UC Berkeley
Earlier Faculty Research

Title
BruinGo: An Evaluation

Permalink
https://escholarship.org/uc/item/5xh3g6gk

Authors
Brown, Jeffrey
Hess, Daniel Baldwin
Shoup, Donald

Publication Date
2003-03-01

eScholarship.org Powered by the California Digital Library
University of California

BruinGO: An Evaluation

Jeffrey Brown
Daniel Baldwin Hess
Donald Shoup

UCTC
No. 680

The University of California
Transportation Center

University of California
Berkeley, CA 94720

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.

Based on the Berkeley Campus, UCTC draws upon existing capabilities and resources of the Institutes of Transportation Studies at Berkeley, Davis, Irvine, and Los Angeles; the Institute of Urban and Regional Development at Berkeley; and several academic departments at the Berkeley, Davis, Irvine, and Los Angeles campuses. Faculty and students on other University of California campuses may participate in Center activities. Researchers at other universities within the region also have opportunities to collaborate with UC faculty on selected studies.

UCTC's educational and research programs are focused on strategic planning for improving metropolitan accessibility, with emphasis on the special conditions in Region IX. Particular attention is directed to strategies for using transportation as an instrument of economic development, while also accommodating to the region's persistent expansion and while maintaining and enhancing the quality of life there.

The Center distributes reports on its research in working papers, monographs, and in reprints of published articles It also publishes *Access*, a magazine presenting summaries of selected studies. For a list of publications in print, write to the address below.

DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Centers Program, in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

University of California Transportation Center

108 Naval Architecture Building
Berkeley, California 94720
Tel: 510/643-7378
FAX: 510/643-5456

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the U.S Department of Transportation. This report does not constitute a standard, specification, or regulation

BruinGO: An Evaluation

Forthcoming in the *Journal of Planning Education and Research*

Jeffrey Brown
Daniel Baldwin Hess
Donald Shoup

Institute of Transportation Studies
University of California, Los Angeles
Los Angeles, CA 90095-1656

March 5, 2003

Abstract

Universities and public transit agencies in the United States have together invented an arrangement—called Unlimited Access—that provides fare-free transit service for all students (and, on some campuses, faculty and staff as well). Unlimited Access is not free transit, but is instead a new way to pay for it. The university pays the transit agency for all rides taken by eligible members of the campus community. This paper evaluates the results of UCLA's Unlimited Access program. Bus ridership for commuting to campus increased by 56 percent during BruinGO's first year, and solo driving fell by 20 percent. Because these startling results were achieved in a city famous for its addiction to cars, they suggest that Unlimited Access will work almost anywhere.

Table of Contents

BruinGO: An Evaluation

Jeffrey Brown, Daniel Baldwin Hess, and Donald Shoup

Over the past decade, federal, state, and local government financial assistance to public transit has increased, but the share of commuters who use public transit declined. The transit share fell from 5.3 percent in 1990 to 4.7 percent in 2000. Transit now serves less than 2 percent of all trips, and passengers occupy only 27 percent of the seats available on public transit buses.[1] At the same time, auto use is increasing, and American motor vehicles now consume one-eighth of the world's total oil production.[2]

But there is also some good news. A small, but growing, number of transit agencies and universities have joined forces to offer a new program that provides fare-free transit for more than a million people. This program is generically known as Unlimited Access, and it has spread rapidly during the past decade.[3] Unlimited Access programs do not provide free transit, instead, they are a new way to pay for transit. The university pays the transit agency, and all eligible members of the university community ride free.

The rapid spread of Unlimited Access suggests that it is meeting a market test: universities are willing to pay for it. Nevertheless, there have been few evaluations of its performance. This paper evaluates UCLA's Unlimited Access program, called BruinGO (the Bruin is UCLA's mascot), and it builds on our previous survey of the Unlimited Access programs at 35 American universities (Brown, Hess, and Shoup 2001). UCLA's pilot program was designed to evaluate the effects of introducing fare-free transit at UCLA, and it is offered with one of the three transit agencies that serve UCLA, but not with the other two agencies. This experimental design allows us to compare the travel behavior of the faculty, staff, and students who live inside the area served by BruinGO, and those who live outside it, both before and after BruinGO began.

BRUINGO

UCLA is located on the west side of Los Angeles. Three major transit agencies serve the campus, but BruinGO includes only the Santa Monica Municipal Bus Lines (the Blue Bus), which serves all of Santa Monica and much of West Los Angeles (see Map) Five of the Blue Bus's 13 lines come directly to UCLA Students, staff, and faculty swipe their university ID card through an electronic reader when they board any Blue Bus, and the university pays the fare of 45¢ per ride The total fare payment for the eight-month pilot program (October 2000 to June 2001) was $640,000 for 62,700 eligible riders (36,900 students, and 26,800 staff and faculty), or $1 27 per person per month [4]

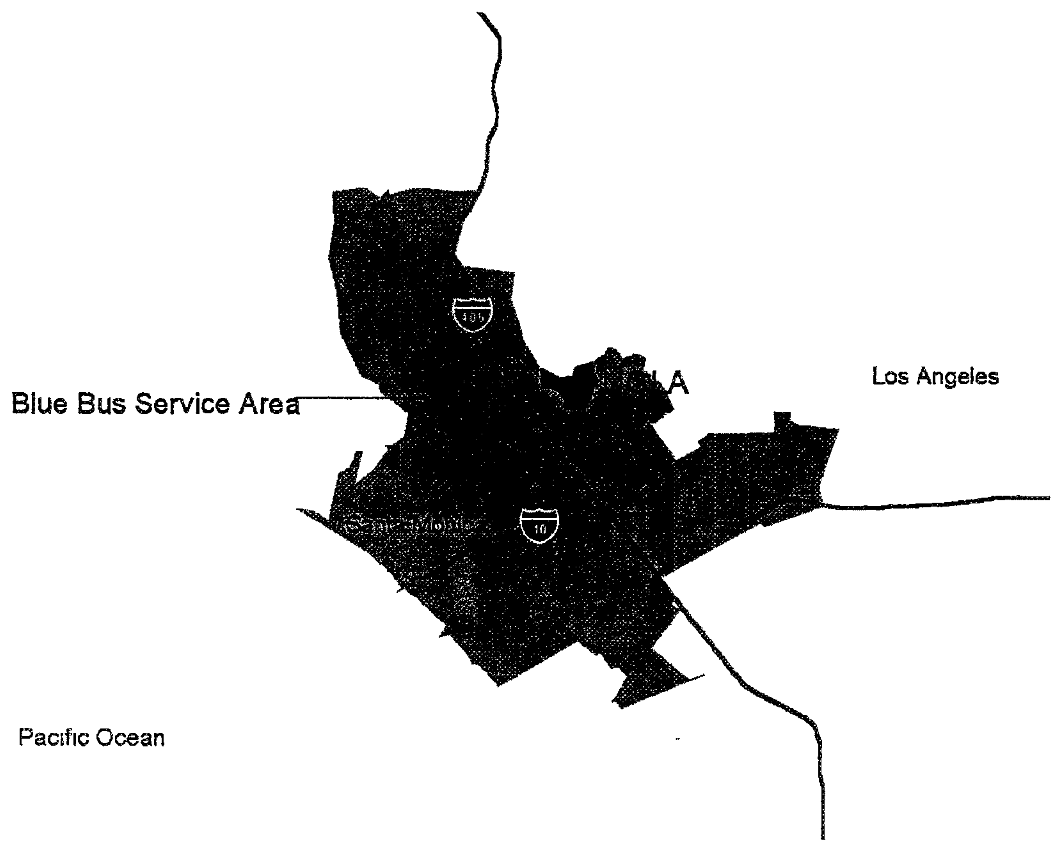
[Map]

BruinGO ridership during the pilot program was 1.4 million rides, or 6 percent of the 23 million rides made on the Blue Bus in 2000 Because fare-free transit was offered to only a small percentage of all Blue Bus riders, overcrowding did not become a problem. This sets BruinGO apart from traditional proposals to make transit free for *all* riders. If a transit agency offers free rides to everyone, total ridership can increase substantially. Beyond the resulting overcrowding, the agency loses all its existing fare revenue from current riders, and receives no revenue from the new ones With BruinGO, the Blue Bus continues to receive all the revenue from its current riders *and* gains additional revenue from the new riders From the transit agency's point of view, the main effect of BruinGO is that UCLA pays the fares for its own riders, so the transit agency loses nothing from the program

Because BruinGO includes only the Blue Bus, it is a natural experiment. UCLA faculty, staff, and students who live outside the Blue Bus service area are not offered an equivalent program, and they therefore serve as a control group for our analysis We can estimate BruinGO's effects on travel choices by comparing the commuting behavior of those who live *inside* and *outside* the Blue Bus service area. For our analysis, we define the Blue Bus service area as all of the zip codes that include a Blue Bus route to UCLA About 35 percent of all faculty and staff, and 46 percent of students, live inside the Blue Bus service area. [5]

EVALUATION METHODOLOGY

UCLA conducted transportation surveys of employees (faculty and staff) and of students before BruinGO began, and again after it had operated for six months [6] Because the respondents provided their addresses, they can be divided into two sub-groups. (1) those who live *inside* the Blue Bus service area, who serve as the experimental group, and (2) those who live *outside*, who



Blue Bus Service Area

serve as the control group [7] We can therefore compare the commute mode shares before and with BruinGO, and between the experimental group and the control group

BruinGO's effects can be estimated three ways. For the high estimate, we assume that BruinGO caused all the mode changes for commuting to campus after the Blue Bus became free For the medium estimate, we assume that BruinGO caused only the mode changes by those who live inside the Blue Bus service area. For the low estimate, we assume that the mode changes made by those who live outside the Blue Bus service area would have occurred inside it even if BruinGO had not been in place, and we therefore subtract them from the mode changes inside the service area to calculate the changes caused only by BruinGO

The "medium" and "low" estimates are both conservative By focusing only on those who live inside the Blue Bus service area, these estimates ignore mode changes made by those commuters who drive from outside the Blue Bus service area for part of their trip, park off campus, and ride the Blue Bus for the rest of their commute (an informal park-and-ride arrangement) For the medium estimate, we simply ignore these new riders. For the low estimate, we penalize BruinGO by subtracting them from the medium estimate.[8]

Three estimates of BruinGO's effects on commute mode shares

High	*Medium*	*Low*
BruinGO caused all mode share changes	BruinGO caused all mode share changes inside the BB service area	BruinGO caused all mode share changes inside the BB service area, less what occurred outside

Some of these new "outside" riders, however, were riding the Blue Bus A survey of BruinGO commuters found that 20 percent of them park on the street near a bus stop, and then take the Blue Bus the rest of the way to campus [9] The survey also found that 16 percent of BruinGO commuters live outside the Blue Bus service area.[10] For our low estimate of BruinGO's effects we thus include 16 percent of Blue Bus riders in the control group (those who live outside the Blue Bus service area), and therefore subtract some new riders from the test group (those who live inside the Blue Bus service area) when we should be adding them Our low estimate of BruinGO's effects is therefore extremely conservative

UCLA set three goals for BruinGO (1) increase bus ridership to campus, (2) reduce vehicle trips to campus, and (3) reduce parking demand on campus.[11] We examine whether BruinGO met these goals for two groups. employees (faculty and staff) and students.

HOW DID BRUINGO AFFECT FACULTY/STAFF COMMUTING?

Southern California has the worst air quality in the nation, and as part of its air quality management plan the South Coast Air Quality Management District (SCAQMD) requires employers of 250 or more employees to reduce their employees' vehicle commuting to work. To fulfill this requirement, employers conduct annual surveys of their employees' commute choices, and report the results in a standard format, similar to an income-tax return.[12] We can use these surveys to examine how BruinGO changed faculty/staff commuting behavior

Figure 1 shows the recent history of faculty/staff bus ridership. Between 1995 and 2000, the bus share for faculty/staff commuting declined in every year but one, and it fell from 9 2 percent in 1995 to 7.6 percent in 2000 In contrast, the share of *all* faculty and staff (both inside and outside the Blue Bus service area) who commute by bus jumped from 7.6 percent in 2000 to 13.1 percent in 2001—a 73-percent increase in just one year.[13]

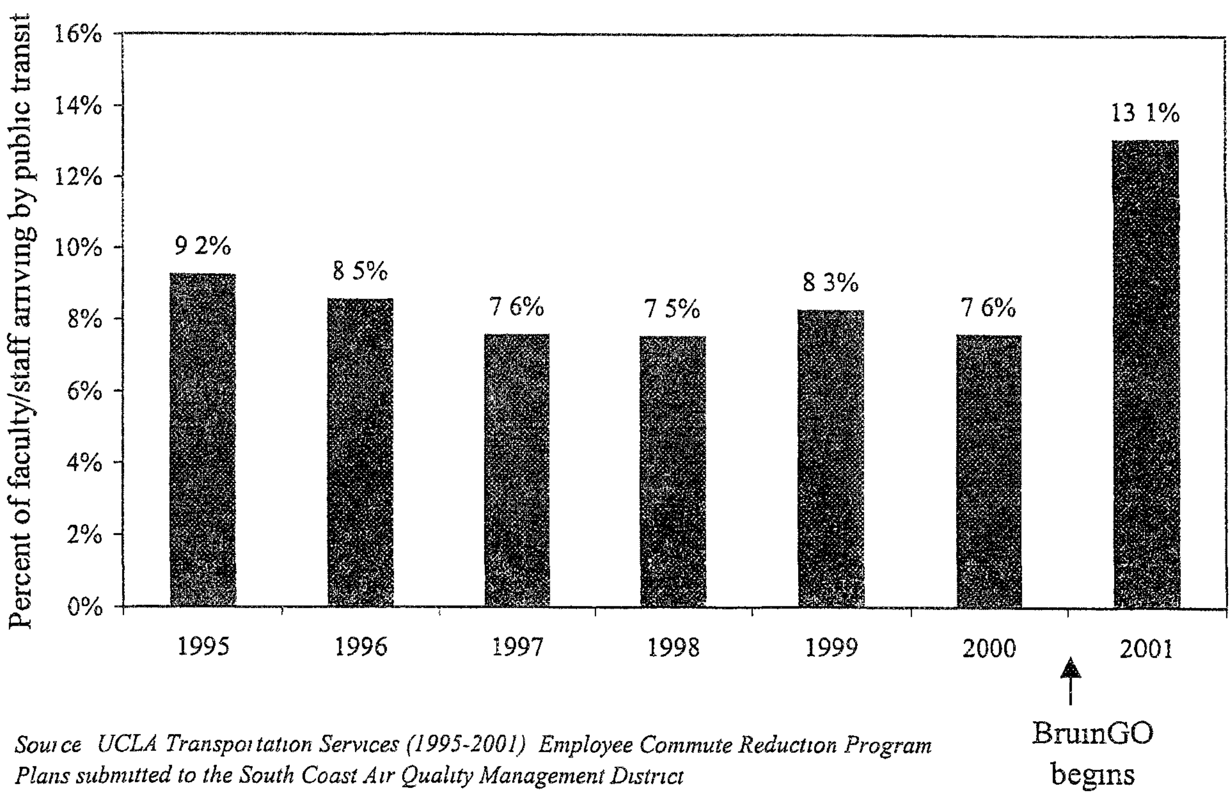
[Figure 1]

Do regional factors (such as gasoline prices) explain the large increase in bus ridership to UCLA between 2000 and 2001? Bus ridership was relatively unchanged at four nearby universities, while it increased substantially at UCLA (see Figure 2)[14] The decline in bus ridership at Santa Monica College, a 29,000-student community college located in the center of the Blue Bus service area, is particularly striking These comparisons suggest that BruinGO caused the large increase in bus ridership at UCLA.

[Figure 2]

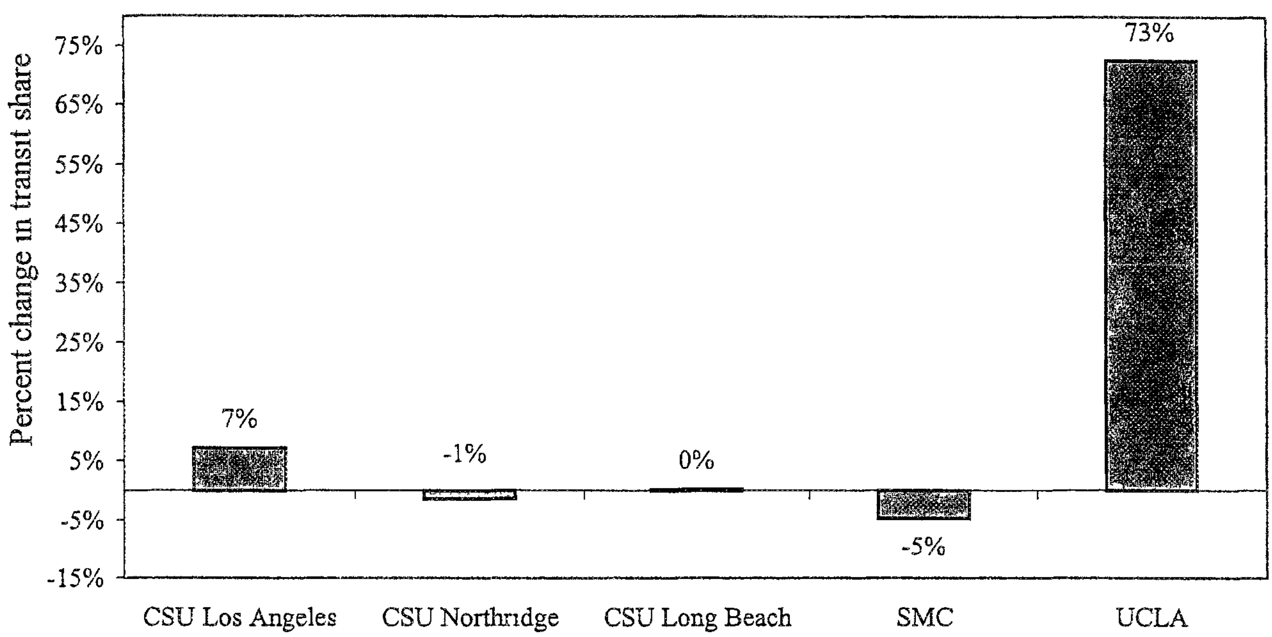
Because the bus share for commuting to UCLA increased by 5.5 percentage points between 2000 and 2001, and because 21,149 employees reported to work during the survey period in 2001, there were about 1,163 new bus riders to campus in 2001 (21,149 x 5 5%) This is the high estimate of BruinGO's effects it attributes all of the new bus riders to BruinGO. This unlikely to be the case because ridership to campus on non-Blue-Bus lines may also have increased To be conservative, we will not consider this high estimate further For the medium

FIGURE 1. Share of faculty and staff commutıng by bus (1995 - 2001)



Souı ce UCLA Transpoı tatıon Servıces (1995-2001) Employee Commute Reductıon Program Plans submıtted to the South Coast Aır Qualıty Management Dıstrıct

FIGURE 2. Change in faculty/staff transit share at five universities in Southern California (2000 to 2001)



Source Employee Commute Reduction Program Plans submitted by each university to the South Coast Air Quality Management District and low estimates of BruinGO's effects, we will examine only the increase in ridership *inside* the Blue Bus service area.

For UCLA faculty/staff commuters who live *inside* the Blue Bus service area, the bus mode share rose from 8 6 percent before BruinGO began to 20.1 percent afterward (see Table 1). The total number of faculty/staff bus riders increased by 134 percent after BruinGO began (11.5 ÷ 8.6) Fifty-seven percent of all bus riders after BruinGO began were new riders (11 5 ÷ 20 1) This is our medium estimate of BruinGO's effects.

Faculty/staff bus share for commuting

	Blue Bus Service Area	
	Inside	*Outside*
Before BruinGO	8 6%	7.2%
With BruinGO	20.1%	7.6%
Difference	11.5%	0.4%
Percent change	134%	6%

Source Crain & Associates (2002, Tables 3 & 4)

[Table 1]

One commuter rode the bus for every five solo drivers before BruinGO began, and this ratio rose to one bus rider for every two solo drivers with BruinGO.[15] For every 100 commuters who live inside the Blue Bus service area, 11 began to ride the bus after BruinGO began; four of these 11 switched from solo driving, four from carpools, two from vanpools, and one from biking or walking. The net result was a large shift from private vehicles to public transit for commuting to campus 37 percent of the new bus riders were former solo drivers, and the number of solo drivers fell by 9 percent In contrast, the mode shares for faculty and staff who live *outside* the Blue Bus service area remained within 1 percentage point of their 2000 values, and no change was statistically significant. This dramatic difference between the "inside" and "outside" results suggests that almost all the changes inside the Blue Bus service area were due to BruinGO

Although the mode share changes for those who live outside the Blue Bus service area were statistically insignificant, we can subtract these small "outside" changes from the "inside" changes to develop a conservative estimate of BruinGO's effects. Doing so produces our low estimate that BruinGO increased faculty/staff bus ridership by 128 percent, and reduced solo driving by 8 percent [16]

The startling 134-percent increase in UCLA employees' transit ridership after BruinGO began has significant implications for the broader concept of Eco Pass programs that allow any employer located within a transit agency's service area to purchase fare-free transit for all its employees at a bulk rate Only six US transit agencies (Dallas, Denver, Portland, Salt Lake City,

Table 1 Effects of BruinGO on commute mode shares

Mode	*Outside Blue Bus Service Area*					*Inside Blue Bus Service Area*					
	Before BruinGO	With BruinGO	Change	Percent change		Before BruinGO	With BruinGO	Change	Percent change Medium	Percent change Low	
(1)	(2)	(3)	(4)=(3)-(2)	(5)=(4)/(2)		(6)	(7)	(8)=(7)-(6)	(9)=(8)/(6)	(10)=(9)-(5)	
Faculty and staff											
Bus	7%	8%	0%	6%		9%	20%	11%	134%	128%	****
Drive alone	69%	68%	-1%	-1%		46%	42%	-4%	-9%	-8%	*
Carpool	15%	14%	-1%	-8%		13%	9%	-4%	-28%	-20%	***
Vanpool	5%	7%	1%	25%		3%	0%	-2%	-85%	-100%	
Bike	1%	0%	0%	-33%		4%	3%	0%	-8%	25%	
Walk	2%	3%	1%	43%		26%	25%	-1%	-5%	-48%	
Students											
Bus	11%	14%	3%	30%	**	17%	24%	7%	43%	13%	***
Drive alone	64%	59%	-5%	-8%	***	17%	12%	-6%	-33%	-26%	***
Carpool	15%	11%	-4%	-24%	***	5%	4%	-1%	-16%	9%	
Bike	1%	1%	0%	43%		5%	3%	-2%	-42%	-85%	
Walk	4%	5%	2%	38%	***	43%	45%	1%	3%	-35%	

* Changes in columns 4 and 8 are significantly different from zero at 10%

** Changes in columns 4 and 8 are significantly different from zero at 5%

*** Changes in columns 4 and 8 are significantly different from zero at 1%

**** Changes in columns 4 and 8 are significantly different from zero at 0.01%

Sources The data are taken from the Spring 2000 and Spring 2001 Student Transportation and Employee Commute Reduction Program Plan surveys conducted by UCLA Transportation Services Percentages may not add to 100% because of rounding

San Jose, Seattle) now offer Eco Pass programs, and the potential market for employer-based programs is much greater than for universities The large increase in transit ridership at UCLA shows that Eco Passes have great potential for increasing transit ridership

HOW DID BRUINGO AFFECT STUDENT COMMUTING?

UCLA Transportation Services surveyed students about their commuting choices in May 2000 (before BruinGO began) and again in May 2001, after BruinGO had operated for seven months. We can compare the results to estimate how BruinGO changed students' commuting behavior. Inside the Blue Bus service area, the bus share rose from 17 percent to 24 percent, while the drive-alone share fell from 17 percent to 12 percent For every 100 students who live inside the Blue Bus service area, seven began to ride the bus and two began to walk; five switched from solo driving, two from bicycles, and one from carpools The net result was a shift from private vehicles to public transit and walking. In 2001, 29 percent of student riders were new riders, and 71 percent of these new riders were former solo drivers. The number of student bus riders increased 43 percent, and the number of solo drivers fell 33 percent [17] This is our medium estimate of BruinGO's effects. In 2000 there was one bus rider for every solo driver, and in 2001 there were two bus riders for every solo driver within the Blue Bus service area.

Some of the mode changes by students who live inside the Blue Bus service area might have occurred without BruinGO. The mode shares for students who live outside the Blue Bus service area also changed, and we subtract these "outside" changes from the "inside" changes to develop a low estimate similar to our low estimate for faculty and staff. Our low estimate is that BruinGO increased student bus ridership inside the Blue Bus service area by 13 percent, and reduced student solo driving by 26 percent (see Table 1).[18]

FARE ELASTICITIES

Large increases in bus ridership and decreases in solo driving were also found at other universities that offer Unlimited Access programs. In his study of transportation on university campuses, James Miller (2001) found that the first-year ridership increases at universities with Unlimited Access programs ranged from 50 percent at the University of Florida to 200 percent at the University of Colorado at Boulder. James Meyer and Edward Beimborn (1998) found that when the University of Wisconsin-Milwaukee began its program in 1994, the number of students who commuted to campus by bus increased by 117 percent, and the number who drove alone fell by 24 percent The results at UCLA are remarkably similar to what happened at the University of Washington, which is very similar to UCLA in its urban location, size, and range of functions Michael Williams and Kathleen Petrait (1993, Figure 2) found that when Washington began its U-Pass program in 1991, the number of commuters who rode the bus to campus increased by 57 percent, and the number who drove alone fell by 30 percent At UCLA, our medium estimate is that the number of bus riders increased by 56 percent, and the number of solo drivers fell by 20 percent (see Table 2).[19]

[Table 2]

We can use the ridership increases at UCLA to estimate the fare elasticity of demand for transit commuting. Among those who live *inside* the Blue Bus service area, the medium estimate of the fare elasticity of transit demand is –0 28[20] A 10 percent reduction in the fare will increase bus ridership by 2.8 percent. The lower initial bus share for faculty/staff commuters before BruinGO began may help explain their higher fare elasticity

We can also use these data to calculate the cross-elasticity between the transit fare and the number of solo drivers to campus Our medium estimate is that the cross elasticity is 0 1.[21] A 10 percent reduction in the transit fare will reduce the number of solo-driver trips by 1 percent. This cross elasticity may seem low, but it leads to a large decrease in the number of solo drivers because both the fare reduction and the initial number of solo-driver trips are large.

These results are for BruinGO's first year During its second year (2001–2002), BruinGO ridership increased by 27 percent[22] This large second-year ridership increase echoes the experiences at other universities with Unlimited Access programs. AT UC Davis, for example, transit ridership increased by 10 percent per year during the decade following the creation of its program in 1990 (Brown, Hess, and Shoup 2001).

Three factors associated with Unlimited Access programs explain these long-term ridership increases service improvements, greater familiarity with the transit system, and changes in residential choices

First, the transit agencies receive more revenue as ridership increases, and they can improve their service to campus. The more convenient and reliable service then attracts more riders than would be expected from the fare reduction alone. The added demand and fare

Table 2. Effects of BruinGO on commuting from inside the Blue Bus service area

	Medium estimate			*Low estimate*		
	Percent change	Fare elasticity	Number change	Percent change	Fare elasticity	Number change
Faculty/staff bus riders	+134%	-0.67	+854	+128%	-0.64	+818
Student bus riders	+43%	-0.22	+1,248	+13%	-0.07	+384
Total bus riders	**+56%**	**-0.28**	**+2,102**	**+33%**	**-0.17**	**+1,202**
Faculty/staff solo drivers	-9%	+0.05	-304	-8%	+0.04	-260
Student solo drivers	-33%	+0.17	-992	-26%	+0.15	-760
Total solo drivers	**-20%**	**+0.10**	**-1,296**	**-16%**	**+0.08**	**-1,020**

revenue created by BruinGO allowed the Blue Bus to schedule 16 new buses on two of its lines to campus, while the new riders on the three other lines were carried with the existing capacity With the added service, 304 scheduled Blue Buses arrive at UCLA every weekday.[23]

Second, because BruinGO provides everyone with a transit pass, more people have an incentive to learn about transit service—where buses go, how often, and how late Most travelers know little about the modes they do not use, and public transit is not a part of most peoples' mental maps As people become more familiar with the transit system, however, they begin to use it for trips they previously believed it would not serve.

Third, and perhaps most important over the long term, students adjust their housing choices to take advantage of fare-free transit. Advertisements for student apartments now often emphasize "Blue Bus accessibility" as a selling point. As the share of students with easy access to public transit grows, ridership does too.

In summary, the ridership increases associated with Unlimited Access programs are not one-shot occurrences, but rather the beginning of a long-term trend BruinGO has fundamentally shifted the way many UCLA students, staff, and faculty view public transportation

HOW DID BRUINGO AFFECT PARKING DEMAND?

Before BruinGO began, 3,400 faculty and staff, and 3,000 students drove to campus alone from within the Blue Bus service area With BruinGO, 3,100 faculty and staff, and 2,000 students drove to campus alone Therefore, more than 1,000 commuters stopped driving to campus alone after BruinGO began (see Table 2) The campus parking spaces these former solo drivers had occupied became available for daily visitors or other students without permits

UCLA's wait list for parking permits confirms that BruinGO reduced campus parking demand. Students who apply for but do not receive a parking permit live in a kind of automotive purgatory, and UCLA considers the wait list an indicator of the "unmet need" for campus parking, even if a student lives only a block from campus. The wait list of "unparked" students declined from 3,969 in Fall Quarter 1999 (before BruinGO began) to 2,637 in Fall Quarter 2000 (during BruinGO's first year) Therefore 1,332 students left the parking wait list after BruinGO began. Some of these students may have received a permit given up by a new bus rider, and others may have decided not to apply for a permit because of BruinGO

BRUINGO ALSO SERVES MANY NON-COMMUTE TRIPS

Our evaluation has focused on commute trips, but students, staff, and faculty also use BruinGO for many non-commute trips. For example, staff and faculty ride the Blue Bus to off-campus worksites, an option that is especially useful for the many vanpool commuters who do not have a car available during the day. Even for those who do have cars available, riding the bus saves parking and unparking time at both ends of a trip, and for short trips this can make the bus faster than driving. As part of the pilot program evaluation, UCLA Transportation Services requested comments on BruinGO from the university community. More than 2,500 students, staff, and faculty responded, and we can look at their own words to see why they ride the Blue Bus for university business trips.[24]

> *My job requires a lot of travel around campus and Westwood in general. Since the BruinGO program started, my job has been made easier.*

> *When I travel between offices, taking the Blue Bus for free saves my time and UCLA's time.*

> *I use the Blue Bus for meetings in the Wilshire Center at least 3 days a week BruinGO saves a lot of time since I don't have to find parking and also saves UCLA money because I don't need validation. Not to mention the Wilshire traffic!!*

Students also use BruinGO for many non-commute trips Students reported that they rode free to the Getty Museum, their internships, volunteer work, the beach, or anywhere else they want to go. Whole classes take the bus to museums or public meetings. Again, comments sent to UCLA Transportation Services explain how BruinGO gives students access to many valuable social, educational, and job opportunities in Los Angeles

> *I am more likely to attend cultural events, concerts, and club meetings since I know that transportation will be so easy BruinGO allows me to get much more out of my education besides simply taking classes*

> *I feel like the whole city is laid out before me I use my Bruin Card to go to my internship at Loyola Marymount University*

> *As a teaching assistant, I believe that expanding learning outside the classroom (to museums) has always been a worthwhile experience Now, with BruinGO, it is a great deal easier for students to expand their horizons beyond campus and Westwood*

As an international student at UCLA, I have found it extremely reassuring and welcoming to be able to negotiate the landscape of Los Angeles with the help of BruinGO I arrived in LA without a car, and BruinGO facilitated the process of getting to know the city and the UCLA campus

These comments by students, staff, and faculty show that BruinGO does much more than change the way they commute to campus It helps students become more engaged with the city, and it helps staff and faculty be more productive in their work

MEASURING THE COST AND BENEFITS OF BRUINGO

BruinGO increased transit ridership, reduced solo driving, and caused more than 1,000 solo drivers to give up their parking spaces. Are these benefits sufficient to justify BruinGO's cost? Some costs and benefits accrue to the university, some to the transit agency, and some to society as a whole. We have estimated BruinGO's costs and benefits from the perspective of the campus community, because this is the population being asked to decide whether or not to continue the program.[25] We allocated the costs and benefits among four groups within the campus community: students, faculty and staff, university departments, and campus visitors.

The cost of BruinGO

BruinGO is funded entirely from parking revenue, which is derived from both daily parking fees and the sale of monthly parking permits. Of the total parking revenue, students pay 17 percent, faculty and staff pay 25 percent, university departments pay 4 percent (for university guests), and campus visitors pay 54 percent[26] We multiply these percentages times BruinGO's $810,000 total cost to allocate this cost, and the top panel of Table 3 shows the distribution.[27]

[Table 3]

The benefits of BruinGO

BruinGO provides many benefits to the campus community, but some are difficult to quantify For example, BruinGO helps the university recruit and retain employees and students, and it enhances the educational experience of students by providing access to local cultural sites. But BruinGO also provides two benefits that we *can* quantify reduced fare payments for riders, and reduced parking demand

Table 3. Measured annual costs and benefits of BruinGO

Distribution of costs						
Costs	Students	Faculty and staff	University depts	Campus visitors	Total	Share
BruinGO rides	$108,800	$160,000	$25,600	$345,600	$640,000	79%
BruinGO administration	$28,900	$42,500	$6,800	$91,800	$170,000	21%
Total cost	$137,700	$202,500	$32,400	$437,400	$810.000	100%
Percent of total cost	17%	25%	4%	54%	100%	

Distribution of benefits						
Benefits	Students	Faculty and staff	University depts	Campus visitors	Total	Share
Reduced fare payments	$399,000	$125,000			$524,000	16%
Reduced parking demand	$463,000	$682,000	$109,000	$1,472,000	$2,726,000	84%
Total benefits	$862,000	$807,000	$109,000	$1,472,000	$3,250,000	100%
Percent of total benefits	27%	25%	3%	45%	100%	

Comparing the benefits and costs					
Benefit-cost measure	Students	Faculty and staff	University depts	Campus visitors	Total
Net benefits (benefits – costs)	$724,000	$605,000	$77,000	$1,035,000	$2,440,000
Benefit/cost ratio	**6.3**	**4.0**	**3.4**	**3.4**	**4.0**

Reduced fare payments

BruinGO subsidizes individual riders, not the Blue Bus. The university pays the Blue Bus for each BruinGO ride, but students, staff, and faculty receive all the money.[28] Riders do not reach into their own pocket to pay the fare when they board the bus, but into the university's pocket. For those who were riding the bus before BruinGO began, the fare subsidy is a transfer payment to students, staff, and faculty because it replaces expenditures they would have made without the program. These existing riders made 909,000 rides using BruinGO, and we valued their fare-reduction benefit at 45¢ per ride.[29] The riders' benefit for the existing rides is thus $409,000 (909,000 rides x 45¢ per ride). For the new bus rides induced by BruinGO, the value to the riders is presumably less than 45¢ a ride, because they were unwilling to pay the fare before the program began. If we assume that the demand curve is linear (as shown in Figure 3), the value to riders is the area under the demand curve (the consumer surplus) for the 512,000 new rides, and the average value (to the rider) per ride is half the fare payment, or 22.5¢ per ride. The total value of the new rides is therefore $115,000 (512,000 rides x 22.5¢ per ride).[30] The combined fare-reduction benefit (increase in consumer surplus) for the existing and new riders is worth $524,000 ($409,000 + $115,000). Because students made 73 percent of the BruinGO rides, while faculty and staff made 27 percent, we allocate 73 percent of the fare reduction benefit to students, and 27 percent to faculty and staff.

[Figure 3]

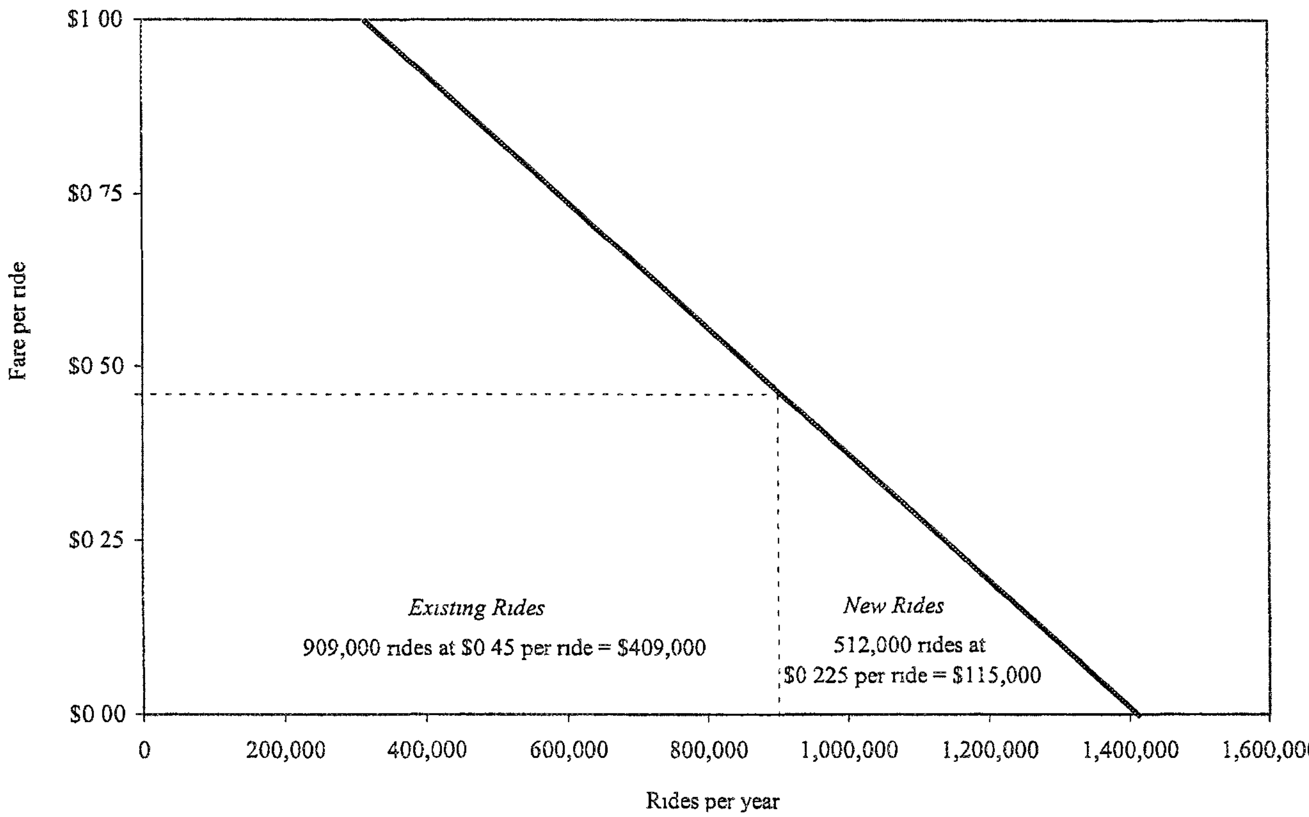
Because we count UCLA's fare payment to the Blue Bus as a cost, we must also count the fare savings for UCLA's riders as a benefit. Most of the university's spending for BruinGO becomes direct financial aid for students. Money not spent on bus fares can be put towards books and other expenses, so UCLA's dollars get used twice: first for transportation, and second, for student aid. Students sent many comments to UCLA Transportation Services describing this benefit.

> *I love the BruinGO program. I have like 700 bucks total ... no kidding, and the BruinGO program is like my lifeline.*

> *I save about $10 weekly, getting back and forth from school. $40 a month buys a lot of groceries.*

> *I know $1 a day doesn't seem like a lot, but being able to ride free means I can spend the $25 I save per month on other things ... like schoolbooks.*

FIGURE 3. Benefit of fare savings for BruinGO riders



A survey of student BruinGO riders in April 2002 found that 76 percent of them received financial aid from the university, so the fare subsidy effectively increases UCLA's financial aid packages.[31] Some riders also save far more than their bus fares. The survey found that 56 percent of riders own a car. When asked why they did not drive to campus, most of them said that they did not receive a parking permit or that a permit costs too much, but several volunteered that another person in the household had the car. One said "BruinGO is our second car." If BruinGO convinces a family that they can live with only one car, the money saved by forgoing a second car can amount to several thousand dollars a year for fuel, maintenance, insurance, parking, and other ownership costs.

Reduced parking demand

BruinGO riders save money, but they are also led, as if by an invisible hand, to promote another goal: reduce parking demand. The fare for a bus ride to campus is far less than the cost of building a parking space on campus, and avoiding the expense of new parking spaces is one of BruinGO's major benefits. BruinGO allows the university to satisfy its transportation demand with a smaller parking supply.

More than 1,000 former solo drivers who began to ride the bus after BruinGO began vacated the parking spaces they previously occupied, and these spaces are made available to new users. For these new users, the parking spaces vacated by former solo drivers are perfect substitutes for newly constructed spaces. We can therefore value the benefit of reducing parking demand by comparing it with the cost of increasing the parking supply. A new 1,500-space parking structure being built on campus will cost $47.3 million, or $31,500 per space.[32] Because UCLA is willing to pay $31,500 per new parking space, we can use this figure to represent the value to UCLA of making another space available. BruinGO "buys back" parking spaces from existing users, as opposed to building new spaces. Since BruinGO reduced the demand for parking by at least 1,020 spaces, the reduction in parking demand is worth $32.1 million (1,020 spaces x $31,500 per space, see Table 2).

The debt service of $2,414 per space per year for the capital borrowed to finance the parking structure shows the annual value of the one-time capital cost of a new parking space. When the operating cost is added, the annual capital and operating cost per new parking space is $2,673 per year (or $223 per month).[33] At this rate, the annual cost of 1,020 new parking spaces is $2.7 million (1,020 spaces x $2,673 per space). Because UCLA is willing to pay $2.7 million per year to increase the campus parking supply by 1,020 new parking spaces, we assume that reducing campus parking demand by 1,020 spaces is also worth $2.7 million per year UCLA increases parking fees to finance new campus parking spaces, and we therefore allocate the avoided cost of new spaces in proportion to the sources of campus parking revenue (see Table 3)

Even those who pay for parking receive a net benefit from BruinGO because it avoids the high cost of increasing the parking supply Drivers enjoy the financial benefit of reduced parking demand in the form of lower parking fees This benefit is worth $2 7 million, while BruinGO cost $810,000. Therefore, the benefit-cost ratio for drivers who pay to park is 3.4 to 1 ($2 7 million – $810,000). Because BruinGO is financed entirely by parking fees, drivers pay for bus riders, but *both* drivers and bus riders are better off.

Many students, staff, and faculty members wrote to UCLA Transportation Services to report that BruinGO reduced their demand for parking

> *I LOVE the BruinGO system I gave up my parking permit because of it*
>
> *Because of BruinGO, I have mothballed my car and take the bus to school every day, so BruinGO has been a tremendous benefit to me (and has stopped me from applying for a parking permit)*
>
> *I never plan to apply for a parking permit again*

New drivers who were formerly wait-listed for a parking permit, and campus visitors who are able to park more easily, don't realize that they also benefit from BruinGO, although they park in spaces vacated by former drivers

By reducing the demand for parking, BruinGO reduces the demand for building new parking structures on campus, makes parking more affordable and available for those who must commute to campus by car, and allows the university to use land for purposes other than parking By making more parking spaces available for visitors, BruinGO also allows more members of the Los Angeles community to take advantage of the campus's cultural and educational resources, and helps counter UCLA's image as an ivory tower with parking as its moat.

External benefits

Beyond its direct benefits to UCLA, BruinGO also produces benefits to all of Los Angeles If BruinGO reduces future parking construction and diverts trips from cars to public transportation, it reduces vehicle trips and vehicle emissions This is an important byproduct of fare-free transit, because Los Angeles has the worst traffic congestion and air pollution in the US We have not attempted to put a dollar value on the social benefits of reduced traffic congestion and air pollution, but we can suggest their magnitude by comparing BruinGO with the alternative strategy of building new parking structures The Environmental Impact Report (EIR) for UCLA's new 1,500-space, $47-million parking structure shows that it will generate 1 5 million additional vehicle trips to and from UCLA every year A parking structure does not, by itself, generate vehicle trips; rather, where there is a shortage of parking, a new parking structure will enable more vehicle trips. According to the EIR, these additional vehicle trips will exhaust 87 tons of carbon dioxide, 9 tons of nitrogen oxide, 14 tons of reactive organic gases, and 7 tons of particulates into the region's air every year.[34] By reducing the demand for vehicle trips, BruinGO can create substantial environmental benefits for the entire region

Comparing the benefits and costs of BruinGO

We can now compare the measured benefits and costs of BruinGO. BruinGO's benefit/cost ratio exceeds 1 0 for every group considered The students' exceptionally high benefit/cost ratio of 6.3 to 1 helps explain the many enthusiastic comments that students have sent to UCLA Transportation Services about BruinGO.

> *BruinGO is one of the smartest things UCLA has done in years With this program, I feel UCLA is finally showing it cares for students.*
>
> *I am a first year graduate student and I do not have the words to adequately describe how wonderful it is to have a free transportation system available to me*
>
> *BruinGO makes me feel proud to be a Bruin*

The bottom panel of Table 3 shows that BruinGO's measured benefits are $3 3 million a year (for fare savings and reduced parking demand), and its costs are $810,000 a year (for fare payments and administration) Even when the unmeasured benefits are neglected, the net benefit is $2.4 million a year, and the overall benefit/cost ratio is 4 to 1

DIFFICULTY IN PREDICTING RIDERSHIP AND COST

The pilot program for BruinGO proved to be a success. But because Unlimited Access is a novel concept, many people have difficulty understanding how it will work, and predicting the ridership and cost is difficult We can show this difficulty by comparing the predictions made before BruinGO began with the results observed during the pilot program in 2000-2001 (see Table 4)

(Table 4)

In 1998, UCLA hired a transportation consultant to predict the ridership and cost of a transit-pass program for faculty and staff. The consultant predicted that fare-free transit for faculty and staff would cost $170,000 per month (exclusive of administrative costs). BruinGO's actual cost for faculty and staff amounted to only $19,200 per month in 2000-2001, or 11 percent of the predicted cost.[35]

Why did the consultant overestimate BruinGO's cost? The main reason seems to be a misunderstanding of how a university transit-pass program works. The consultant assumed that UCLA would buy a regular transit pass (at a cost of $42 per month) for all employees who do not have a UCLA parking permit. The consultant also assumed that most employees who receive these transit passes would not use them. This misunderstanding helps to explain why the consultant overestimated BruinGO's actual cost by 885 percent. Although BruinGO gives free transit to everyone at UCLA (not just to those without a parking permit), it costs 89 percent less than the consultant predicted.[36]

The consultant also predicted that fare-free transit would attract only 315 new faculty/staff riders, but BruinGO attracted at least 800 new riders, or more than 260 percent of what was predicted.[37] What explains this error? The consultant assumed that the fare elasticity of demand for transit ridership would be only –0.18, which is extremely low. In reality, the fare elasticity for faculty and staff turned out to be between –0.67 and –0.64, more than three times greater.[38] The consultant also used the *point* elasticity rather than the *arc* elasticity that economists recommend for predicting the effects of large fare changes (in this case a 100-percent reduction); this arithmetic error reduced the predicted ridership by another 50 percent.

These difficulties in predicting the effects of BruinGO show the value of UCLA's decision to offer a pilot program. UCLA, the Big Blue Bus, and the riders themselves could not fully understand how a transit-pass program works without the actual trial run. BruinGO's high ridership and low cost are a welcome departure from many transportation investments that attract fewer riders and cost more than consultants predict.

Table 4. Predicted and realized results of a transit-pass program for faculty and staff

	Consultant prediction (1)	BruinGO result (2)	Result as % of prediction (3)=(2)/(1)
Fare subsidy ($ per month)	$170,000	$19,200	11%
Transit ridership increase (riders per day)	315	818	260%
Reduction in parking demand (spaces per day)	150	260	173%

Source Consultant's predictions are from Crain & Associates (1998) Results are taken from the low estimates discussed earlier

CONCLUSION

The substantial mode shifts caused by BruinGO refute the common assumption that fare-free transit cannot entice commuters from their cars Transit ridership for commuting to campus increased by 56 percent during BruinGO's first year, and solo driving fell by 20 percent Because these startling results were achieved in a city famous for its addiction to cars, they suggest that Unlimited Access will work almost anywhere

If Unlimited Access can produce so many benefits for students, universities, and transit agencies at such a low cost, why don't more universities offer it? More universities *are* offering it every year, and it is also spreading to other settings. Six transit agencies in the US offer Eco Pass programs that allow all employers to purchase transit passes for all their employees at a heavily discounted fare. A few transit agencies have even taken the idea beyond the workplace In Seattle, the transit system has arranged for game tickets to serve as transit passes on game days at the University of Washington football stadium. In Silicon Valley, the transit system allows residential developments to buy Eco Passes for all residents.

Unlimited Access programs contribute to so many important planning goals: transportation demand management, smart growth, transit-oriented development, energy conservation, clean air, and sustainable cities Few transportation planning reforms produce such large benefits at such low cost, and have so much potential for growth.

APPENDIX: THE COST AND PRICE OF CAMPUS PARKING

Inefficient pricing causes UCLA's parking shortage. The price of parking is the same for all spaces on campus, regardless of their location or the time of day. Prices are set not to manage the supply efficiently, but only to cover the total cost of the parking system, and the resulting problems shouldn't surprise us The demand for parking exceeds the supply during peak hours, and students who cannot obtain a permit place themselves on the wait list. The UCLA Transportation Service views this wait list as a measure of "unmet need," and responds by building new parking structures

Because the price of a parking permit is far below the cost of new parking spaces, drivers who park in a new structure pay only a small fraction of the spaces' actual cost. UCLA's newest 1,500-space parking structure costs $31,500 per space, or $223 per space per month, while the price of a permit to park in it is only $52 per month UCLA makes up the difference by raising the price of all parking on campus. Because the marginal cost of adding to the parking supply is so far above the average cost for the system, every addition to the parking supply drives up this average cost. Every time a new parking structure comes on line, the price of all permits jumps (see Figure 7) New structures open and permit prices increase, yet the shortage persists. Even after spending $330 million (in 2002$) to construct 18,000 parking spaces during the last 40 years, UCLA cannot provide a parking space for every student who is willing to pay the system's average cost for a permit

[Figure 7]

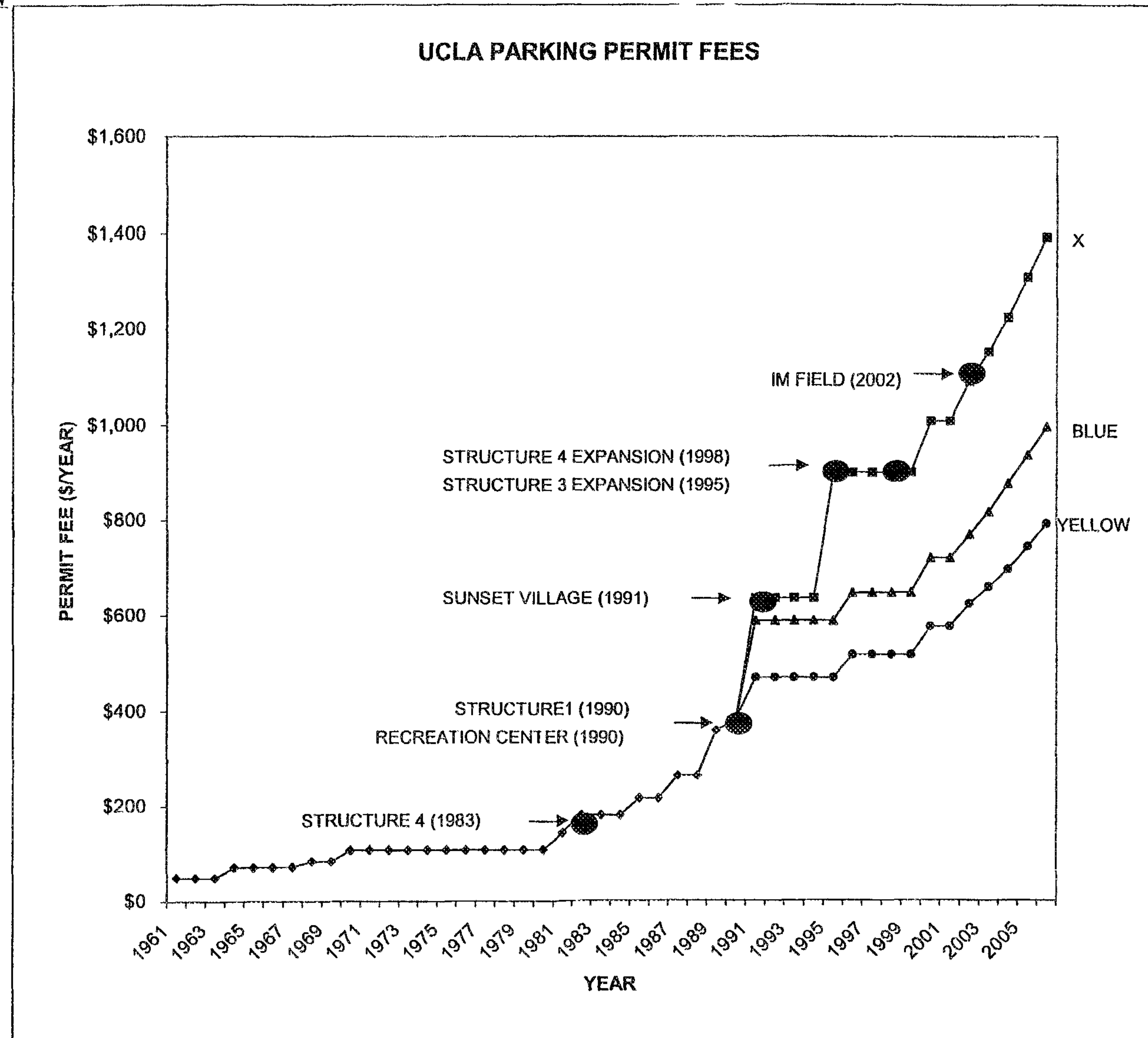
Given the current pricing system, UCLA will never have enough parking spaces, because the problem is not a shortage of spaces Instead, the problem is the way UCLA charges for parking. Only two universities in the US have more parking spaces than UCLA. Ohio State University has 25,000 spaces, and the University of Florida has 24,000 spaces. Both are large campuses in towns with relatively low land values, while UCLA, with 21,000 spaces, is a much smaller campus in West Los Angeles, which has among the highest land values on earth. If UCLA reaches the parking cap of 25,169 parking spaces adopted in its Long Range Development Plan, it will have more parking spaces than any other campus in the country But constructing expensive new parking spaces and undercharging for them is like feeding pigeons. the more spaces you build, the more cars will come to fill them, and there will always be a shortage.

Instead of reaching for its parking cap, UCLA should reach for its thinking cap The solution is *not* to charge $223 a month—the marginal cost of a new parking space—for a parking permit. A more promising approach is to change the way the university allocates parking to students. Currently, UCLA uses a "need based" point system to allocate parking permits. Points are awarded for commuting distance to campus, and students with the highest number of points (longest commutes) are given the best parking spaces Unfortunately, the "need-based" point system encourages students to falsify information on their parking applications to make their commutes seem longer and thus "earn" a desired parking space Students are led to believe that the only way to get parking at UCLA is to cheat the system, and this is notoriously easy to do. Students who live close to campus report their parents' addresses in Long Beach or Anaheim as their own, and they

UCLA PARKING PERMIT FEES ($/YEAR)

UCLA PARKING PERMIT FEES ($/YEAR)

YEAR	ALL	X	BLUE	YELLOW
		PERMIT TYPE		
1961	$50			
1962	$50			
1963	$50			
1964	$72			
1965	$72			
1966	$72			
1967	$72			
1968	$84			
1969	$84			
1970	$108			
1971	$108			
1972	$108			
1973	$108			
1974	$108			
1975	$108			
1976	$108			
1977	$108			
1978	$108			
1979	$108			
1980	$108			
1981	$144			
1982	$180			
1983	$180			
1984	$180			
1985	$216			
1986	$216			
1987	$264			
1988	$264			
1989	$360			
1990	$384			
1991		$636	$588	$468
1992		$636	$588	$468
1993		$636	$588	$468
1994		$636	$588	$468
1995		$900	$588	$468
1996		$900	$648	$516
1997		$900	$648	$516
1998		$900	$648	$516
1999		$900	$648	$516
2000		$1,008	$720	$576
2001		$1,008	$720	$576
2002		$1,092	$768	$624
2003		*$1,152*	*$816*	*$660*
2004		*$1,224*	*$876*	*$696*
2005		*$1,308*	*$936*	*$744*
2006		*$1,392*	*$996*	*$792*



automatically get parking. Apart from the serious ethical problems this "need-based" system creates, it also creates serious economic inefficiency. The wait list for parking is used to justify the construction of parking spaces that cost far more than the price charged for parking in them, and many of the new spaces are allocated to students who live near campus

Is there a better way to manage UCLA's parking supply—a lower cost alternative that is fair, efficient, and does not encourage the cheating that many believe runs rampant in the current point system? There is, and other universities already use it.

Transportation Prices Turned Upside Down

UCLA sells parking permits to students either for the quarter or the year. Students thus pay a fixed cost for the parking permit and a zero marginal cost for parking on each trip. This arrangement increases the demand for parking once students have bought their permits The zero marginal cost of parking encourages excessive use of scarce spaces during peak hours, increases the "need" for parking, and leads to shortages that generate demands for more campus parking. The permit system is designed for conventional commuters who come to campus five days a week and stay on campus all day Students who come to campus only on certain days, or who do not remain all day, or who drive to campus only occasionally, are ill-served by the permit system.

Some universities—such as the University of Oregon and the University of Wisconsin—have reversed this relationship between the fixed and the marginal costs of parking by using in-vehicle parking meters (which resemble debit cards) to pay for parking Students can use in-vehicle parking meters to pay for parking by the hour in all parking structures and lots (see box). They pay for parking on every trip, and they pay only for the exact time they use—no more, no less. This arrangement gives everyone an incentive to consider the alternatives to solo driving for every trip Students can always save on parking by carpooling, riding transit, bicycling, or walking.

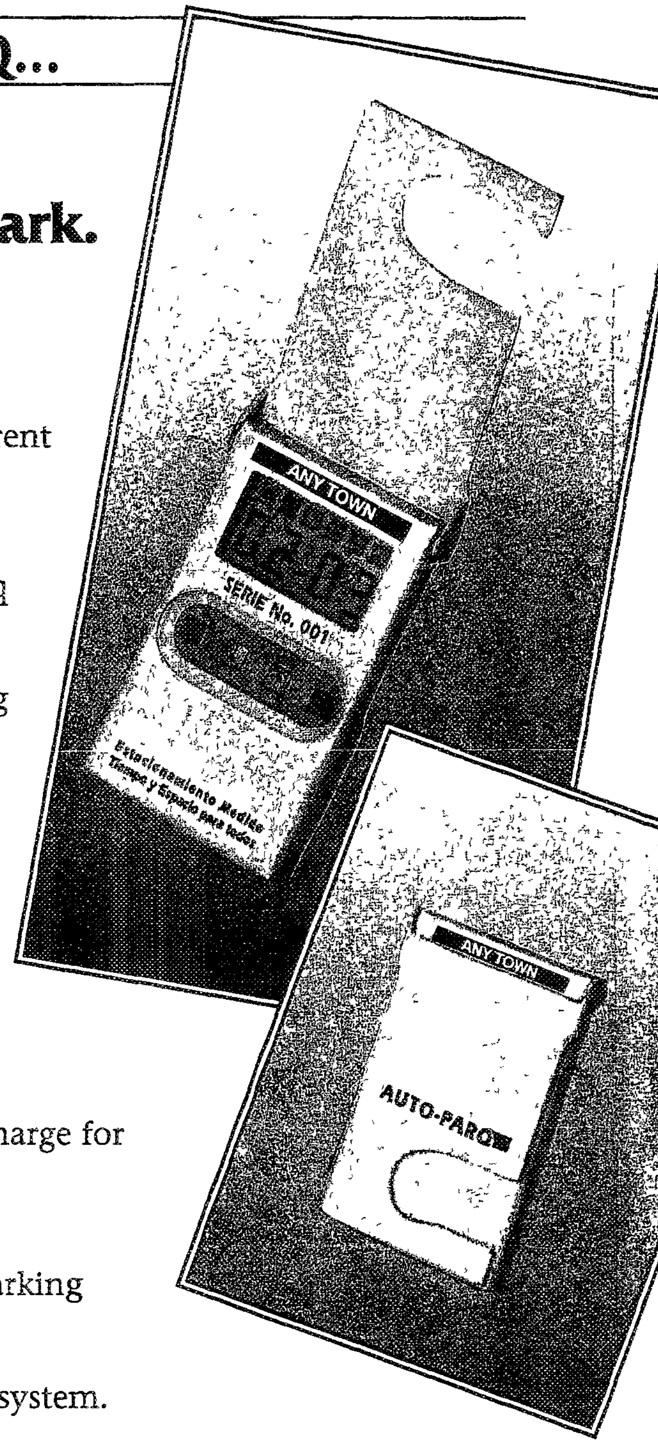
Using Prices to Manage the Parking Supply

BruinGO reduced parking demand by at least 1,000 spaces, and the IM Field Parking Structure will increase the parking supply by 1,500 spaces in Fall 2002 Rather than allocate all of the new spaces to students on the wait list for permits, we can price more parking spaces by the hour, and use the revenue to fund BruinGO. But if we make additional spaces available for hourly parking, what price should be charged for them? Prices should not be set to recover a fixed cost, but to match demand with the available supply. This means charging "market clearing" prices for parking. Everyone who already has a parking permit can keep it at the current price, but we can charge flexible prices for the vacancies that BruinGO makes available

What is the "right" price for parking? It is the price that balances the demand for parking—which varies over time—with the fixed supply of spaces If prices are just high enough to keep a few curb spaces vacant at every location, drivers can always find a vacant space near their destination The purpose of charging the right price for parking is to ration a scarce resource, *not*

DUNCAN INDUSTRIES

AUTOPARQ...



It's changing the way people park.

AutoParq Features

- Programming for up to twenty time zones with different rates for each zone.
- Use with other systems or as a new "stand alone" system.
- Increase controlled parking area by adding "AutoParq Parking Only" in fringe areas of current metered area with no capital investment.
- Optional penalty system provides means for charging higher rates for overtime parking.
- Maintenance free.
- Discourages theft - each AutoParq can be programmed with a personal identification code prohibiting unauthorized access.
- Non-Contact reloading.

Revenue Advantages To Parking Authorities

- Flexibility to change time and rate structures at no charge for up to 20 different parking zones.
- No initial capital investment in costly equipment.
- No maintenance costs.
- Allows for charging higher fees than conventional parking systems.
- Timed parking fees collected in advance.
- Encourages parking turnover using optional penalty system.
- Multi-City use.
- Reduced Collection Costs.

User Benefits - Convenience

- No need to carry coins or tokens.
- System is fair - charging only for the actual time parked.
- Motorist receives receipt whenever parking time is purchased.

AutoParq made in USA

DUNCAN INDUSTRIES
340 Industrial Park Road
P.O. Box 849
Harrison, AR 72601

1-800-338-6226
(501) 741-5481
Fax: (501) 741-2868

to finance the cost of providing it. Public agencies often price at cost regardless of the market, but parking should be priced at market regardless of cost

If the goal of right pricing is to achieve a vacancy rate that allows drivers to park anywhere, what is this rate? Traffic engineers usually recommend that at least 15 percent of spaces remain vacant to ensure easy access and egress. This cushion of vacant spaces eliminates the need to search for a place to park. If we accept this recommendation, the right price for parking should vary through the day to produce a stable vacancy rate of about 15 percent When the price is *not* right, too many spaces will be empty (the price is too high), or shortages will appear (the price is too low).

Figure 12-1 illustrates this "market-clearing" price for parking (the price at which demand equals supply) The supply of spaces at any site is fixed, so a vertical line positioned at the 85-percent occupancy rate represents the supply of spaces available with a 15-percent vacancy rate The demand curve for parking slopes downward, and the point where this demand curve intersects the vertical supply curve shows the price that will clear the market for spaces For example, when demand is high (demand curve D_1), a price of 60¢ an hour produces a 15-percent vacancy rate. When demand is moderate (demand curve D_2), a price of 20¢ an hour produces a 15-percent vacancy rate. When demand is low (demand curve D_3), the vacancy rate is 50 percent even with free parking, so the right price of parking is zero.

Figure 12-1

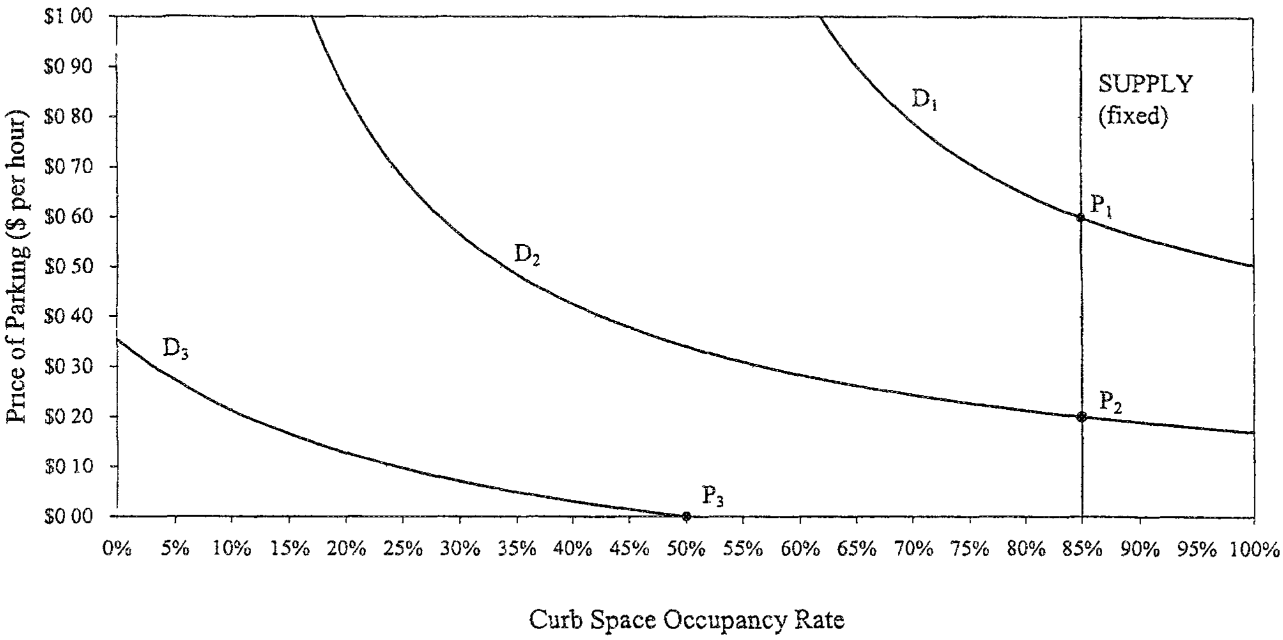
We can rely on prices alone to maintain a few vacancies and to create turnover The parking supply is fixed, but demand rises and falls during the day, so demand-responsive parking prices will necessarily rise and fall to maintain the desired vacancy rate. If the price is too low, overcrowding results If the price is too high, many spaces remain vacant and a valuable resource is underused Obviously, prices can't constantly fluctuate to maintain a vacancy rate of *exactly* 15 percent, but they can vary sufficiently to avoid chronic overcrowding or underuse.

A variable price for parking may seem impractical at first, but the price of most commercial parking varies by time of day and day of the week. Parking lot operators instinctively raise prices when their occupancy rates approach 100 percent, and some operators claim they don't own a "full" sign because they never need one. To set the prices for on-street parking, UCLA could use the traditional four-step process that commercial operators use to set prices for off-street parking

1. Look to see if your lot is full or empty
2. Then check your competition
3. If you are full and they are empty, raise your price
4. If you are empty and they are full, lower your price

Campus parking should *not* be priced like a private parking lot, however, because commercial operators aim to maximize private profits, not social benefits Nevertheless, this example does show that we can vary the price of parking to create vacancies The purpose of "right-priced" parking is

FIGURE 12-1
THE MARKET PRICE OF CURB PARKING



not to gouge drivers or to maximize revenue. Instead, *the right price of parking is the lowest price that will avoid shortages*

The price of campus parking for those who pay by the hour should vary according to (1) location on campus, (2) time of day, (3) day of the week, and (4) time of year The price of parking for those using in-vehicle meters should be set to clear the market for the number of spaces made available to these users in each structure. That is, the price of parking should be set to match the quantity demanded with the available supply, at each location and time Prices should be lower in the less convenient locations and at off-peak hours Parking could even be free on weekends and during vacations when there is excess capacity even at a zero price, and this would encourage travel to campus during uncrowded times.

Parking spaces priced by the hour can be introduced as a demonstration project, perhaps for a small sample of students, staff, and faculty who choose not to buy a conventional permit. Offering a few hundred market-priced spaces on an hourly basis will show how the new option works, and if the users prefer them to monthly permits, the option can be expanded incrementally to meet the demands of other non-permit holders The results of the demonstration project can be carefully evaluated before proceeding to more widespread adoption

Advantages of a Market-Priced Parking Program

1. All students will be able to obtain parking at UCLA, while only one out of six students now obtains a permit under the point system.

2 By encouraging more rapid turnover of the better-located parking spaces, the existing parking supply can serve more students

3 All students will be treated the same The Parking Service will not judge whether a student "needs" parking

4 Low-income students can be allocated financial aid to help them with their transportation needs. The existing need-based "point" system gives no preference to low income students.

5 Students will pay only for the exact parking time they use—no more or no less Charging only for the time actually used on each trip will give everyone an incentive to consider alternatives to solo driving for every trip to campus. Students can save money by carpooling, by parking in a peripheral location, or by riding transit, bicycling, or walking Under the point system, once a student has paid the fixed cost of a parking permit, the marginal cost of parking is free for every trip to campus, and this leads to overuse.

6 Students will have more flexibility They can pay a higher price to park in the more central spaces when they are in a hurry, or when they want to park for a short time. When they have

time to spare or want to park all day, they can save by parking in the cheaper, peripheral spaces. All students can park in the more convenient locations at off-peak times. Moreover, students want flexibility in parking location because their specific destinations on campus can change from day to day. Students who want to spend only a short time on campus—such as a quick trip to the library—will not have to spend a long time walking from their "assigned" parking space to their final destinations. The faster turnover of the most convenient central parking spaces will make more of them available to more students.

7. Areas where high parking demand leads to high parking prices will signal where new parking spaces should be made available to students. This will create a dynamic, self-correcting parking system that shows when and where new parking spaces should be built.

8. Lower off-peak prices will draw people to campus during the summer, in the evenings, and on weekends when the university has empty parking spaces waiting to be used. The result will help to make UCLA a 12-month-a-year institution.

9. Students with disabilities can be offered transportation allowances to park in the best-located spaces, enhancing their access to the campus and their overall mobility.

10. Highly-recruited students can be offered transportation allowances to be used for parking on campus or for any other purpose. By rewarding academic excellence, the transportation allowance can further the academic mission of the university.

11. In-vehicle parking meters are already effective in managing the parking supply at other universities.

12. Any additional revenue raised by the metered-parking program can be used to provide new transportation services for students, including BruinGO.

In conclusion, right pricing should be considered as a practical and theoretically appealing alternative to the current point system for allocating parking spaces to students, staff, and faculty who do not buy monthly permits. In-vehicle parking meters will allow a market to match parking supply with parking demand. Flexible prices will introduce fairness, efficiency, and honesty into the parking space allocation process.

In combination, in-vehicle meters for parking *and* BruinGO for transit will change the price of travel to campus in two important ways. First, the meters will shift the price of parking to a marginal cost with no fixed cost. Second, BruinGO shifts the price of transit to a fixed cost with no marginal cost. These price reforms will make it cheaper for students to drive to campus when they carpool, or intend to stay for only a short time, and will encourage students to ride the bus when they want to stay on campus all day. In-vehicle meters for parking *and* BruinGO for transit will together have a much greater impact on travel behavior than will either one acting alone. In combination, they will turn transportation prices upside-down.

Endnotes

1 The transit mode share data come from the 1990 and 2000 US census, available at <http //www census gov>. We calculated the average bus occupancy using data from the National Transit Database In 2000, transit patrons traveled 18 8 billion passenger miles by bus, and transit agencies provided 1 7 billion vehicle revenue miles of service Dividing the 18 8 billion passenger miles by the 1.7 billion vehicle revenue miles gives an average bus occupancy of 10 7 passenger miles per bus mile (18.8 – 1.7 = 10 7). Dividing the average bus occupancy of 10 7 passengers by the average bus capacity of 40 seats gives an average bus occupancy of 27 percent (10 7 – 40 = 27 percent) See Federal Transit Administration (2001).

2 Transportation accounted for 66 4 percent of US oil consumption in 1996, and highway transportation accounted for 78.3 percent of US oil consumption for transportation Therefore, highway transportation accounted for 52 percent of US oil consumption (66 4% x 78 3%). The US also consumed 25 7 percent of the world's oil production in 1996. Therefore, highway transportation in the U S consumed 13 4 percent (slightly more than an eighth) of the world's total oil production (52% x 25.7%) Highway transportation refers to travel by cars, trucks, motorcycles, and buses. See Stacy Davis (2000, Tables 1.3, 2 10, and 2.7) for the data on energy consumption in the US.

3. Universities have given their programs a variety of names—such as BruinGO, ClassPass, SuperTicket, and UPass We refer to these programs collectively as Unlimited Access See Brown, Hess, and Shoup (2001) for a survey of 35 Unlimited Access programs There were more than sixty programs by 2002

4 BruinGO was launched as an eight-month pilot program. UCLA paid $640,000 for student, staff, and faculty rides, and spent an additional $170,000 in administrative and marketing expenses, for a total cost of $810,000 BruinGO is funded entirely from parking revenue, which is derived from both daily parking fees and the sale of monthly parking permits UCLA and the Blue Bus renewed the program for the 2001-2002 and 2002-2003 school years.

5 The Blue Bus service area is defined as the zip codes that include the five Blue Bus lines that serve UCLA· 90024, 90025, 90034, 90035, 90049, 90064, 90066, 90291, 90401, 90402, 90403, 90404, and 90405 Crain and Associates (2002, 21) report that 7,424 of the 21,149 employees (35%) surveyed in 2001 live inside the Blue Bus service area Boyd et al (2002) report that 17,102 of the 36,084 students (44%) live inside the Blue Bus service area

6 There were 4,565 faculty, staff, and student respondents in 2000, and 3,614 in 2001.

7. Crain and Associates (2002, Tables 3 and 4) report the separated results for faculty and staff, while Boyd *et al* (2002) report the results for students

8 The medium and low estimates are also conservative because, over time, people may relocate their residences to take advantage of BruinGO. Students are often new to the community, and they move often, so they can easily adjust their housing locations in response to the free public transit.

9. Santa Monica Municipal Bus Lines (2002, Table 5-1). The sample size was 763 BruinGO riders.

10. Santa Monica Municipal Bus Lines (2002, Table 3-1). Some commuters who live inside the Blue Bus service area probably park and ride because, although they live in a zip code served by the Blue Bus, they do not live within walking distance of a bus stop.

11. UCLA Transportation Services Advisory Board (1999) reports BruinGO's goals.

12. The SCAQMD requires employers of 250 or more employees to conduct employee travel surveys during the four-hour peak-arrival period of 6 a.m. to 10 a.m. from Monday to Friday. UCLA had 27,644 employees who reported to work between 6 a.m. and 10 a.m. in 2001, and 77 percent of them, or 21,419 employees, commuted to campus on an average day. The text of the SCAQMD's regulation is available online at <http://www.aqmd.gov/trans/doc/rule/index.html>

13. UCLA's Employee Commute Reduction Program Plans show that the share of UCLA employees who commute by public transit rose from 7.6 percent in 2000 to 13.1 percent in 2001, a 5.5 percentage-point increase. The number of daily transit trips increased from 1,625 before BruinGO (2000) to 2,805 with BruinGO (2001), an increase of 1,180 daily transit trips. This is a 73-percent increase in transit ridership in one year. Campus parking fees increased by 11 percent in July 2000, and this may have contributed to the increase in transit ridership to campus in 2001. But the prices of campus parking permits also increased by between 22 and 66 percent in 1991, while transit ridership fell by 1 percent the following year. And the prices for permits increased by 10 percent in 1995, while transit ridership fell by 7 percent in the next year. Therefore, the 11-percent increase in parking fees in 2000 is unlikely to have caused the 73-percent increase in transit ridership in 2001.

14 The four universities are: California State University, Los Angeles; California State University, Northridge; California State University, Long Beach; and Santa Monica College.

15 The ratio of bus riders to solo drivers rose from 9%/46% before BruinGO to 20%/42% with it.

16 An example shows how we calculated the low estimate. Consider the case of faculty/staff bus ridership. The employee survey shows there were 638 faculty/staff bus riders before BruinGO, and 1,492 with BruinGO, an increase of 854 riders, or 134 percent. There was a 6 percent increase in faculty/staff bus riders *outside* the Blue Bus service area. We might expect that bus ridership *inside* the Blue Bus service area would have increased 6 percent without BruinGO; this would have resulted in approximately 35 new bus riders (638 x 6%= 35). Thus,

we assume that BruinGO is responsible for 818 new riders (854 – 35= 818), or a 128 percent increase in bus ridership (818 ÷ 638) By contrast, the high estimate discussed earlier showed that overall bus ridership to campus increased by 1,163 new riders in 2001

17 Parking permit holders also use BruinGO. UCLA Transportation Services surveyed a random sample of 2,473 parking permit holders during February 2002 to learn about their BruinGO use The survey found that 9.6 percent of all parking permit holders used BruinGO for commuting to or from campus during the previous week, and they used BruinGO for an average of 4.0 one-way commute trips per week. Among permit holders who live within any zip code served by the Blue Bus, 18 7 percent rode the bus to or from campus during the previous week, and they made an average of 3.8 trips per week.

18 The bus share for students who live *outside* the Blue Bus service area rose from 11 percent to 14 percent, the drive-alone share fell from 64 percent to 59 percent, and the carpool share fell from 15 percent to 11 percent The large increase in bus ridership could be a function of students' propensity to park off campus and ride the Blue Bus the rest of the way to campus The large increases in walking and bicycling are probably a function of the small sample size.

19 We combined the student data with the faculty/staff data to calculate these numbers The combined survey and swipe data show there were 909,000 bus riders per year before and 1.4 million bus riders per year after BruinGO, an increase of 56 percent. The survey data also show there were 6,369 solo drivers per day before and 5,072 solo drivers per day after BruinGO, a decrease of 20 percent The change in the number of travelers by each mode is calculated by multiplying the change in mode shares after BruinGO began by the number of commuters who live in the Blue Bus Service area: 7,424 faculty/staff and 17,102 students

20 Elasticity measures the percent change in ridership divided by the percent change in fare. When fare changes are large, as with BruinGO, the preferred measure of elasticity of demand is the logarithmic arc elasticity. But the logarithmic arc elasticity is undefined when the fare is reduced to zero. Therefore, the fare elasticities for BruinGO are calculated as the linear arc elasticity, or "midpoint" elasticity, which approximates the average elasticity between two points along a demand curve To calculate the midpoint elasticity, the percent change in fare is defined as the absolute change in fare divided by the average of the two fares between which elasticity is measured Similarly, the percent change in ridership is defined as the absolute change in ridership divided by the average of the two riderships between which elasticity is measured See Samuelson and Nordhaus (1989, 425) for an explanation of the midpoint formula

21 The cross-elasticity is the percent change in drive-alone vehicle trips divided by the percent change in transit fare, again calculated as the arc elasticity. The cross-elasticity is positive because public transit and solo driving are substitutes

22 The number of rides increased from 1,383,479 in the first year to 1,750,640 in the second year (communication from UCLA Transportation Services, November 27, 2002) This shows

that the one-year fare elasticities reported in the text underestimate BruinGO's longer-run effects

23 Additional unscheduled "booster" buses are also run during peak hours and days when overcrowding would otherwise occur. These booster buses are deleted during university holidays, when demand is low. The first scheduled bus arrives on campus at 5 53 a m., and the last one leaves at 12 08 a m. The route structure and timetables for the Blue Bus are available online at <http://www.bigbluebus com/home/index asp>.

24. The comments on this and the following page are taken from a survey of UCLA students, staff, and faculty. The comments are available at <http.//www sppsr ucla edu/its/bruingo pdf>.

25 The program clearly provides net benefits to the transit agency, or it would not participate. BruinGO also produces significant benefits for the Los Angeles community because it reduces solo driving to UCLA, and in turn reduces traffic congestion and vehicle emissions

26. UCLA Transportation Services provided the data on the shares of total permit revenue paid by faculty, staff, and students, and on the shares of total daily sales revenue paid by faculty, staff, students, university departments, and visitors Many visitors attend athletic events, concerts, lectures, theatrical performances, and other events on campus Because they pay for parking by the hour or day, visitors account for a disproportionate share of total parking revenue.

27. This cost includes $640,000 for BruinGO rides and $170,000 for administration and marketing

28 For *financing* BruinGO, both the administrative cost ($170,000) and the fare payments ($640,000) are the same: UCLA must cover both. But for *evaluating* BruinGO, these two costs are utterly different. The administrative costs represent a consumption of resources (mainly UCLA staff time), while the fare payments represent an income transfer to students, staff, and faculty

29 Most riders paid the cash fare of 50¢ per ride before BruinGO began, so valuing the existing riders' fare reduction benefit at UCLA's price of 45¢ per ride is a conservative estimate of BruinGO's benefit to the existing riders UCLA paid the Blue Bus for 1.4 million BruinGO rides According to the swipe data, students made 73 percent of the rides (1 4 million x 73 percent = 1,038,222 rides) and faculty and staff made 27 percent (1 4 million x 27 percent = 384,000 rides) The swipe data do not allow us to break these numbers down into new and existing rides, but the transportation surveys do. The student survey showed that the bus mode share for those who live inside the Blue Bus service area was 17 percent before and 24 percent after BruinGO Therefore, those who rode the bus before BruinGO made 71 percent (17 – 24) of student rides and new riders made 29 percent (7 – 24) Existing student riders thus made 737,138 rides (1,038,222 rides x 71 percent), and new student riders made 301,084 rides (1,038,222 rides x 29 percent). The faculty/staff survey showed that the bus mode share for those who live inside the Blue Bus service area was 9 percent before and 20 percent after BruinGO Therefore, those who rode the bus before BruinGO made 45 percent (9 – 20) of faculty/staff rides and new riders made 55 percent (11 – 20) Existing faculty/staff riders thus made 172,800 rides

(384,000 rides x 45 percent), and new faculty/staff riders made 211,200 rides (384,000 rides x 55 percent). Existing riders made a total of 909,938 rides (737,138 + 172,800), and new riders made a total of 512,284 (301,084 + 211,200) rides

30 This area under the demand curve for the new rides is the consumer surplus enjoyed by the riders (Friedman 2002, 202).

31 From a parking-centered view of BruinGO, the fare payments are money down the drain (because in this view BruinGO's only purpose is to reduce parking demand). From a broader university-centered point of view, however, the spending for bus fares becomes additional income for students, staff, and faculty

32 Memo from the UC Office of the President to the UC Regents, November 7, 2001.

33. The structure cost $47 million for 1,500 spaces, or $31,500 per space. UCLA borrowed the money to finance the structure at 6.125% for 27 years, and incurred an annual debt service of $2,414 per debt-financed space. When the annual operating cost of $259 per space is included, the annual total cost per debt-financed space is $2,673, or $223 per space per month. This high cost of structured parking is not unique to UCLA. The Parking and Transit Services department at the University of Colorado, Boulder, reports that the estimated debt service for a new parking structure on campus is $227 per month for each parking space added by the structure (University of Colorado 1998)

34. Intramural Field Parking Structure Final Environmental Report, May 2001, Vol. I, Table IV.I-4. The EIR reports the vehicle trips and emissions per day. To obtain the annual values, the daily values are multiplied by the number of weekdays per year (excluding all trips on the weekends).

35. UCLA's fare subsidy was $640,000 for nine months (see Table 3), and faculty/staff accounted for 27 percent of all BruinGO rides, so the fare subsidy for faculty/staff was $19,200 per month ($640,000 x 0.27 ÷ 9).

36. BruinGO offers free transit only to Blue Bus riders, while the consultant estimated the cost of transit passes for all bus lines to campus. Nevertheless, the Blue Bus carries most of the transit riders to UCLA, and extending it to the other lines would not greatly increase the cost. BruinGO offers free transit to *all* of UCLA's 31,000 employees, not merely to those without a parking permit, so it is far more generous to faculty and staff than what the consultant proposed. UCLA is also undercharged for BruinGO, because some riders report the bus drivers sometimes allow UCLA riders to board without swiping their BruinCards. A more accurate record of the boardings would therefore increase UCLA's cost for BruinGO.

37. See Crain and Associates (1998, 47) for the consultant's prediction.

38. See Crain and Associates (1998, 47)

REFERENCES

Boyd, Brent, Melissa Chow, Robert Johnson, and Alexander Smith. 2002 University Transit Passes: An Evaluation. UCLA Master's degree client project prepared for the Los Angeles County Metropolitan Transportation Authority

Brown, Jeffrey, Daniel Hess, and Donald Shoup 2001 "Unlimited Access," *Transportation* 28(3), pp. 233-267. Available online at < http //www.sppsr ucla edu/res_ctrs/its/UA/UA.pdf>

Crain and Associates 2002 UCLA BruinGO! Transit Pass Program Prepared for UCLA Transportation Services, April.

Crain and Associates 1998 UCLA Transit Subsidies/Incentives Study, Prepared for University of California at Los Angeles January

Davis, Stacy 2000. *Transportation Energy Data Book Edition 20,* ORNL-6959, prepared by the Oak Ridge National Laboratory for the U. S Department of Energy. Available online at <http://www-cta ornl gov/data/tedb20/>

Friedman, Lee. 2002 *The Microeconomics of Public Policy Analysis,* Princeton, NJ Princeton University Press

Institute of Transportation Studies, UCLA 2001 Comments about BruinGO from UCLA Students, Staff, and Faculty Available at <http //www.sppsr ucla.edu/res_ctrs/its/bruingo.pdf>

Meyer, J. and Edward Beimborn. 1998. "Usage, Impacts, and Benefits of an Innovative Transit Pass Program," *Transportation Research Record 1618,* pp 131-138.

Miller, James. 2001. *Transportation on College and University Campuses*, Transportation Cooperative Research Program Synthesis 39, Washington, DC. National Academy Press.

Office of the President, University of California. 2001. Memo from the University of California Office of the President to Members of the Regents' Committee on Grounds and Buildings and the Committee on Finance January 10, 2001.

Samuelson, Paul and William Nordhaus. 1989. *Economics* 13th Edition. New York: McGraw-Hill

Santa Monica Municipal Bus Lines. 2002 "UCLA Passenger Survey" Conducted in Fall 2002

UCLA Transportation Services 1995 - 2001 Employee Commute Reduction Program Plans submitted to the South Coast Air Quality Management District (SCAQMD)

UCLA Transportation Services 2000 Spring 2000 Student Transportation Survey.

UCLA Transportation Services. 2001a Spring 2001 Student Transportation Survey

UCLA Transportation Services 2001b. Spring 2001 Student Transportation Survey: BruinGO Data and Analysis

UCLA Transportation Services Advisory Board. 1999 Meeting Notes for December 13, 1999.

United States Federal Transit Administration. 2001. *National Transit Summary and Trends*, Available online through the National Transit Database at <http.//www ntdprogram com>.

University of Colorado, Boulder, Parking and Transit Services 1998 "Comparative Annual Cost Analysis: CU F/S Eco Pass vs Added Parking Structure "

Williams, Michael E and Kathleen L. Petrait 1993 U-Pass: A Model Transportation Management Program That Works. *Transportation Research Record 1404*: 73-81. Available online at <http://www fta dot.gov/library/program/UPAS/UPAS.html>

Sample pages from UCLA's 2001 Employee Commute Reduction Plan

UCLA

BUSINESS MANAGEMENT GROUP
CITATION REVIEW & ADJUDICATION
COMMUNICATIONS & MARKETING GROUP
FLEET & TRANSIT SERVICES
INFORMATION TECHNOLOGY GROUP
PARKING & COMMUTER SERVICES
PARKING ENFORCEMENT

TRANSPORTATION SERVICES
555 Westwood Plaza, Suite 200, 135408

Telephone (310) 206 119(
Facsimile (310) 206 423!

July 26, 2001
SCAQMD ID # 087728

Ms. Carol A. Gomez, Manager
Transportation Programs
South Coast Air Quality Management District
21865 East Copley Drive
P.O Box 4933
Diamond Bar, CA 91765-0933

Dear Carol,

In accordance with the South Coast Air Quality Management District's (SCAQMD) Rule 2202, the University of California, Los Angeles is submitting the attached 2001 Annual Analysis of the 1999 Triennial Employee Commute Reduction Plan (ECRP).

The results of this analysis indicate an AVR of 1.60, an increase of .09 from last year. This increase shows that we have surpassed our designated AVR target of 1.5 for two years in a row. The results were achieved through a combination of factors again including improved survey methodology and the external environment, such as higher gasoline prices.

The data shows a reduction in the trips generated within the window, as well as in the vehicles arriving to work within the window. The data continues to indicate a preference by those living closer to campus choosing walking as their preferred mode of transport. These improvements overall contributed to the significant increase in the AVR.

Additionally, this year's enhanced survey methodology served to provide cleaner data. The online survey was implemented again. There was a 100% increase of online surveys from 32% to 65%. The streamlined survey resulted in better responses requiring less time and attention during the data cleaning process. This year we were successful in again implementing direct, immediate, and personal follow up with survey respondents, which aided in more accurate recall and an increase in response rate. These improvements positively impacted our ECRP Program and will be continued in future years.

Transportation Services
Dedicated to Excellence

UCLA's commitment to cost-effective trip reduction is substantial and long-term. The goals of Rule 2202 will continue to be an integral part of the University's traffic mitigation and long range development plans. UCLA is committed to implementing the programs outlined in the 1999 ECRP and to sustaining or improving this impressive 1.60 AVR. We look forward to your approval of this analysis and are confident that our program will continue to serve as a role model for other employer-sponsored ridesharing endeavors. We welcome the opportunity to meet with you to discuss our future survey and ECRP plans.

Sincerely,

Patricia A. Menton
Associate Director
UCLA Transportation Services

cc: Sam J. Morabito
Associate Vice Chancellor
UCLA Business and Financial Services

Mark J. Stocki
Director
UCLA Transportation Services

Year: 2001 Site ID#: 087728

Section II-1: AVR Verification Process

A. Methodology:
Identify the methodology used to obtain the survey data by checking one of the following choices:

[ ] District Approved AVR Survey — *(If selected, complete B thru F.)* The 7-day survey form is available upon request for qualified employers.

[X] Random Sample Survey — *(This method requires prior SCAQMD approval. If selected, complete sections B, C, E and F.)*

Random Sample Survey Percent Sampled	Number Sampled	Certification Number (If applicable)	Certification Date
10%	3425		

[ ] Record Keeping — *(If selected, complete sections B, C, F and complete Section II-1A, III-2 & III-3 for each monthly/quarterly period.)*

Record Keeping *Need prior approval from AQMD

Certification Number	Certification Date

If commercial software system is used, please specify vendor's name here:

B. Number of employees who report to work within the standard 6 – 10 am, Monday – Friday window

Current total	Total (Prior Yr. Submittal)
27, 644	26,820

C. Total number of employees reporting to this site* Current total: 34,250

*Seasonal employees; temporary employees; volunteers; field personnel; field construction workers; and independent contractors may be excluded from this total (see Rule 2202 – Employee Commute Reduction Program Guidelines for additional information).

D. Survey Response Rate

Number of surveys returned from employees reporting to work within the standard window.		Total number of employees reporting to work within the standard window.		Survey response rate (60% minimum response rate required.)	
2078	divided by	2267	x 100 =	93%	Percent

E. Survey Week

First day of survey	Last day of survey
04 /23 /2001	04 /29 /2001

NOTE: Survey must be taken M-F (5 consecutive days), 6 am – 10 am, exclusive of holidays and rideshare week (see holiday listing in the program guidelines).

F. Specific location where surveys/record keeping data are stored at your worksite

555 Westwood Plaza, UCLA Transportation Services, Los Angeles, CA. 90095

Year: 2001 Site ID#: 087728

Section III-2: Weekly Employee Survey Summary Form

Summarize the commute modes of employees reporting to work within the standard 6-10 a.m., Mon-Fri window only.

If you have received written District approval prior to taking your survey to use an alternative window, identify your window below:

Days of the week: M T W TH F *Hours:* 6:00 a.m. *through* 10:00 a.m.

(Identify the 5 consecutive days above) *(Identify the 4 consecutive hours above)*

Mode	MON	TUE	WED	TH	FRI	Total
NSR. No Survey Response (60-89%)						
A Drive Alone	938	946	952	921	863	4620
B Motorcycle	9	8	9	10	10	46
C. 2 persons in vehicle	166	145	160	144	150	765
D 3 persons in vehicle	32	31	34	29	28	154
E. 4 persons in vehicle	3	2	2	2	1	10
F. 5 persons in vehicle	2	3	2	2	2	11
G. 6 persons in vehicle	3	5	4	5	4	21
H. 7 persons in vehicle	3	3	4	3	0	13
I. 8 persons in vehicle	3	3	3	3	3	15
J. 9 persons in vehicle	10	10	10	10	10	50
K 10 persons in vehicle	13	13	13	13	13	65
L. 11 persons in vehicle	6	6	6	6	6	30
M. 12 persons in vehicle	6	6	6	6	6	30
N. 13 persons in vehicle	7	7	7	7	7	35
O. 14 persons in vehicle	12	12	12	12	12	60
P. 15 persons in vehicle	7	7	7	7	7	35
Q. Bus	204	210	214	222	204	1054
R. Rail/plane	0	0	0	0	0	0
S. Walk	184	188	180	181	164	897
T. Bicycle	29	30	23	26	28	136
U. Electric Vehicle	0	0	0	0	0	0
V. Telecommute	20	17	13	14	31	95
W. Noncommuting						
Compressed Work Week Day(s) Off						
X. 3/36 work week	13	15	6	13	13	60
Y. 4/40 work week	5	1	2	3	13	24
Z. 9/80 work week	1	1	1	1	5	9
Other Days Off						
AA. Vacation	47	41	36	42	58	224
BB. Sick	26	24	13	13	17	93
CC. Other	329	345	356	382	423	1835
DD. Other NSR (90% or higher)*						
DAILY TOTALS	2078	2078	2078	2078	2078	10390

* Enter the No Survey Response on line DD if the response rate is 90% or higher.

Year: 2001 Site ID#: 087728

Section III-4: AVR Planning Form

1. Total employee trips generated within window. (Section III-2, Column I, Line ET)	1.	8238
2. Total vehicles arriving at the worksite within the window. (Section III-2, Column II, Line TV).	2.	5138
3. Divide line #1 of this page by line #2 of this page for current AVR.	3.	1.60
4. Enter AVR target area here. (1.3, 1.5, or 1.75)	4.	1.50
5. AVR of last submittal.	5.	1.51
6. Divide line #1 of this page by line #4 of this page. This is the maximum weekly number of vehicles allowed at the worksite in order to meet and/or maintain the target AVR.	6.	5,492
7. Subtract line #6 of this page from line #2 of this page. This is your necessary weekly vehicle reductions required to reach your target AVR.	7.	0
8. Divide line #7 of this page by 5 days to calculate the necessary daily vehicle reductions required to reach your target AVR.	8.	0

Year: 2001 Site ID #: 087728

MANAGEMENT COMMITMENT COVER LETTER

Ms. Carol A. Gomez, Manager
Transportation Programs
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

RE: University of California, Los Angeles
Company/Worksite Name

Dear Ms. Gomez:

As the highest ranking official at the worksite, or the person responsible for allocating the resources necessary to implement the program, I attest that the attached Annual Analysis has been prepared, in accordance with the provisions of Rule 2202 Employee Commute Reduction Program Guidelines.

All strategies listed in the approved Employee Commute Reduction Program have been and are being offered to employees and all data in the program is accurate and verifiable to the best of my knowledge.

[signature] 7/27/01
Signature Date

Sam J. Morabito (310) 794-6000
Please print or type name Phone number

Associate Vice Chancellor - Business and Financial Services
Title