride transit without paying a fare. Nine universities also include faculty and staff in their programs, and two universities include emeriti faculty. Including faculty and staff will not cost much if they are infrequent riders, and four of the five least expensive programs include faculty and staff.

The criteria for eligibility depend on the university's goals. If the university's goal is to reduce traffic congestion and air pollution it should consider covering everyone--students, faculty, and staff--to reduce overall automobile use.

How is eligibility verified?

The most frequently cited problem is verifying students' eligibility to ride transit without paying a fare.¹¹ To prevent fraudulent use of university identification cards or bus passes, four universities place a validation sticker on the identification card every quarter or semester.¹² This policy insures that only registered students use the card to ride free.¹³ Madison Metro, by contrast, produces an inexpensive paper bus pass for use in their program. Students must pick up a new bus pass on campus each semester after their current fees have been paid. They must then show the bus pass along with their university identification to board a bus. This prevents former students and others who are not eligible from riding free. The University of Illinois at Urbana-Champaign deals with potential pass misuse by paying \$70,000 per year to the transit agency to account for possible fraud, this is a lower-cost alternative to printing a separate bus pass for students.

An additional strategy is to conduct random eligibility audits of riders after they board the bus. A higher-tech verification strategy is to use swipe-card technology to scan student identification cards for information about each cardholder's eligibility. Swipe-card technology can provide valuable statistical information by tracking where, how often and when the passes are used.

What geographic area is covered?

Most programs provide students with unlimited rides throughout the local transit district during the regular school year¹⁴. In a few cases the transit agency and university agree upon a more limited coverage area within which students can ride free, students may pay a full or partial cash fare outside this area¹⁵.

Choosing whether to offer unlimited or limited access depends on the university's goals. If the university wants to improve students' mobility and reduce the need for a car--the reasons mentioned most frequently in the surveys--an unlimited access program makes more sense. An unlimited access program is also much simpler for the transit agency to manage.

What is the university charged?

If the university pays a fixed price per ride for the pass program, the transit agency must count the number of rides so it can bill the university properly. Alternatively, if the university pays a fixed annual fee per student, the university and the transit agency must agree on the size of the fee. This per-student fee inevitably depends on the expected number of student rides and a reasonable price per ride--reasonable to both the university and the transit agency. Therefore, regardless of the formula chosen--a fixed fee per student or a fixed fee per ride--the cost to the university fundamentally depends on (1) the price per ride and (2) the number of rides.

In most cases the university and the transit agency negotiate a lump sum annual payment, often spread through the year in installments. Arriving at an agreed upon payment for the program is most difficult during the first year when there is no precedent for the estimated number of rides that will be taken. One approach is to estimate the number of rides currently taken by students and the revenue that will be lost when the transit program begins. To that figure is added the estimated cost of serving additional ridership generated by the program.

For example, the Central Ohio Transit Authority (COTA) estimated that in 1996, the year before the program began at Ohio State University, approximately 1,500 Ohio State students used the buses daily, yielding annual fare revenue of \$1 million. COTA determined that it would add \$450,000 worth of service to accommodate new student travel after implementing the transit program with the university. Ohio State University's student fee of \$9 per quarter covers \$1.4 million of COTA's \$1.45 million in program-related costs.¹⁶ Transit contracts at the University of Georgia, the University of Wisconsin at Milwaukee, and the University of Wisconsin at Madison are based on similar cost calculations.

After a program has been established for several years, basing the university's annual payment on the fare revenue lost when the program began makes less sense. Although both the university and the transit agency benefit from the program, negotiations over the payment can be contentious if the principles of financing the program are ambiguous. For example, should the public subsidy per rider for the student program be the same as for all other riders? If so, who should provide the additional public funds necessary to subsidize the additional service for students?

In this ambiguous environment the agreement negotiated between the University of Georgia and Athens Transit seems both fair and transparent. The university's annual payment is determined by a simple formula: each year the average student ridership over the previous three years is multiplied by the best fare available to the general public. The best fare available to the general public is the average price per ride associated with a monthly pass. This formula gives the transit agency an incentive to improve service for students in order to attract more riders and earn more revenue.

In Fall 1998, the Chicago Transit Authority (CTA) began a "U-Pass" program that eliminates the need for negotiations between university and transit agency. The CTA charges all participating universities \$50 per calendar day per full-time student for the duration of the semester, trimester or quarter. The rate is therefore a take-it-or-leave-it proposition, this approach is particularly useful in areas where one transit agency serves many universities because it offers each university exactly the same program under exactly the same terms. Twelve Chicago-area universities enrolled in the CTA program during the first year it was available.¹⁷

Who should pay for the program?

Some of the benefits of the programs accrue to universities while others accrue specifically to students. It therefore appears quite reasonable to expect both universities and students to share in the cost of the programs. It seems unreasonable that students should be asked to pay a special transportation fee to finance the entire cost of the program, but this is typically the case.

Of the twenty-three universities surveyed, seventeen finance their programs exclusively through student fees. Some universities have a comprehensive transportation fee that also finances other programs such as campus shuttles. The University of Wisconsin at Milwaukee keeps a nominal portion of each student's transportation fee (\$1) for administrative and handling charges, and the remainder of the transportation fee is paid to the transit agency to finance the program.

The University of Illinois and the University of Massachusetts finance their programs through a combination of student fees and university funds. Two of the four programs with the lowest cost per eligible rider are financed with non-student funds. The housing, transportation, and student affairs departments finance the program at UC San Diego. Parking citation revenues and fines cover the majority of the cost of the program at Cal Poly San Luis Obispo.

Where students pay for the programs, student referenda are generally required to approve the new transit fee, and most of these referenda have sunset clauses that require the transit pass program to be re-approved periodically by the student body at large or by the student government. These recurring referenda give transit agencies a continuing incentive to improve service to the students who pay the cost. According to university administrators, transit pass referenda usually have low voter turnout, but often it is higher than campus votes on other issues. As students get to know the programs, the yes votes increase in subsequent referenda. The high approval rates in the transit pass referenda suggest that the programs' benefits greatly exceed their costs (see Figure 1).

FIGURE 1 APPROVAL RATES IN STUDENT REFERENDA

In February 1997 students voted 4 to 1 in favor of a transit pass program, and the program began operating in April of the same year Ohio State University

The student body reaffirmed their support by voting 15 to 1 in April 1997 to raise student fees to enhance the transit pass program University of Colorado at Boulder

In Spring 1996 student voters approved, with 84 percent of the votes cast in support, continuing the transit pass program University of California, Santa Barbara

When our program was established in 1983, it was approved by 85 percent of voters, and roughly half of the student body voted Virginia Polytechnic Institute and State University

The transit pass program originally passed with an approval vote of 58 percent, two reapproval votes in subsequent years have seen it pass by 68 percent and 78 percent San Jose State University

The elected student government unanimously approved the transit pass program Marquette University

Pitt students voted an overwhelming 93 percent Yes to increase student fees to fund their unlimited access program University of Pittsburgh

Ninety-four percent of the University of Wisconsin at Milwaukee student body approved a student fee to fund unlimited access in a student referendum University of Wisconsin at Milwaukee

Several university administrators reported that some students complain because they must pay for the program whether or not they use transit. This issue of paying without riding arises in all public transit finance decisions, because non-riders subsidize the riders. The student referenda mirror ballot measures in which voters approve sales taxes to finance public transit even though most voters are not riders. The large majorities in these student referenda suggest that students believe the benefits of a transit pass program greatly outweigh the costs. The cross-subsidies of riders by non-riders are approved by the students in a democratic election.¹⁸

V. INCREASING TRANSIT RIDERSHIP

The benefits of university transit pass programs depend on how much they increase student transit ridership. Unfortunately, most universities do not know the ridership increase because they do not know how many students rode transit before the program started.

Table 5 shows the ridership increases during the first year of program operation at the three universities that collected detailed before-and-after ridership data.¹⁹ At all three universities, ridership continued to increase after the first year of the program. For example, at UC Davis student ridership increased by 79 percent during the first year. In the subsequent seven years, student ridership has continued to increase at a rate of 12 percent per year.

	Year	Annual Transit Ridership			Fare Elasticity
	Program Began	Before	After	Change	
UC Davis	1990	587,000	1,054,000	+79%	-0.28
University of Illinois	1989	1,057,500	3,102,000	+193%	-0.49
U Wisconsin Madison	1996	812,000	1,653,000	+104%	-0.34

What explains the large ridership increases? We believe that, in addition to the predictable effect of price elasticity, four additional factors associated with university transit pass programs increase student transit ridership: (1) group dynamics, (2) increased knowledge about transit service, (3) residential relocation, and (4) reduced automobile ownership.

Group Dynamics

Carpoolers share the cost of gasoline and parking either formally or informally. Because of this cost sharing among those who travel together by car, the cost per person decreases as the size of the carpool increases. In contrast, those who travel together by public transit do not share the cost of a single transit fare. Each person pays his or her own fare, and when a group of friends travel together by public transit the cost per person does *not* decrease as the size of the group increases. This pattern of cost sharing among carpoolers but not among transit riders suggests that groups will naturally gravitate toward automobile travel.

A university transit pass program reduces the gravitational pull toward automobile travel. Because the program automatically gives a transit pass to every student, all students implicitly understand that transit is free not only individually but also collectively within any group of students who might want to go somewhere together. Without any need to discuss the financial cost, any group of students can casually board any bus that will take them where they want to go.

Because of these group dynamics, a transit pass is worth much more to an individual if everyone he or she knows also has a transit pass. By providing universal coverage for everyone in an affinity group (the university community), the university programs increase the worth of each individual transit pass. Giving all students transit passes increases average per-student transit ridership by more than would be observed among individual students who are randomly selected to be given a transit pass.

One way to show the importance of group dynamics in the transit pass programs is to use the analogy of e-mail, which most universities provide free to all students. If you were the only person with e-mail, you would never use it. If everyone you knew had e-mail, you would use it often. In between these two extremes, you will use e-mail more often as more people you know have e-mail. University transit pass programs may cause some students to treat transit service like e-mail: they will ride transit more often if everyone else they know can also ride free. For example, before the UC Davis program began, students rode transit an average of 32 times per year. Now, students ride transit an average of 109 times per year.

But what would happen if only some students, rather than all students, were randomly selected to be given a transit pass? The average number of transit rides per year per student given a transit pass is a function of how many people in one's affinity group have a transit pass. As an increasing proportion of students receive access to free transit, the average number of rides per student given a transit pass increases. Once a critical mass in the affinity group have transit passes, the average ridership per person given a transit pass begins to increase rapidly. After some point nearing saturation, the rate of increase slows.

University transit pass programs communicate information about travel prices to everyone in the group, and this information reduces the transaction costs associated with deciding how to travel. This interaction between group psychology and rational calculus will shift some travelers from automobiles to mass transit.

Increased Knowledge About Transit Service

A second factor affecting transit ridership is a student's knowledge about transit service. Because the university programs automatically provide transit passes to everyone, students have a reason to invest time learning where the buses can take them. Greater knowledge alone can lead to increased transit ridership.

Without a pass program, many students are unaware of transit service that is available. They may simply assume that public transit does not serve them. Although transit does not go everywhere, a typical transit agency serves a wide array of travel destinations, and some complaints about a lack of service undoubtedly stem from a lack of information.

For example, while investigating the prospects for a transit pass program at UCLA we found, to almost everyone's surprise, that 1,100 buses arrive at UCLA every day. Between the hours of 5 AM and 8 PM an average of more than one bus arrives at UCLA every minute. Fifty thousand seated passengers a day could arrive at UCLA on the existing bus service.

Students were also greatly surprised to learn just how extensive the service centering on their campus really is. Figure 2 shows that UCLA students can get to many destinations without transferring to another bus. The beaches, Hollywood, and many museums are within thirty minutes direct travel time from the campus.

When every student has a transit pass, information about transit service becomes common knowledge. When students are more familiar with transit service, they begin to use transit for trips for which they previously believed it was inappropriate. The information "buzz" caused by a transit pass program can imprint the transit system on students' mental maps, and the increased knowledge about transit service increases transit ridership.

Residential Relocation

Students are often new to a community and they move frequently. With high residential turnover, student residential patterns may become very sensitive to transit access. University transit pass programs can alter the residential decision-making process because the money cost of traveling by public transportation--but not by other modes--falls to zero.

As a result, some students will choose to live near public transit. Because they save on transportation, they can afford better housing, and can more easily live in high-density

neighborhoods where parking is scarce. Living in transit-accessible neighborhoods also enables students to use public transit for non-commute trips. For example, officials at the University of Pittsburgh report that beginning in the first year of the transit pass program, and continuing to the present, students moved away from the residential districts adjacent to campus and into outlying areas well-served by public transit where rents were lower and the selection of housing was wider, simply because a bus ride to campus became free.

Students all go to the same “job” location, the university campus, and expect to do so for several years. Many students can therefore easily adjust their housing location in response to a transit pass program. Developers and universities can also respond by building more student housing along transit routes. University housing offices can post maps of available transit service and adjacent student housing to encourage students seeking housing to locate near available transit. As some students respond by moving near transit lines, transit ridership continues to increase beyond the first year of a transit pass program.

Reduced Automobile Ownership

University transit pass programs reform the price structure of transportation. They change the price of travel by transit at a very low cost. The transit pass programs may convince some students not to buy a car. Reduced automobile ownership may explain part of the large increases in transit ridership when universities begin a transit pass program. For example, the 1995 NPTS found that households without cars made 19 percent of all trips by public transit, while households with one car made only 2.8 percent of all trips by transit (Pucher, et al 1998:19).

Automobile owners rarely ride transit because the marginal cost of driving is so low. Table 6 shows estimates of the marginal and fixed costs of travel by automobile and by transit. Most of the costs associated with automobile use are fixed costs that rarely enter into the owners’ calculus when deciding whether or not to drive their cars. In contrast, a transit passenger has no fixed cost, and the marginal cost is the fare. The average transit fare is 17.3¢ per mile in the U.S., which is 60 percent greater than the average marginal cost per mile of automobile use.²⁰ Because marginal cost is the key to an individual’s decision-making calculus, transit’s higher marginal cost reduces transit ridership.

**TABLE 6 THE FIXED AND MARGINAL COSTS OF TRAVEL
BY AUTOMOBILE AND TRANSIT**

Mode	Fixed Cost (cents per mile)	Marginal Cost (cents per mile)
Automobile	42¢	11¢
Transit	0	17¢

Source American Automobile Manufacturers Association (1998) and American Public Transit Association (1997)

The university transit pass programs reduce the marginal cost of using transit to zero and eliminate a significant barrier to transit ridership. This results in higher transit ridership among all program participants and may convince some of them not to buy a car.

VI. CONCLUSION

American universities have invented a new way to finance public transit. These universities contract with their local public transit agencies to allow their student identification cards to serve as transit passes. The average cost of these transit pass programs is only \$36 per student per year.

University transit pass programs produce many benefits. They reduce the demand for parking, allow transit agencies to improve service and increase ridership, attract and retain students, increase students' access, aid low-income students, and increase equity. The transit pass programs also reduce traffic congestion, improve air quality, and conserve natural resources. Transit pass programs produce all these benefits by increasing all students' access to the university and the community.

Few transportation reforms will increase mobility and reduce vehicle trips. How can university transit pass programs achieve both of these goals at the same time? They increase mobility by giving students free access to all public transportation. They reduce vehicle trips by shifting some travelers from cars to public transportation. And they achieve both goals at a low cost. In short, everybody wins--students, universities, transit agencies, and society.

APPENDIX: Comparing Costs: A Transit Pass Program Versus a Campus Shuttle Service

We can compare the cost of a university transit pass program with the cost of a conventional campus shuttle bus service. For example, UCLA's shuttle service carries passengers on short hops from one part of the campus to another. In 1996-1997 the total cost of this "Campus Express" was \$928,836 and riders made 947,670 trips. The average cost of providing the shuttle service was 98¢ a ride ($\$928,836 \div 947,670$)²¹. In comparison, the average cost of university transit-pass programs is only 58¢ a ride. Why is the cost per trip for rides to and from campus so far below the cost per trip for short rides around campus?

First, a university's cost per ride on public transit is low partly because students often travel at off-peak hours when there is excess transit capacity. The marginal cost of these rides is almost zero, and the saving can be passed on to the university. In comparison, a university shuttle service has its own off-peak hours with few riders and a high cost per rider that must be paid by the university. Second, the federal, state, and local governments subsidize public transit, so the university takes advantage of an already-subsidized service, while a university must pay 100 percent of the cost of a campus shuttle service.

Many of the riders on UCLA's shuttle service are traveling from a parking space to their classes or offices. For these riders the bus serves as a parking shuttle, and the service can be considered a subsidy for automobile drivers. In contrast, a university transit pass program carries students, staff, and faculty to and from campus, and therefore replaces automobile travel.

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NOTES

1 We asked university administrators and transit agencies if they knew of other universities and transit agencies who participated in similar programs (a snowball sample). The twenty-three programs that we discuss in this paper meet the two criteria that we outline. Certain programs that we researched are not included in our study because they are limited subscribed services through the local transit agency (University of Michigan at Ann Arbor), bus passes subsidized by and sold by the university (University of California, Irvine), or transit pass programs that do not provide universal coverage because students can choose not to participate (University of Washington).

2 In Table 1, the annual cost of the program is the cost paid by the university. All universities, with the exception of the University of California, San Diego and the University of Pittsburgh, provide free, unlimited rides throughout the jurisdiction of the transit agency, which is usually the surrounding county.

3 Another explanation for the difference in cost between the San Diego and Santa Cruz programs is the different type of service offered. The San Diego program offers limited service on routes within two miles of the campus and in selected residential areas while the service offered in the Santa Cruz program is county-wide.

4 The number of spaces a parking structure adds to the parking supply is the number of parking spaces in the structure minus the surface parking spaces lost as a result of building the structure. A structure's construction cost (excluding land value) divided by the number of parking spaces added to the parking supply gives the structure's cost per parking space added, taking into account the opportunity cost of the surface parking spaces lost (Shoup 1997).

5 The capital cost of the proposed parking structure is \$40,000 per parking space. These parking spaces would be extremely expensive for three reasons: (1) all parking spaces would be constructed at the second story below ground level, (2) the parking structure would meet extremely high seismic safety standards (designed to survive an 8.4-magnitude earthquake on the Newport-Inglewood fault), and (3) the parking structure would meet the high standards of the Americans with Disabilities Act. If the parking structure is financed on the same terms as UCLA's most recent parking structure (bonds with a 7.5 percent interest rate for 27.5 years), the annual debt service for the parking spaces would be \$3,360 per space per year. The total annual cost of a transit pass program for 35,000 UCLA students would be \$1,260,000 ($35,000 \times \36). Employing the debt service of \$3,360 per space per year, the cost of constructing 375 spaces is equivalent to the cost of providing the transit pass program ($\$1,260,000 \div \$3,360 = 375$ spaces).

6 The cultural shuttle bus is supported by the City of Pittsburgh, the Cultural Trust of Pittsburgh, and the attractions themselves. All three entities recognized that the transit pass program provided an opportunity to enhance Pittsburgh students' accessibility to cultural institutions.

7 Ridership data is available from the American Public Transit Association while trip data is taken from Pisarski 1997.

8 The low transportation costs for students living in on-campus housing reflects their low rate of auto ownership. The transportation cost difference between independent and at-home students is due to the different commute distances between these two groups of students.

9 For the sake of comparison, we include both the University of California, Irvine and the University of Washington. Neither of these programs is included in our survey because they do not meet the two criteria discussed at the beginning of the paper.

10 The average contract length is six pages. The one page contract (AppalCart Transit/Appalachian State University) simply states the cost of the program and the payment due dates. The ten page contract (Denver RTD/Auraria Higher Education Center) is an intergovernmental agreement that gives a detailed description of

each party's transit pass program responsibilities, as well as a transit pass program cost summary and an itemization of new service costs by line

11 A related problem is that of ensuring that bus drivers are aware of the programs. At Pittsburgh's Port Authority Transit, it was difficult for the first six months of the program to get bus drivers to understand the program and comply with it. The University of Pittsburgh reports that some bus drivers did not read the memos they were given about the program and refused boarding to eligible UPass holders, resulting in frequent complaints from transit riders. In Columbus, Ohio, the bus drivers had difficulty accepting passes that were valid but were different from the passes that they were trained to accept.

12 Many universities have recently introduced new university identification cards that can also double as credit cards or ATM cards. Because of the magnetic stripe technology and the fact that the cards must have the capability of being read by a credit machine or inserted into an automatic teller machine, some identification card vending companies do not allow stickers to be affixed to the cards.

13 When UC San Diego began the university transit pass program in 1969, students were given a bus pass with no picture on it. Because students could receive a replacement bus pass with no questions asked when they reported their bus pass lost or stolen, UC San Diego reports that students gave or sold bus passes to local high school students. Currently, UC San Diego affixes a transit sticker to their university photo identification card.

14 Usually, the transit pass program continues into the summer months only for those students registered for summer courses.

15 Among the few universities that do not offer unlimited access throughout the transit district are UC San Diego and the University of Pittsburgh. UC San Diego's pass program applies only to bus rides within a 2-to-4-mile radius of the campus, plus rides through certain student residential corridors. At the University of Pittsburgh, students, faculty, and staff ride free on weekdays between 6 AM and 7 PM when they present their UPass within the university district (UZone) and its surrounding neighborhoods.

16 The contract appears to result in a financial loss for COTA, but the agency has also experienced gains in non-student riders as a result of the program—riders who are paying the full fare.

17 For more information on the CTA's U-Pass program, see the CTA web-site at <http://www.transitchicago.com/upass.htm>

18 Exempting students from paying the fee can also accommodate this type of objection in special cases. For example, Ohio State University annually exempts approximately 100 students who are studying overseas.

19 The fare elasticity of demand in Table 5 is calculated using the arc elasticity formula.

20 The fixed cost and marginal cost of travel by automobile are the costs for driving a new model vehicle.

21 Memo from Mark Stocki, Director of UCLA Transportation Services, June 2, 1998.