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Evaluation of the Lloyd District Parking Programs, City of Portland: The Impacts of Parking Pricing and Transportation Management Association Programs in a High-Density, Mixed-Use District

Martha J. Bianco

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PR-100

Evaluation of the Lloyd District Parking Programs, City of Portland

The Impacts of Parking Pricing and Transportation
Management Association Programs in a High-
Density, Mixed-Use District

Martha J. Bianco, Ph.D.

**The Center for Urban Studies
Portland State University**

**Final Report
June 1999**

**For the City of Portland
Office of Transportation**

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Executive Summary

I. Executive Summary

Preliminary Conclusions

During the one year that had elapsed between the implementation of the Lloyd District transportation management programs and the survey information collected by this study, the drive alone mode for the trip to work by employees in the Lloyd District had decreased by 7 percent. For the District as a whole, the drive alone commute share is now about 56 percent. These are remarkable achievements.

The majority of the respondents to our survey indicated that their employers participate in Tri-Met's *PASSport* program. For these respondents, results were even more striking: the drive-alone mode decreased by 19 percentage points to only 41 percent of the total commute share.

The presence of the parking meters has clearly made a difference for all employees working in the Lloyd District. Before the meters were in place, 61 percent of all District employees who drove parked for free. Of those 61 percent who parked for free, 77 percent drove alone. After the meters were in place, 46 percent of all District employees who drive park for free. Of those 46 percent who continue to park for free, about 69 percent drive alone.

There are still groups of employees who have not made a significant shift in their commute mode as a result of any one or a combination of parking pricing, increased transit availability, or Tri-Met's *PASSport*. For the most part, these people appear to fall into one or more of three groups: (1) those who need their car for either trip-chaining purposes related to household maintenance, such as childcare, or for purposes related to their job, (2) those who report not having convenient access to transit, and (3) those who can afford to pay for off-street parking.

The relationships between sociodemographic characteristics and mode shift are difficult to interpret, but suggest that a "one-size-fits-all" approach cannot work. The Lloyd District program has recognized that from the beginning, by emphasizing commute options (including bicycling and telecommuting) and by being flexible enough so that those who need to drive can, even if they don't do so every day and even if they incur some financial hardship.

The challenge continues to be to reach those individuals who may not be particularly auto dependent, but can afford to pay the increased parking prices, so drive anyway. These individuals may not respond until pricing reaches such a high level that the resulting inequity for lower-income groups outweighs the societal gain of the mode shift. Another challenge is to reach those individuals who have misconceptions about the availability of the *PASSport*, transit service, or transit safety. In this case, continued educational outreach may be the answer.

The program's complementary and reinforcing strategies that have emerged as the most significant are the installation of the meters and the *PASSport* program. For the entire sample, nearly 22 percent cited the new meters as the No. 1 reason they have changed their travel habits, with 19 percent citing the *PASSport*. As a No. 2 reason, nearly 36 percent cited the *PASSport* program. Clearly, the two programs are equally essential in a transportation management program. The meters provide the drive-alone disincentive, while the *PASSport* provides the transit incentive.

The coordinated efforts of the City and Tri-Met have been crucial to the success of the Lloyd District programs. In addition, the role of the Lloyd District Transportation Management Association (LDTMA) in helping coordinate outreach and educational efforts cannot be overemphasized. The same is true of the transportation coordinators (TCs) who work at the individual firms to assist their employees with understanding and participating in the LDTMA programs. While the Lloyd District program is, again, a package of reinforcing strategies that have depended on coordination by the City and Tri-Met, the LDTMA and the individual TCs are the folks that bring it all together.

In sum, the successes of the Lloyd District programs have depended on multiple and coordinated efforts by several partners and many individual dedicated front-line TCs. With continued attention at all levels and in all areas (specifically pricing and transit improvements), the drive alone mode share should continue to decline and achieve hoped-for levels in a timely manner.

Introduction

In 1998, the City of Portland contracted with Portland State University to assess the parking management strategies that had been put in place in the Lloyd District in 1997. The parking management strategies constitute just one element in the Lloyd District Partnership Plan, a concerted effort by the member organizations of the Lloyd District Transportation Management Association (LDTMA), the City of Portland, and Tri-Met (the regional transit agency), to provide an effective strategy for implementation of the Central City Transportation Management Plan (CCTMP).

Elements of the Plan

There are six elements in the Lloyd District Partnership Plan:

- ◆ Fixed-route service element, which includes three direct express am/pm transit routes to the Lloyd District business core
- ◆ Facility improvements, providing for a concentration of passengers and buses, convenience of transfers, and passenger amenities
- ◆ Rideshare and bicycle improvements
- ◆ Parking management strategies, including parking meters activated on most streets within the district; limitations on new parking supply; maximum parking ratios; and carpool metered spaces
- ◆ Marketing plan, including the Tri-Met **PASSport**, which allows participating employers to purchase discounted passes for employees at their work site; Tri-Met's Emergency Ride Home program; and communication and promotion activities on the part of all three partners, the LDTMA, the City, and Tri-Met
- ◆ Program evaluation, to be undertaken by each partner—the LDTMA, Tri-Met, and the City. Tri-Met, in particular, was required to fulfill very specific evaluation requirements as set forth in the ECO rule.

Objectives and Methodology of this Study

Although each of the groups participating in the Lloyd District Partnership contributed in a variety of ways to the overall plan, the City's goal in contracting for this study was focused: to assess the impact of specific parking management strategies. In particular, the City wanted to know the following:

1. How has the Lloyd District transportation management plan – particularly the parking management strategies – affected employees who work within the district?
2. Which elements of the transportation management plan have had the most impact?
3. What have been the direct effects, in terms of mode share, for the journey-to-work within the District?
4. What are the sociodemographic characteristics of those employers who making changes as a result of the transportation management programs?

PSU entered the evaluation phase of the transportation management program described above in 1998, a year after it had already been underway. Thus, instead of conducting a baseline and follow-up survey, we administered one survey that asked respondents to compare their travel behavior now with their behavior during the period before the program – specifically, before the installation of the parking meters.

Surveys were sent to a random sample of 1000 employees in the Lloyd District. Follow-up postcards were sent to those survey participants who had not responded to the first mailing. Out of the initial 1000 surveys, a total of 519 returned surveys were deemed valid for analysis, representing a 52-percent response rate.

Findings with Respect to Mode

Changes with Respect to Mode Share

Of the survey respondents who worked in the Lloyd District both before and after the parking meters were installed, **23 percent indicated they *had* changed their mode of travel to work.**

Mode Shares Before and After Meter Installation

For all respondents, there was a **7-percent decrease in the drive-alone mode for the commute to work.** Most of those who moved from auto went to carpooling, which saw a 38-percent increase in share.

In the Lloyd District, now that the transportation management programs are in place, the drive alone mode accounts for only 56 percent of the work trip. Transit accounts for 19 percent of the work trip, followed by carpool at 17 percent.

TABLE E-1: COMMUTE SHARES BEFORE AND AFTER METER INSTALLATION,
ENTIRE SAMPLE, N = 401 (before) 516 (after)

(Source: PSU Survey, 1998)

Commute Method	Percent Before	Percent After	Percentage Change
Drive alone	60.1	55.6	-7%
Carpool	12.4	17.1	+38%
Bus/MAX	19.7	19.1	-3%
Bicycle	3.2	2.1	-34%
Walk	1.5	2.1	+40%
Other	3.0	3.9	+30%

Mode Shares for PASSport Employees

Because we did not ask respondents directly whether or not they use the Tri-Met *PASSport*, we define *PASSport* employees as those who said that their employer offers a discounted Tri-Met pass. This does not necessarily mean that these employees use the *PASSport* themselves, only that they know that their employer offers it. We define non-*PASSport* employees as those who indicated that their employer does not offer a discounted Tri-Met pass.

For *PASSport* employees, there was a **19-percent decrease in the drive-alone mode for the commute to work**. A significant majority of those who moved from auto went to carpooling, which saw a 41-percent increase in share. Transit saw a 12-percent increase in share among these employees.

TABLE E-2: COMMUTE SHARES BEFORE AND AFTER METER INSTALLATION
PASSport EMPLOYEES, N = 238 (before) 281 (after)

(Source: PSU Survey, 1998)

Commute Method	Percent Before	Percent After	Percentage Change
Drive alone	50.4	40.6	-19%
Carpool	12.6	17.8	+41%
Bus/MAX	27.0	30.2	+12%
Bicycle	3.8	2.8	-26%
Walk	1.7	2.5	+47%
Other	4.6	6.0	+30%

Mode Shares for Non-PASSport Employees

The transportation management program has not had a positive impact on the non-*PASSport* employees, who show an actual **2-percent increase in the drive-alone mode** and a **36-percent decrease in transit**, although carpooling has increased by 20 percent.

Changes in Transit Use Frequency

Although this study did not measure number of trips *per se*, we did ask respondents how often they took transit (bus or MAX) for their trip to or from work, both before and after the parking meters were in place. Responses were converted to **number of roundtrips per month**.

For the trip to work, all employees making between 9 and 19 transit roundtrips per month increased their number of transit trips by between 19 and 28 percent. Overall, the number of transit roundtrips per month increased for the District as a whole; results were most impressive for *PASSport* employees and least impressive for non-*PASSport* employees. See Figure E-4 for an illustration of these results.

TABLE E-3: TRANSIT USE FREQUENCY BEFORE AND AFTER METERS
 ENTIRE SAMPLE, N = 391 (before) 395 (after)
 (Source: PSU Survey, 1998)

Transit Roundtrips Per Month	Number Before	Number After	Percentage Change
1-8	185	183	-1%
9-19	381	473	+19%
20 or more	1167	1224	+5%
Totals	1733	1880	+8%

Transit Trips for *PASSport* Employees

Table E-4 shows that for the journey to work for *PASSport* employees, the number of transit roundtrips increased by 22 percent for those making between 9 and 19 roundtrips per month, followed by a 13-percent increase for those making between 1 and 8 roundtrips per month. Overall, for *PASSport* employees in the District, there was an 11-percent increase in transit roundtrips per month.¹ See Figure E-4 for a comparison of this category of employees with the others.

TABLE E-4: TRANSIT USE FREQUENCY
PASSport EMPLOYEES ONLY, N = 234 (before) 236 (after)
 (Source: PSU Survey, 1998)

Transit Roundtrips Per Month	Number Before	Number After	Percentage Change
1-8	135	156	+13%
9-19	309	396	+22%
20 or more	1027	1104	+7%
Totals	1471	1656	+11%

¹ Our figures are not comparable with Tri-Met's, which used a different methodology, sampling method, and sample size to report a 72-percent increase in transit trips for *PASSport* participants in the Lloyd District.

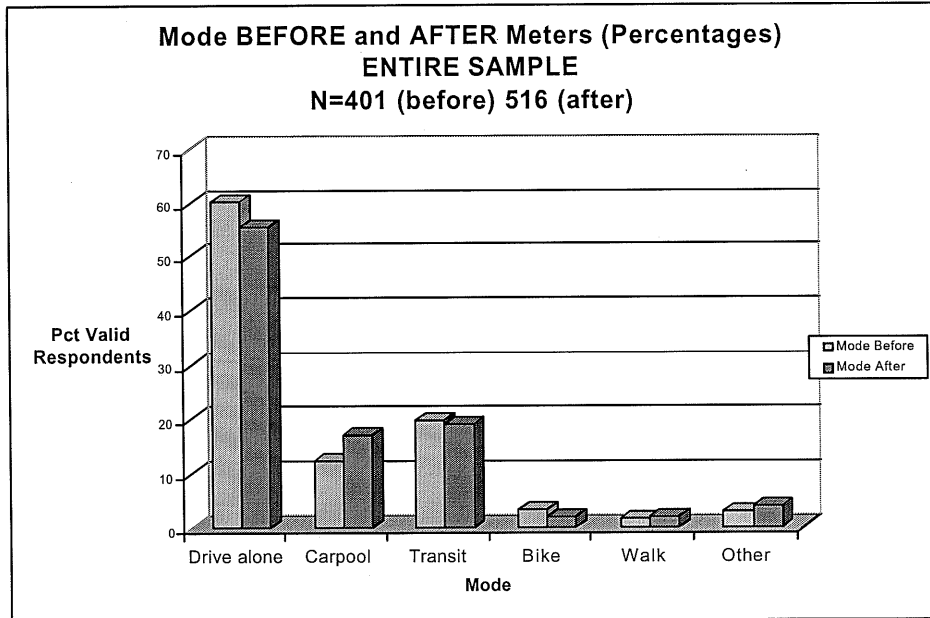


Figure E-1. Mode Before and After Meters, Entire Sample (Source: PSU Survey, 1998).

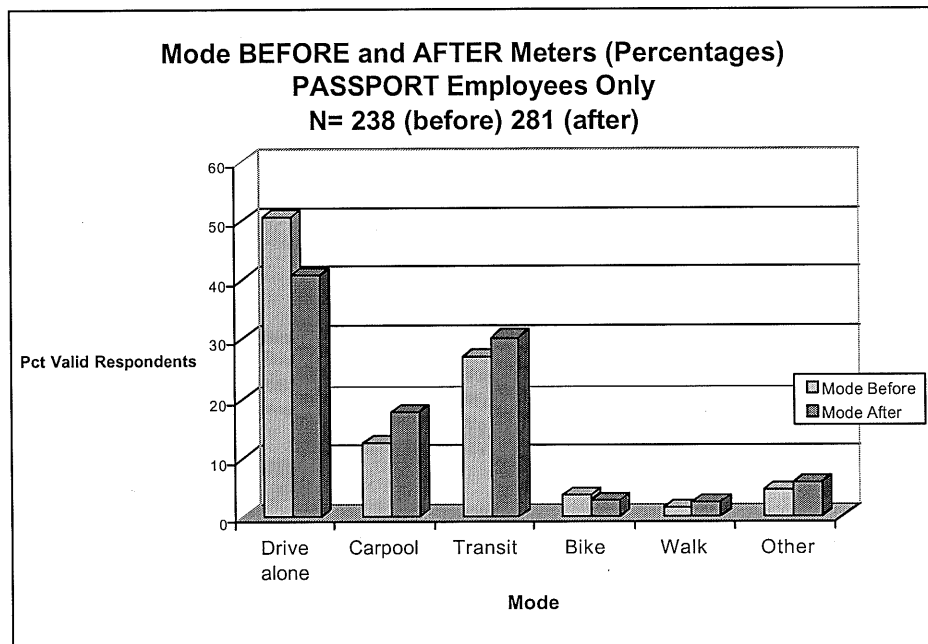


Figure E-2: Mode Before and After Meters, *PASSport* Employees Only (Source: PSU Survey, 1998).

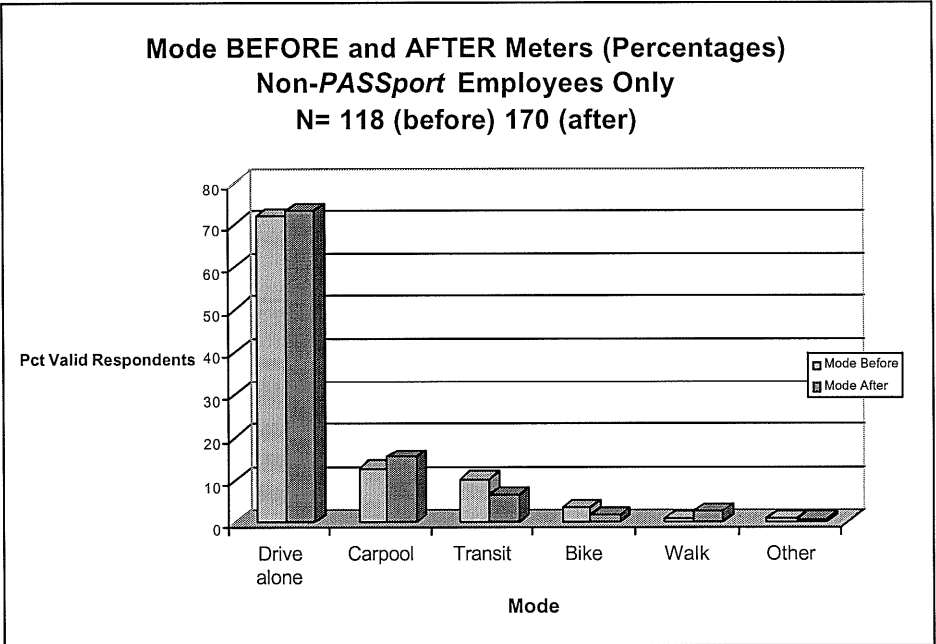


Figure E-3: Mode Before and After Meters, Non-PASSport Employees (Source: PSU Survey, 1998).

**Number of Transit Roundtrips Per Month
Percentage Change BEFORE and AFTER Meters
N=Number of Roundtrips (before) and (after) indicated below**

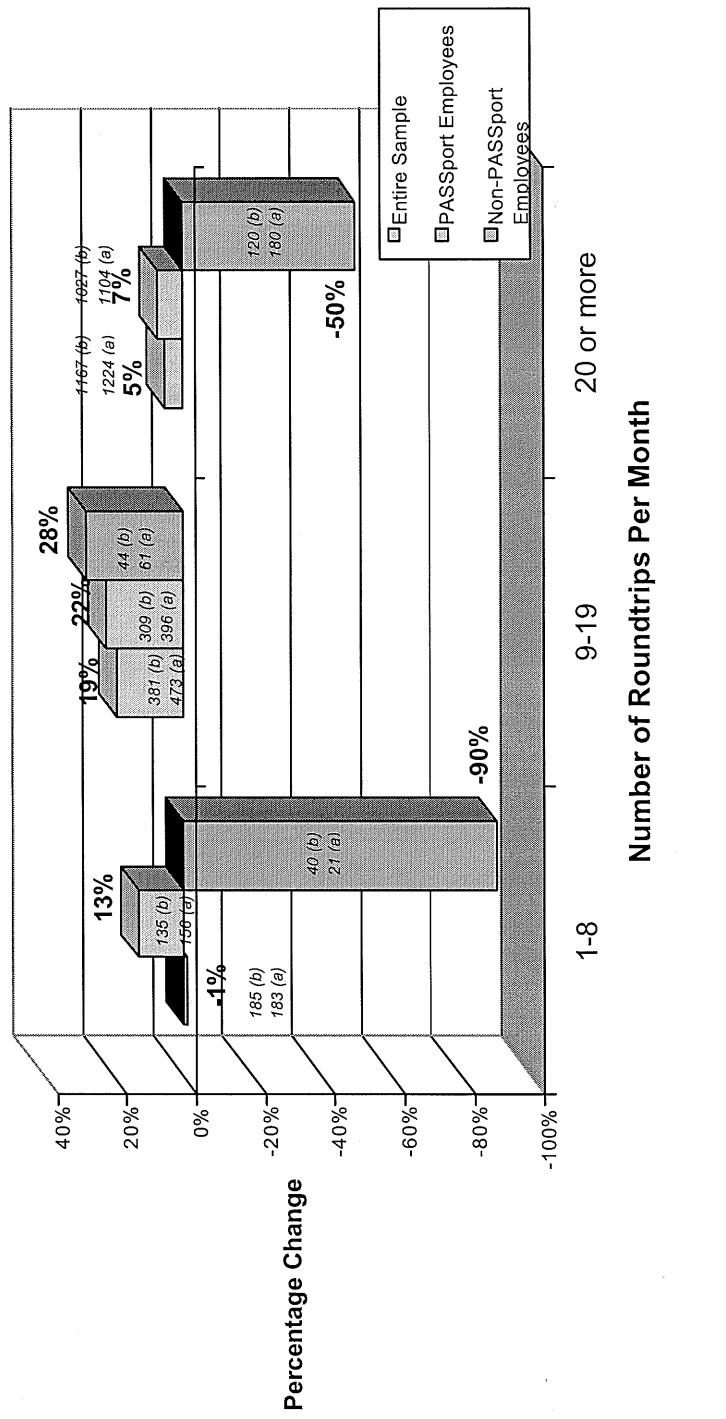


Figure E-4. Percentage Change in Number of Transit Commute Roundtrips Per Month Before and After Meters (Source: PSU Survey, 1998).

Findings with Respect to Parking

This research looked at changes in where people parked and how much they paid for parking.

Changes with Respect to Parking Location

The key finding with respect to parking location is that **most employees have apparently responded to the installation of the parking meters not by diverting to another mode, but by moving to another parking location** – in some cases, as discussed later, demonstrating a willingness to pay for what was once free (parking).

For all employees, of those who drive and park, **the percentage of those who park in off-street parking – either employer provided or non-employer provided – has increased.** As expected, the percentage of those who park on the street, but not at meters, has dropped significantly (because the number of on-street nonmetered spots has dropped significantly).

Employees Who Park in Employer-Provided Off-Street Parking

As Table E-5 indicates, among all employees who drive and park, a majority of non-*PASSport* employees have parked, and continue to park, in employer-provided parking accommodations. **The percentage of employees who park in employer-provided off-street parking has increased by at least 5 percent.**

TABLE E-5: EMPLOYEES WHO PARK IN EMPLOYER-PROVIDED PARKING
BEFORE AND AFTER METER INSTALLATION

(Source: PSU Survey, 1998)

Employee Category	Percent Before (N)	Percent After (N)	Percentage Change
All Employees	47.9 (147)	50.6 (165)	+6%
<i>PASSport</i> Employees	37.7 (63)	39.4 (71)	+5%
Non- <i>PASSport</i> Employees	59.6 (59)	63.8 (67)	+7%

Employees Who Park on the Street, but Not at Meters

As Table E-6 indicates, **the percentage of employees who park on the street but not at meters has decreased by at least 40 percent.**

TABLE E-6: EMPLOYEES WHO PARK ON THE STREET, BUT NOT AT METERS
BEFORE AND AFTER METER INSTALLATION

(Source: PSU Survey, 1998)

Employee Category	Percent Before (N)	Percent After (N)	Percentage Change
All Employees	28.3 (87)	13.2 (43)	-53%
<i>PASSport</i> Employees	31.1 (52)	11.7 (21)	-62%
Non- <i>PASSport</i> Employees	24.2 (24)	14.3 (15)	-41%

Employees Who Park in Non-Employer-Provided Off-Street Parking

Table E-7 reveals that the percentage of employees who park in non-employer-provided off-street parking has increased by at least 15 percent.

TABLE E-7: EMPLOYEES WHO PARK IN NON-EMPLOYER-PROVIDED OFF-STREET PARKING
BEFORE AND AFTER METER INSTALLATION

(Source: PSU Survey, 1998)

Employee Category	Percent Before (N)	Percent After (N)	Percentage Change
All Employees	19.2 (59)	24.2 (79)	+26%
<i>PASSport</i> Employees	24.0 (40)	30.6 (55)	+28%
Non- <i>PASSport</i> Employees	14.1 (14)	16.2 (17)	+15%

Employees Who Park at Meters, Carpool Spots, or Park-and-Ride Locations

Figures E-5 and E-6 show that only a small percentage of employees have been parking at other types of locations than those discussed above. For the entire sample, of those who drive and park, those who park at meters has increased from about 1 to 5 percent.

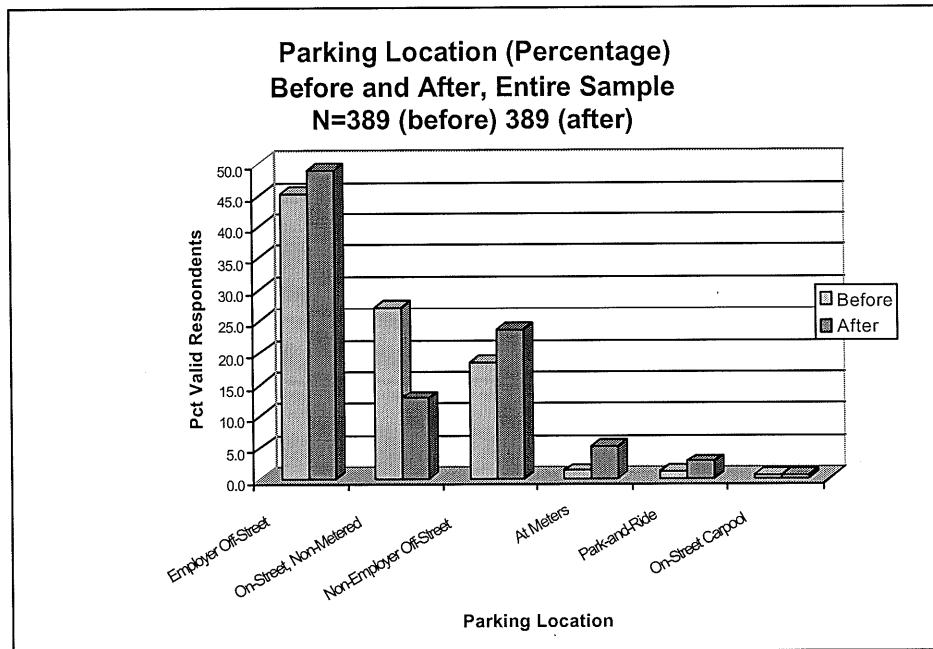


Figure E-5. Parking Location, Before and After, Entire Sample (Source: PSU Survey, 1998).

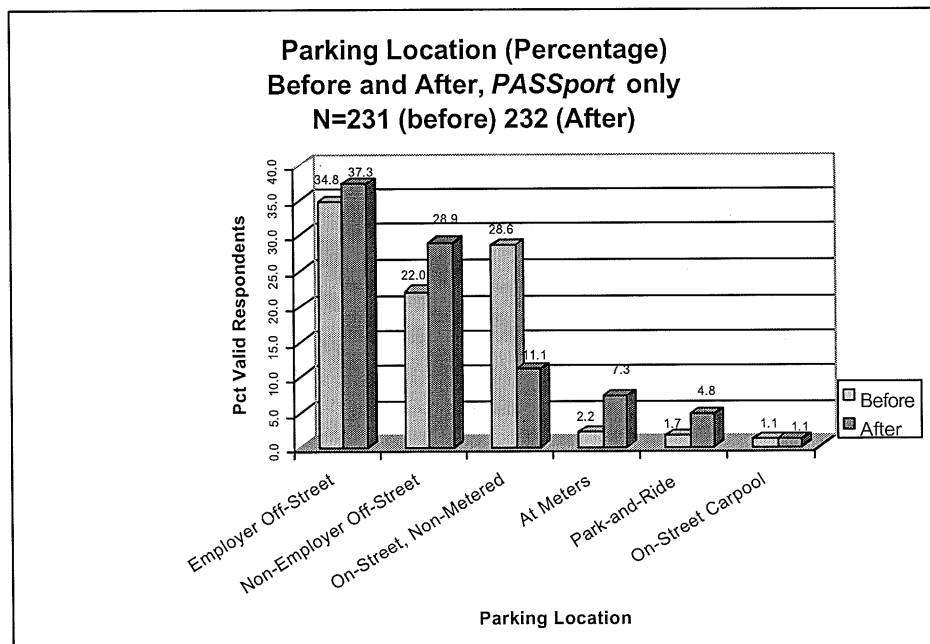


Figure E-6. Parking Location, Before and After, *PASSport* Employees (Source: PSU Survey, 1998).

Changes with Respect to Parking Prices Paid

Parking Prices Paid Before and After Meter Installation

The percentage of employees who drive and park for free has dropped from 61 to 46 percent. However, the average hourly price paid by the non-PASSport employees has actually decreased.

TABLE E-8. HOURLY PARKING PRICE PAID BEFORE AND AFTER METER INSTALLATION
ENTIRE SAMPLE, N= 306 (before) 322 (after)
(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Percent Before	Percent After	Percentage Change
Zero	60.8	46.3	-24%
\$0.01 to \$0.24	7.5	8.7	+16%
\$0.24 to \$0.40	24.2	25.2	+4%
\$0.41 to \$0.50	5.6	15.2	+171%
More than \$0.50	2.0	4.7	+135%

TABLE E-9: HOURLY PARKING PRICE PAID BEFORE AND AFTER METER INSTALLATION
PASSport EMPLOYEES ONLY, N = 167 (before) 177 (after)
(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Percent Before	Percent After	Percentage Change
Zero	46.7	28.2	-40%
\$0.01 to \$0.24	11.4	11.3	-1%
\$0.24 to \$0.40	31.7	30.5	-4%
\$0.41 to \$0.50	8.4	23.7	+182%
More than \$0.50	1.8	6.2	+244%

TABLE E-10: HOURLY PARKING PRICE PAID BEFORE AND AFTER METER INSTALLATION
NON-*PASSport* EMPLOYEES ONLY, N = 99 (before) 104 (after)
(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Percent Before	Percent After	Percentage Change
Zero	81.8	74	-10%
\$0.01 to \$0.24	2.0	4.8	+140%
\$0.24 to \$0.40	11.1	15.4	+39%
\$0.41 to \$0.50	2.0	2.9	+45%
More than \$0.50	3.0	2.9	-3%

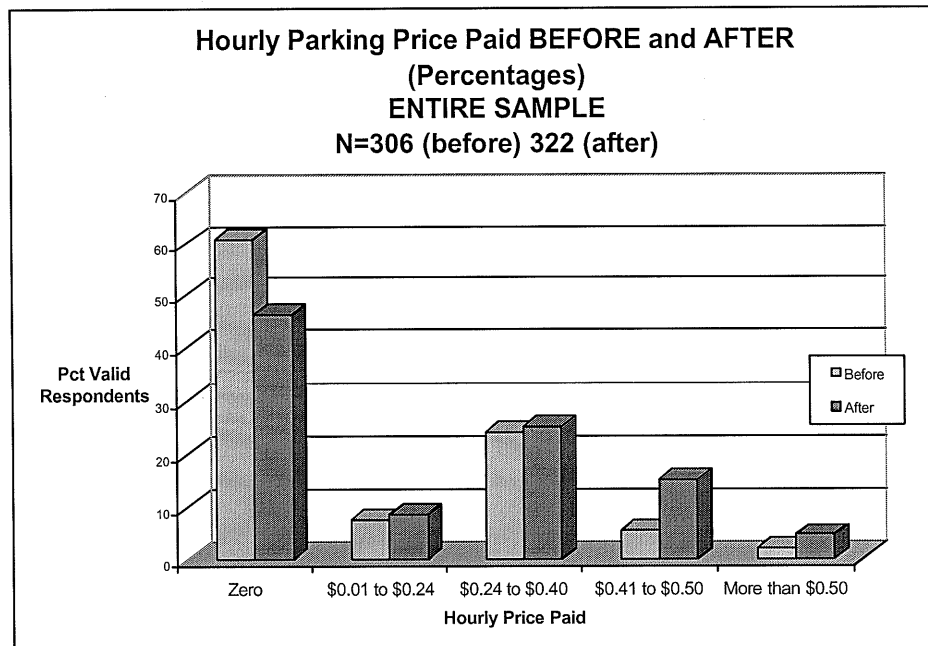


Figure E-7: Hourly Parking Price Paid Before and After, Entire Sample (Source: PSU Survey, 1998).

Relationship Between Parking Location, Mode and Parking Price Paid

Those who currently park for free are most likely to be parking in employer-provided, off-street accommodations; in fact, they are more likely to be parking in such facilities than before the meters were installed. In terms of the relationship between parking price paid and mode, those who park for free were and are more likely to drive alone than to use any other mode in the commute to work. However, the likelihood that a commuter will drive alone has declined somewhat at all pricing levels. At the highest pricing level, commuters are somewhat more equally likely to drive alone, take transit, or use some other form (except carpool) than they were before the meter installation.

TABLE E-11: HOURLY PARKING LOCATION BY HOURLY PARKING PRICE PAID (PERCENTAGE) BEFORE METER INSTALLATION, ENTIRE SAMPLE, N=303 (Source: PSU Survey, 1998)

Hourly Parking Price	Zero	\$0.01-\$0.24	\$0.24-\$0.40	\$0.41-\$0.50	More than \$0.50
Parking Location					
Employer-Provided Off-Street	47.8	47.8	47.3	25.0	50.0
Non-Employer-Provided Off-Street	5.4	17.4	48.6	37.5	33.3
Other (park-and-ride, carpool, free on-street)	46.7	30.4	4.1	25.0	16.7

TABLE E-12: HOURLY PARKING LOCATION BY HOURLY PARKING PRICE PAID (PERCENTAGE),
AFTER METER INSTALLATION, ENTIRE SAMPLE, N=321

(Source: PSU Survey, 1998)

Hourly Parking Price	Zero	\$0.01- \$0.24	\$0.25- \$0.40	\$0.41- \$0.50	More than \$0.50
Parking Location					
Employer-Provided Off-Street	64.2	46.4	38.3	56.5	40.0
Non-Employer-Provided Off-Street	2.7	17.9	46.9	57.1	20.0
Other (park-and-ride, carpool, free on-street)	32.4	25.0	7.4	10.2	20.0
On-Street Meters	.7	10.7	7.4	6.1	20.0

TABLE E-13: COMMUTE MODE BY HOURLY PARKING PRICE PAID (PERCENTAGE)
BEFORE METER INSTALLATION, ENTIRE SAMPLE, N=301

(Source: PSU Survey, 1998)

Hourly Parking Price	Zero	\$0.01- \$0.24	\$0.25- \$0.40	\$0.41- \$0.50	More than \$0.50
Mode					
Drive alone	77.2	72.7	83.6	43.8	66.7
Carpool or vanpool	13.0	18.2	13.7	12.5	16.7
Transit	5.4	9.1	1.4	31.3	16.7
Other	4.3	0.0	1.4	12.5	0.0

TABLE E-14: COMMUTE MODE BY HOURLY PARKING PRICE PAID (PERCENTAGE)
AFTER METER INSTALLATION, ENTIRE SAMPLE, N=321

(Source: PSU Survey, 1998)

Parking Price	Zero	\$0.01- \$0.24	\$0.25- \$0.40	\$0.41- \$0.50	More than \$0.50
Mode					
Drive alone	68.5	64.3	79.0	45.8	40.0
Carpool or vanpool	18.8	21.4	14.8	14.6	13.3
Transit	8.1	10.7	4.9	33.3	26.7
Other	4.7	3.6	1.2	6.3	20.0

Why Employees Changed their Behavior

The researchers asked employees to rank the top three reasons for changes, if any, in travel (i.e., mode) and parking behavior (both parking location and price paid).

Reasons for Changes in Travel Behavior

For the entire sample, 25 percent said their No. 1 reason for changing their travel habits was changes in life-style, residence, or job—factors unrelated to the transportation management

program. Nearly 22 percent reported the new meters and 19 percent the *PASSport* program as the No. 1 reason for their change.

For *PASSport* employees, the *PASSport* program was cited by a large percentage as both the No. 1 (24 percent) and No. 2 (44 percent) reason for change. Few non-*PASSport* employees reported a change in travel habits. Of the few who did, the most noteworthy finding is that the largest percentage cited changes in life-style, residence, and job as their No. 1 and No. 2 reasons.

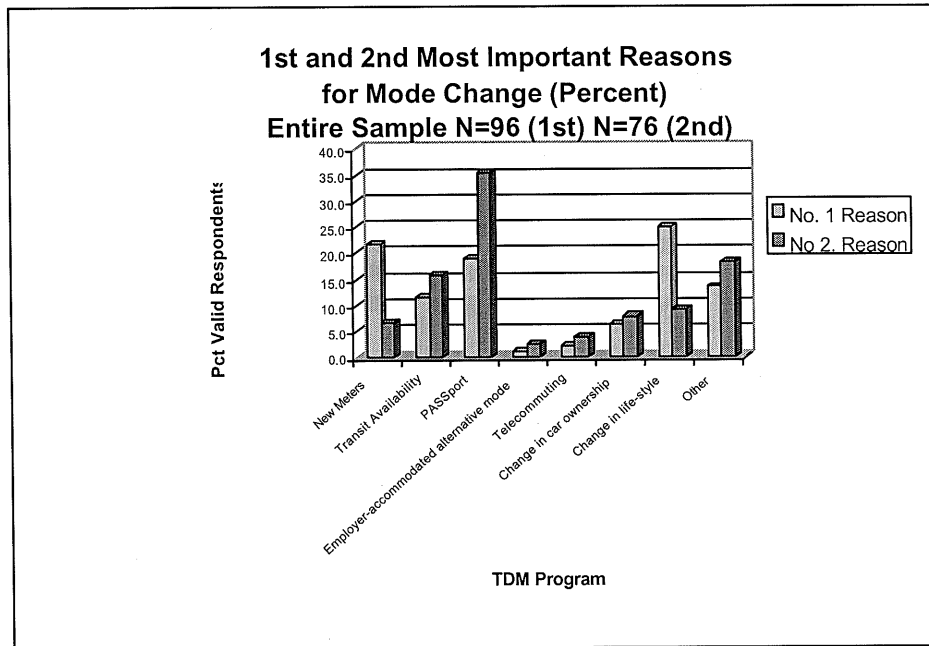


Figure E-8. First and Second Most Important Reasons for Mode Change, Entire Sample (Source: PSU Survey, 1998).

Reasons for Changes in Departure Time to or from Work

About 30 percent of the respondents reported that they had changed their departure time during the period before and after the meter installation; however, the changes in time were not meaningful in terms of spreading the peak: changes in departure time were small. For 37 percent of these employees, the No. 1 reason they changed their departure time was a life-style reason unrelated to the transportation programs. About 15 percent said the No.1 reason they changed their departure time was “to find parking,” while 12 percent gave “bus or MAX schedule” as their No. 1 reason.

Reasons for Changes in Parking Habits

The No. 1 reason cited by the majority of the respondents (51 percent) for a change in their parking habits—whether location or price—was the new meters. Even for *PASSport* employees, this was cited as the No. 1 reason by 48 percent of the respondents. The percentage

was even greater (65 percent) for non-*PASSport* employees (keeping in mind that few non-*PASSport* employees reported changing their parking habits at all).

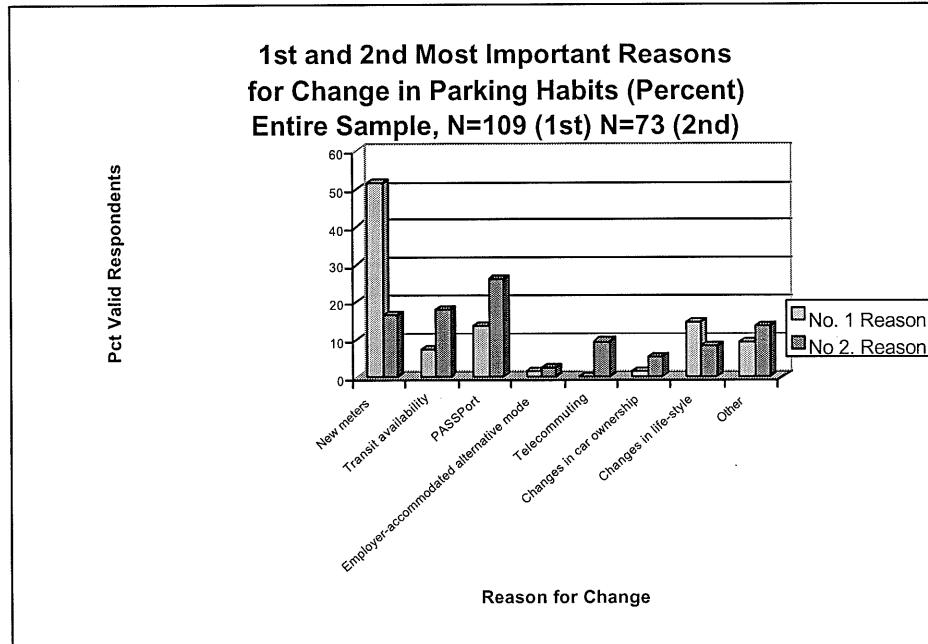


Figure E-8. First and Second Most Important Reasons for Change in Parking Habits, Entire Sample (Source: PSU Survey, 1998).

Most Important Transportation Demand Management Programs

We asked *all* respondents—whether or not they had worked in the District in the period before the meter installation—to rank the top three aspects of the Lloyd District transportation programs that they felt were the most important for their *present* work-related travel habits. This was not a question about factors responsible for *change*, only a question about present behaviors.

A large percentage of employees (41 percent) do not consider any of the transportation demand management programs (TDM) in the Lloyd District to be responsible for their present work-related travel habits. This situation is the most marked among non-PASSport employees, 64 percent of whom indicated that none of the TDM programs in place were affecting their present habits.

Nearly 19 percent of all respondents cited the *PASSport* program as the No. 1 TDM program, followed by nearly 13 percent citing transit availability and 11 percent citing the parking meters. The *PASSport* was cited as a No. 1 TDM program by a large percentage of the *PASSport* employees (32 percent), but even among this group, it is notable that 24 percent said that none of the TDM programs was responsible for their present work-related travel habits.

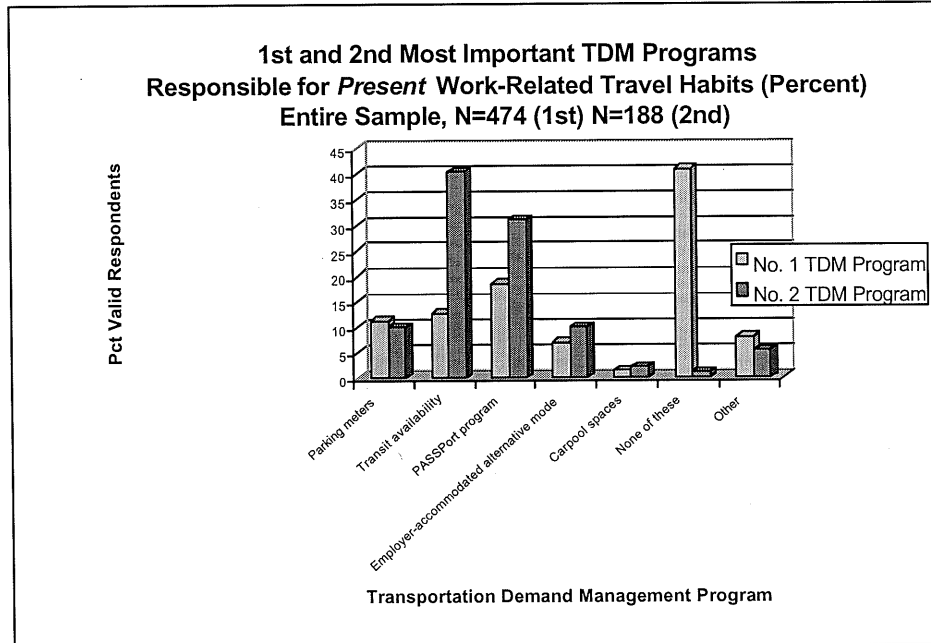


Figure E-9. First and Second Most Important TDM Programs, Entire Sample (Source: PSU Survey, 1998).

Sociodemographic Implications

The researchers asked the survey respondents questions about gender, work status (part time or full time), marital status, monthly income, household size, and race.

Sociodemographic Characteristics of Respondents in this Study

In general, the majority of respondents to this survey report that they

- ◆ are female
- ◆ work full time
- ◆ are married or partnered
- ◆ are white
- ◆ are in the upper-income categories
- ◆ live in households of either one or two members, and
- ◆ do not have children under 18 years of age living at home

The Relationship Between Sociodemographics and the Transportation Programs in the Lloyd District

Mode

Mode by Income Quintile

At all income levels, before the installation of the meters, the majority of respondents chose to drive alone. Those in the top income quintile were more likely than others to drive alone, whereas those in the bottom income quintile were more likely to choose transit relative to the other quintiles. **After the installation of the meters, those in the top income quintile remained the most inclined to continue to drive alone.** In fact, for this quintile, the drive alone mode has increased, while it has decreased for the other quintiles.

Nevertheless, **for all quintiles except the third, the majority of respondents still drive alone** (for the third quintile, the majority are divided among carpooling, transit, and other).

Those in the bottom and third quintiles seem to have been more likely to move from drive alone to carpool than to transit.

Those in the fourth income quintile seem more likely to have moved from drive alone to transit than to any of the other options. Those in third income quintile are more likely than the other income quintiles to commute by bike, walk, or other.

Mode by Gender

As for gender, before the meter installation, there was little difference between males' and females' proclivity to drive alone. However, **after the meter installation, women appear less likely than men to drive alone and more likely to carpool.**

Mode by Household Composition

In looking at household composition, **those who are most likely to drive alone, both before and after the meter installation are married or partnered respondents with no children and married or partnered or single respondents with five or more children.** Both groups did, however, reduce their drive alone share, with a resulting increase in carpool and/or transit. In fact, **in all categories—except single with no children and single with one child—the drive alone share declined, with carpool or vanpool seeing a corresponding increase.** Only in two cases did transit see an increase: married or partnered with no children or married or partnered with one child.

Parking Price Paid

Parking Price by Income Quintile

Before the meter installation, those in the lower income quintiles were the least likely to pay for parking. This remained true after the meter installation, although for all income quintiles,

respondents are more likely to pay for parking than before. **Those most likely to pay the highest prices for parking are in the third, fourth, and fifth quintiles.**

Parking Price by Gender

In terms of gender, **males were and still are more likely to park for free than females.** Still, both genders are more likely to pay now after the meter installation than they were before. For males, however, the majority are more likely to continue to park for free, while for females, the majority are more likely to pay at least \$0.25 per hour.

PASSport Availability

PASSport Availability by Income Quintile

Those in the lowest income quintile are about as likely to report that **PASSport** availability as not, while those in the remaining quintiles are much more likely to report **PASSport** availability. **In the upper income quintiles, the majority not only report PASSport availability, but a smaller percentage say they “don’t know” that the program exists.** In the other income categories, there appears to be less awareness of the **PASSport** program.

PASSport Availability by Gender

In terms of gender, **there is little differentiation between males and females in awareness of their employer offering the PASSport.** In both cases, the majority report being aware that their employer participates in the program.

TABLE E-15: MODE TO WORK BEFORE METERS BY INCOME QUINTILES
 ENTIRE SAMPLE, N=312
 (Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Mode Rows
Mode Before Meters						
Drive Alone	59.3	67.7	51.7	57.0	68.5	60.6
Carpool or Vanpool	13.0	6.2	18.3	12.7	11.1	12.2
Bus or MAX	25.9	16.9	18.3	24.1	11.1	19.6
Bike, Walk, or Other	1.9	9.2	11.7	6.3	9.3	7.7
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N = 312

TABLE E-16: MODE TO WORK **AFTER** METERS BY INCOME QUINTILES
 ENTIRE SAMPLE, N=394
 (Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Mode Rows
Mode Before Meters						
Drive Alone	53.8	54.0	47.3	54.4	70.8	55.6
Carpool or Vanpool	24.4	18.4	23.0	11.1	10.8	17.5
Bus or MAX	17.9	18.4	18.9	26.7	10.8	19.0
Bike, Walk, or Other	3.8	9.2	10.8	7.8	7.7	7.9
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N = 394

TABLE E-17. MODE TO WORK BEFORE AND AFTER METERS BY GENDER
 ENTIRE SAMPLE, N=401 (BEFORE); N=516 (AFTER)
 (Source: PSU Survey, 1998)

Mode	Gender	Male		Female	
		Before	After	Before	After
Drive Alone		61.6	60.1	58.5	52.3
Carpool or Vanpool		10.5	13.9	13.8	19.5
Bus or MAX		20.9	18.4	19.2	20.2
Bike, Walk, or Other		7.0	7.6	8.5	8.0
Total Percentage		100.0	100.0	100.0	100.0

TABLE E-18: HOURLY PARKING RATE PAID **BEFORE** METER INTALLATION BY INCOME QUINTILE,
 ADJUSTED FOR HOUSEHOLD SIZE, MARITAL STATUS, AND DEPENDENT CHILDREN
 (PERCENTAGES) N = 236
 (Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Pricing Rows
Hourly Parking Price Paid						
Zero	80.0	67.4	61.4	53.4	48.8	61.0
\$0.01 to \$0.24 per hour	2.5	7.8	4.5	6.9	11.6	6.8
\$0.25 to \$0.40 per hour	10.0	23.5	25.0	27.6	37.2	25.0
\$0.41 to \$0.50 per hour	5.0	2.0	9.1	8.6	0.0	5.1
More than \$0.50 per hour	2.5	2.0	0.0	3.4	2.3	2.1
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N =236

TABLE E-19: HOURLY PARKING RATE PAID **AFTER** METER INSTALLATION BY INCOME QUINTILES, ADJUSTED FOR HOUSEHOLD SIZE, MARITAL STATUS, AND DEPENDENT CHILDREN (PERCENTAGES) ENTIRE SAMPLE, N=249
(Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Pricing Rows
Hourly Parking Price Paid						
Zero	62.2	49.0	44.4	39.7	33.3	45.4
\$0.01 to \$0.24 per hour	6.7	3.9	2.2	6.3	13.3	6.4
\$0.25 to \$0.40 per hour	22.2	25.5	26.7	30.2	28.9	26.9
\$0.41 to \$0.50 per hour	8.9	15.7	22.2	15.9	20.0	16.5
More than \$0.50 per hour	0.0	5.9	4.4	7.9	4.4	4.8
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N =249

TABLE E-20: HOURLY PARKING PRICE PAID **BEFORE** AND **AFTER** METER INSTALLATION BY GENDER (PERCENTAGE) ENTIRE SAMPLE, N=306 (BEFORE); N=322 (AFTER)
(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Male		Female	
	Before	After	Before	After
Gender				
Zero	69.0	53.2	54.6	40.8
\$0.01 to \$0.24 per hour	8.5	8.6	6.9	8.4
\$0.25 to \$0.40 per hour	19.4	18.0	27.6	31.3
\$0.41 to \$0.50 per hour	1.6	14.4	8.6	15.6
More than \$0.50 per hour	1.6	5.8	2.3	3.9
Total Percentage	100.0	100.0	100.02	100.0

TABLE E-21: *PASSport* AVAILABILITY BY INCOME QUINTILE, ADJUSTED FOR HOUSEHOLD SIZE, MARITAL STATUS, AND DEPENDENT CHILDREN (PERCENTAGES) ENTIRE SAMPLE, N=397
(Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in <i>PASSport</i> Rows
<i>PASSport</i> Availability						
No	47.4	23.6	33.8	23.1	29.2	31.0
Yes	44.9	56.2	52.7	71.4	60.0	57.4
Don't Know	6.4	18.0	10.8	5.5	6.2	9.6
Total Percentage	98.7	98.7	97.3	100.0	95.4	98.0

I. Introduction

In 1998, the City of Portland contracted with Portland State University to assess the parking management strategies that had been put in place in the Lloyd District (see Map 1) in 1997. The parking management strategies constitute just one element in a comprehensive transportation management plan for the District, which was articulated as the Lloyd District Partnership Plan, a joint effort between the Lloyd District business community; Tri-Met, the regional transit provider; and the City of Portland.

Objectives of this Study

Although each of the groups participating in the Lloyd District Partnership contributed in a variety of ways to the overall plan, the City's goal in contracting for this study was focused: to assess the impact of specific parking management strategies. In particular, the City wanted to know the following:

1. How has the Lloyd District transportation management plan – particularly the parking management strategies – affected employees who work within the district?
2. Which elements of the transportation management plan have had the most impact?
3. What have been the direct effects, in terms of mode share, for the journey-to-work within the District?
4. What are the sociodemographic characteristics of those employers who making changes as a result of the transportation management programs?

Background to this Study

There are two overarching guiding policies behind the Lloyd District Partnership Plan that implemented the transportation management programs this report assesses. These two policies are Portland's Central City Transportation Management Plan and the state Department of Environmental Quality's Employee Commute Options (ECO) Rule. A brief overview of these two guiding policies provides the context for the Lloyd District Partnership Plan elements assessed in this report.

Central City Transportation Management Plan

In 1990, the City of Portland began development of the Central City Transportation Management Plan (CCTMP). The Association for Portland Progress (APP), Tri-Met, the state Department of Environmental Quality (DEQ), the Portland Development Commission (PDC), and Metro—the regional planning agency—worked together to develop a plan whose ultimate goal was to provide for a projected 75,000 new jobs and 15,000 new housing units within the central city by the year 2010.

The CCTMP project called for dividing the central city into eight districts, of which the Lloyd District is just one – but one that is very close to the downtown core and expected to capture 20 percent of the new jobs and 13 percent of the new housing units.

A Lloyd District Task Force, a local citizens committee, began working with the City to develop a comprehensive plan for the District. This led to the establishment of the Lloyd District Transportation Management Association (LDTMA) in 1994, with a 15-member board representing neighborhood and business interests in the area. The LDTMA has played a major role in implementing the transportation management programs under review in this study.

Employee Commute Options (ECO) Rules

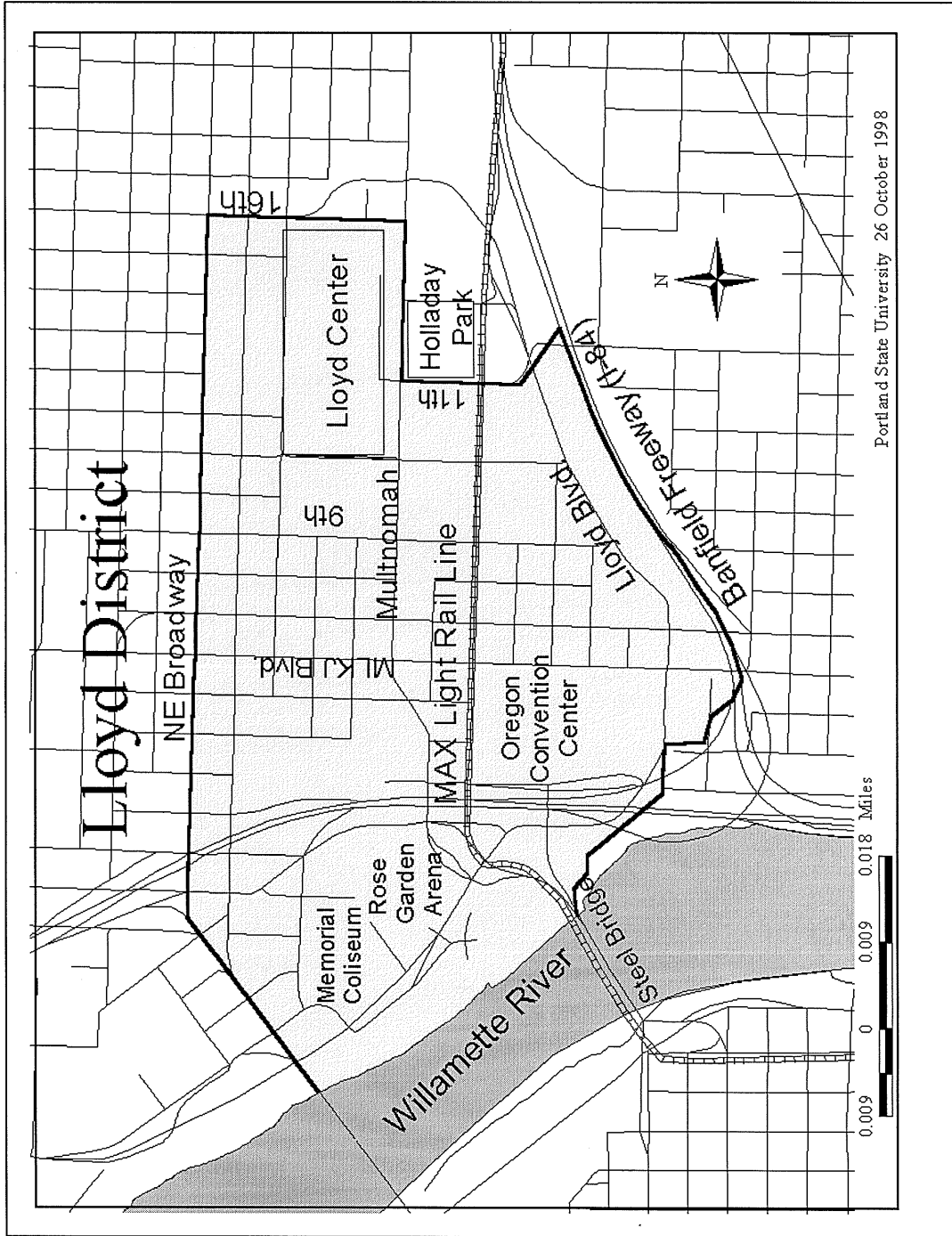
In 1996, Oregon's Department of Environmental Quality (DEQ) established the ECO rule to be in compliance with the Clean Air Act Amendments of 1990, which require that trip-reduction measures be implemented in air quality maintenance areas (AQMA) to achieve or maintain compliance with the National Ambient Air Quality Standards (NAAQS).

The ECO rules were developed by the legislature in 1993 through HB 2214. The resulting Oregon Administrative Rule, OAR 340-030-0800 through 1080, specifies the details of ECO rule implementation.

The most salient requirement of the ECO rule is that, within Portland's AQMA, any employers of 50 or more employees have to develop a plan that will achieve a 10-percent reduction in work-destined auto trips over three years (certain employers are exempt if they face significant constraints such as insufficient access to transit).

Lloyd District Partnership Plan

The Lloyd District Partnership Plan is a concerted effort by the member organizations of the Lloyd District Transportation Management Association (LDTMA), the City of Portland, and Tri-Met (the regional transit agency), to provide an effective strategy for implementation of the Central City Transportation Management Plan (CCTMP). Specifically, the plan (1) addresses those issues that continue to affect the economic vitality of the district; (2) provides specific employer incentive programs that support parking meter installation and transit service improvements; and (3) provides a comprehensive implementation plan that can be supported by the Lloyd District business community, Tri-Met, and the City of Portland ("Lloyd District Partnership Plan Executive Summary," April 1997, 1).



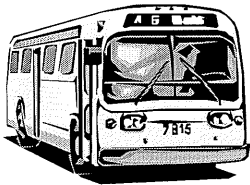
Map 1: The Lloyd District

Elements of the Plan

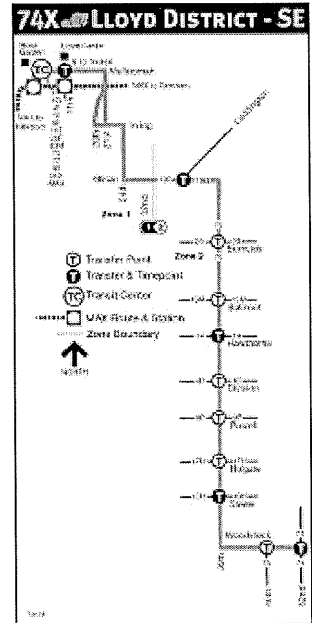
There are six elements in the Lloyd District Partnership Plan, which are described in more detail in the sections that follow.

- ◆ Fixed-route service
- ◆ Facility improvements
- ◆ Rideshare and bicycle improvements
- ◆ Parking management strategies
- ◆ Marketing plan
- ◆ Program evaluation

Fixed-Route Service



This element provided for three direct express am/pm transit routes to the Lloyd District business core. For the first year of the program (1997-1998), Tri-Met allocated 190 new weekly service hours, in conjunction with its **PASSport** program (discussed below). At benchmark levels of pass sales, new service improvements were to be implemented.

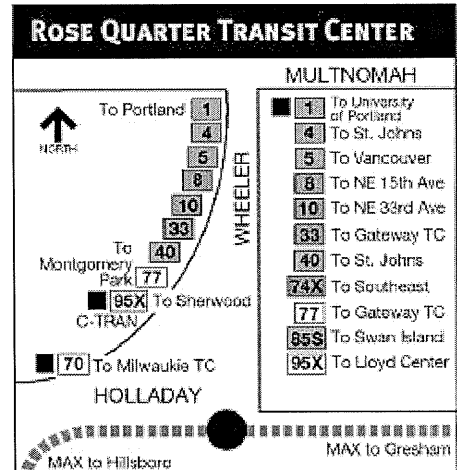
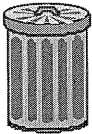


Facility Improvements



This element included the development of a "Transit Hub," with many of the features of a traditional "Transit Center," including concentration of passengers and buses, convenience of transfers, and passenger amenities. Other specific improvements included:

- ◆ Relocation of bus shelters on Multnomah
- ◆ Installation of trash receptacles
- ◆ Installation of information kiosks
- ◆ Enlarged sidewalk area adjacent to future development



Rideshare and Bicycle Improvements



Specific strategies in this element included the following:

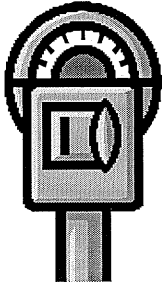
- ◆ Development of an off-street carpool program
- ◆ Creation of a Lloyd District area-specific rideshare matching database
- ◆ Implementation of a voluntary bicycle facilities improvement program
- ◆ Creation of a Lloyd District vanpool program



Parking Management Strategies

The parking management element has a number of important components, which are enumerated here in detail because of the focus of this report on the impact of the parking programs:

- ◆ Maximum parking ratios of 2 spaces per 1000 square feet on new office building development in the District
- ◆ Mandatory review process for parking supply on other types of new development
- ◆ Prohibition of any new commuter parking (4-hour shopper parking continues to be allowed, with review)
- ◆ Prohibition of surface lots greater than 40,000 square feet
- ◆ Parking meters activated on most streets within the district (notably *not* on the two major business thoroughfares of Broadway and Weidler, where significant retailer opposition was encountered)
- ◆ Carpool metered spaces reserved till 10 a.m.; carpoolers must purchase a \$30 monthly carpool permit (which was previously free)
- ◆ Least-desirable spaces (at fringes of District) designated as 5-hour spaces, meant primarily for in-District employees and carpoolers

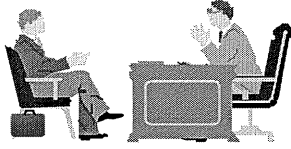


Marketing Plan

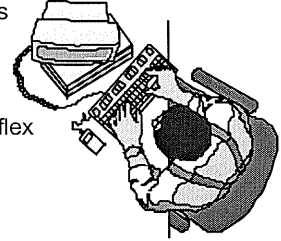
Crucial to the success of the transportation management program were the marketing and outreach efforts conducted jointly by the LDTMA, the City of Portland, and Tri-Met. There are three key components of the marketing plan:

- ◆ The Tri-Met **PASSport**: This program requires participating employers to purchase discounted annual all-zone passes for 100 percent of all qualified employees at their work site. The cost of the **PASSport** is \$100 per qualified employee. As required by the ECO rule, employers with 50 or more employees must participate in the **PASSport** program (unless exempt as noted previously), but otherwise there are no size restrictions; an employer of any size may participate. There is, however, a minimum contract of \$500. Employers whose employee transit use is below 5 percent receive a 15-percent discount on the cost of the program as an incentive to participate.
- ◆ Emergency Ride Home (EHR): The program is available, free of charge, for any employers who participate in the **PASSport** program. Tri-Met will pay for taxi or a rental car if an employee needs a free ride home in the event of an emergency.





- ◆ Communication/Promotion Activities: All three partners—the LDTMA, the City, and Tri-Met – participate in outreach and educational activities. The LDTMA, in particular, takes a lead role in working with employers' transit coordinators (TCs), who are the front-line implementers at the employer site responsible for communicating and promoting all elements of the District's transportation management programs. TCs often work one-on-one with employees to help them coordinate ridesharing, flex time, and telecommuting.



Program Evaluation

All elements of Lloyd District's transportation management program have been in operation since the fall of 1997. Each partner – the LDMTA, Tri-Met, and the City – agreed to conduct evaluations. Tri-Met, in particular, was required to fulfill very specific evaluation requirements as set forth in the ECO rule. In January of 1999, Tri-Met issued its report, "Analysis of Tri-Met's Employer Assistance." Although the methodology Tri-Met used differed significantly from that employed in this study, both assessments share similar conclusions as to the remarkable effectiveness of the programs discussed thus far in meeting local, regional, and national goals of trip reduction.

II. Methodology

This chapter will focus on the methodology PSU used to address the City's overarching research goal, which was to assess the effect of the parking meter installation on those streets in the Lloyd District where on-street parking had previously been free.

PSU entered the evaluation phase of the transportation management program outlined in Chapter 1 in 1998, a year after it had already been underway. Thus, instead of conducting a baseline and follow-up survey, we administered one survey that asked respondents to compare their travel behavior now with their behavior during the period before the program – specifically, before the installation of the parking meters. This element of our methodology differs from the evaluation process Tri-Met conducted and accounts, in part, for some of the differences in our findings. Despite these differences, both evaluations have found similar positive results. These will be discussed in detail in subsequent chapters.

Survey Construction

Researchers at Portland State University constructed a survey based on research questions generated by the contracting agency, the City of Portland's Office of Transportation.

See Appendix 1 for the final version of the survey and cover letter.

Pilot Testing

A pilot version of the survey was sent to the Lloyd District Transportation Management Association (LDTMA), which disseminated 50 copies among five of the Transportation Coordinators (TCs) that the LDTMA considered to be the most involved and committed. The LDTMA instructed the TCs to disseminate the pilot surveys to 10 employees in their companies. No randomization was attempted, although TCs were encouraged to make an attempt to select a group of pilot survey-takers who were representative of the firm's general commuting population.²

Through a consideration of the results of the pilot survey and discussion among representatives from the City of Portland and Tri-Met, the final version of the survey was completed and prepared for mailing.

² The TCs work only with those firms that participate in Tri-Met's *PASSport* program, which may have introduced some bias into the nature of the pilot survey responses; however, this bias, if any, is inconsequential, since the sole purpose of the pilot survey was to assess the quality of the survey as an instrument.

Sampling

Sampling Frame

The sampling frame consisted of all employers with a 97232 Zip Code, determined by the researchers to correspond with the geographic parameters of the Lloyd District. This sampling frame contained 1370 employers, as of September 1998. The number of employees per employer firm varied, from 1 to 500 or more.³

Sampling Procedure

The researchers employed a multistage stratified random sampling procedure.⁴

First-Stage Sampling

The first stage of the multistage sampling process involved drawing a random sample from the sampling frame of the 1370 Lloyd District employers. The sample sizes were stratified according to employer size, with smaller employers being sampled at a smaller rate than larger employers. The sampling process yielded 259 firms, or about 19 percent of the total number of firms.⁵

Table 1 presents information regarding the number of firms, employee size, and sampling details for the first stage of the sampling process.

TABLE 1: STAGE 1 SAMPLING OF EMPLOYERS

Employee Size	Number of Firms	Percentage of Total Population	Sample Drawn	
			Percent	N
1-4	623	45	15	121
5-19	518	38	15	94
20-49	119	9	15	18
50-249	71	5	30	21
250-499	8	.06	30	2
500+	13	.01	30	3
unclassified	18	.01	0	0
	1370		<i>Total number of employers</i>	259

³ The researchers contracted with the Portland, Oregon, office of *infoUSA*, a consulting division of American Business Information, Inc., to provide an electronic file of business-related data specific to this sampling frame.

⁴ All random sampling was done with replacement, so as not to change the probability of any given case being selected. However, no case was included in the final sample twice. If a case (either an employer during the first stage or an employee during the second stage) had already been sampled, then a decision rule was employed of selecting the next nonsampled case.

⁵ Representatives from the City of Portland then identified employers who, while within the 97232 Zip Code, were not determined to be within the boundaries of the Lloyd District for purposes of this study. Those employers were removed and alternates were randomly chosen in their place. This process was reiterated until the final 259 employers were all within the Lloyd District as defined for the purposes of this study.

Second-Stage Sampling

Representatives from the City then contacted each of the 259 sampled firms.⁶ Each of these firms was asked to furnish the researchers with a listing of their employees.⁷ This activity had been facilitated by groundwork previously laid by the LDTMA and TCs, who had, where appropriate, provided information to employers educating them on the importance of cooperating with this study.⁸ These employee lists then constituted the secondary sampling frame and the basis for the next stage in the sampling process.

A saturation sample (i.e., 100 percent) of the 233 firms with 49 or fewer employees was drawn, and surveys prepared for each employee at those firms. This constituted a total of 545 employees from the smaller firms.

From the remaining 26 firms with 50 or more employees, a random sample of about 50 percent was drawn, to bring the total number of employees up to 1000. Employees were assigned an ID number, and Microsoft Excel 97's random-number generator yielded the random numbers needed; surveys were prepared for employees whose ID numbers corresponded to those randomly chosen.

Survey Administration

First Mailing

All surveys were stamped with a number that corresponded with the ID number assigned by the researchers to each sample case. The purpose of this ID stamping was to assist in the follow-up process of ensuring an adequate return rate.

Surveys were mailed to employees at their employment address. It had previously been determined that employers might be reluctant to furnish home addresses of their employees for the purpose of this survey. Although the PSU researchers had concerns that employees might consider a survey received at work as mandatory, rather than voluntary, as required by PSU's Human Subjects Review Committee, the researchers considered the employees' right to privacy with respect to their home address to be more important than the potential that employees would not consider their completion of the survey to be voluntary. To counter this concern, the voluntary nature of the survey was emphasized in the cover letter to the survey.

⁶ City representatives used the contact name and phone number supplied by *infoUSA*

⁷ Two firms did not want to issue a listing of employees, but agreed to match up a list of randomly generated numbers with their own employee rosters.

⁸ The activities of the City, the LDTMA, and the TCs in this regard had been approved by PSU's Human Subjects Review Committee, as all potential respondents were, at all times, aware of the voluntary nature of their participation.

Follow-Up Mailing

Based on the ID numbers stamped on each survey, follow-up postcards were sent to all survey participants who had not responded to the first mailing.⁹ The wording of the survey thanked participants if they had already returned their survey, but provided a gentle reminder and other information if they had not.

See Appendix 2 for the follow-up postcard.

Response Rate

Out of an initial 1000 surveys sent out, a total of 519 returned surveys were deemed valid for analysis, representing a 52-percent response rate. Both the response rate and the total number of final usable surveys were considered by the researchers to be sufficient for robust statistical analysis.¹⁰

Data Analysis

All survey items had been created to facilitate data entry. The Statistical Package for the Social Sciences (SPSS), Version 8.0 for Windows, was used for data entry and data analysis. Microsoft Excel 97 was used for organizing qualitative remarks written in by respondents in open-ended sections or in the margins by questionnaire items.

Types of Analysis Employed

Descriptive analyses (measures of central tendency, cross-tabulation tables, etc.) have been supplemented with charts (histograms, bar charts, pie charts, etc.), and statistical testing of hypotheses whenever appropriate. Again, SPSS Version 8.0 was used for all analyses.

⁹ The ID stamping served another purpose, as well. When researchers noted that a large group of consecutively numbered surveys had not been returned, it was determined that one of the internal mailrooms at one of the larger employers had not yet disseminated the surveys to the employees. A follow-up phone call to the contact at that employer remedied the problem.

¹⁰ In contrast, the ECO rule requires Tri-Met to achieve at least a 75-percent response rate.

III. Findings with Respect to Mode

PSU asked survey respondents how they usually get to and from work *now* and how they usually got to and from work prior to August of 1997, that is, *before* the parking meters were installed. We also asked them the direct question of whether or not the way they usually get to or from work had changed between now and prior to the meter installation.¹¹

Nearly a fourth (23 percent) of all respondents said they had changed their mode of travel to work in the Lloyd District between the time before the parking meters were installed and after.

For all respondents, there was a 7-percent decrease in the drive-alone mode for the journey to work in the District. The drive-alone mode now accounts for only about half (56 percent) of the work trip, while transit (19 percent) and carpooling (17 percent) have seen substantial increases.

Results were even more marked for those employees whose employer participates in the *PASSpot* program: for this group, the drive-alone mode decreased by 19 percent.

Overall, the number of actual transit trips increased for employees in the District as a whole. For the trip to work, all employees making between 9 and 19 transit roundtrips per month increased their number of transit trips by between 19 and 28 percent.

Changes with Respect to Mode Share

Of the survey respondents who worked in the Lloyd District both before and after the parking meters were installed, 23 percent indicated they *had* changed their mode of travel to work.

We asked respondents how they usually get to and from work now. Then, in order to control for the fact that not everyone working in the Lloyd District today worked there prior to the transportation management programs, we had respondents skip a number of questions related to mode change if they did not work in the District prior to August of 1997. Thus, although we received slightly more than 500 surveys, we did not always have 500 responses to all questions – particularly those related to mode change.

¹¹ Our methods of obtaining mode information from our respondents differed from those of Tri-Met, which was obligated to fulfill ECO rule assessment procedures. Their baseline and follow-up surveys were constructed to obtain specific information about the number of trips by mode. The PSU researchers did not focus on number of trips. This, combined with the fact that we conducted only one survey, not a baseline and follow-up survey, and that our total sample size was less than Tri-Met's (again, their sampling methods and sample size are dictated by ECO rule requirements), account for disparities between some of our findings with respect to mode.

Out of the approximately 500 total respondents, 400 answered the direct question: Has the way you usually get to or from work changed between now and August of 1997, that is, before the parking meters were installed? Out of these 400 respondents, 23 percent indicated a change in mode from the period prior to the implementation of the meters to the present time. This is indicated in Figure 1.

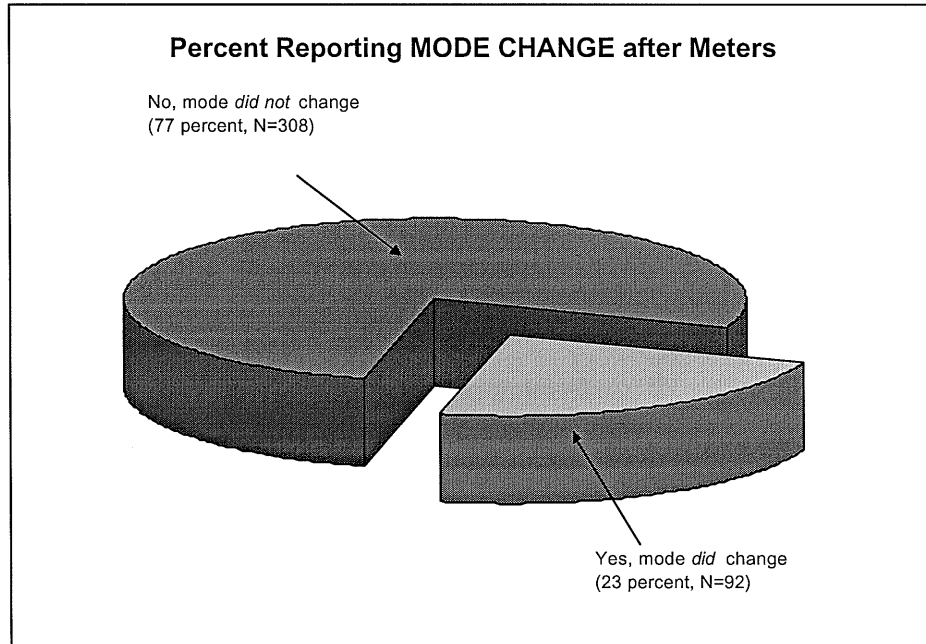


Figure 1. Percent Reporting Mode Change after Meter Installation (Source: PSU Survey, 1998).

Mode Shares Before and After Meter Installation

The PSU researchers divided the entire sample into three groups: all respondents, respondents whose employers participate in Tri-Met's *PASSport* program, and respondents whose employers do not participate in the program. As noted, we asked them how they usually get to and from work now and how they usually got to and from work before the meters were installed. Actually, there were separate questions for the "to" and "from" trips, but the differences between them weren't significant. So, the results below are based on mode to work, both before and after the parking meter installation.

Mode Shares for All District Employees

For all respondents, there was a **7-percent decrease in the drive-alone mode for the commute to work**. Most of those who moved from auto went to carpooling, which saw a 38-percent increase in share.

In the Lloyd District, now that the transportation management programs are in place, the drive alone mode accounts for only 56 percent of the work trip. Transit accounts for 19 percent of the work trip, followed by carpool at 17 percent.

Transit saw a small and insignificant decrease in share. The other modes – bike, walking, and “other” – show large changes, but the actual percentages and numbers are unsubstantial.¹² The real message here is that the Lloyd District transportation management program resulted in an impressive decline in the drive-alone mode. Table 2 shows the mode shares, while Figure 2 at the end of this chapter gives an illustration of the mode to which those diverted from auto shifted.

TABLE 2: COMMUTE SHARES BEFORE AND AFTER METER INSTALLATION,
ENTIRE SAMPLE, N = 401 (before) 516 (after)

(Source: PSU Survey, 1998)

Commute Method	Percent Before	Percent After	Percentage Change
Drive alone	60.1	55.6	-7%
Carpool	12.4	17.1	+38%
Bus/MAX	19.7	19.1	-3%
Bicycle	3.2	2.1	-34%
Walk	1.5	2.1	+40%
Other	3.0	3.9	+30%

Mode Shares for *PASSport* Employees

Because we did not ask respondents directly whether or not they use the Tri-Met *PASSport*, we define *PASSport* employees as those who said that their employer offers a discounted Tri-Met pass. This does not necessarily mean that these employees use the *PASSport* themselves, only that they know that their employer offers it. We define non-*PASSport* employees as those who indicated that their employer does not offer a discounted Tri-Met pass.

For *PASSport* employees, there was a **19-percent decrease in the drive-alone mode for the commute to work**. A significant majority of those who moved from auto went to carpooling, which saw a 41-percent increase in share. Transit saw a 12-percent increase in share among these employees.

¹² It should be noted that about 12 of the 20 or so respondents who chose “other” as a mode indicated some mode involving transit (e.g., bused to MAX or walked to bus). Thus, the transit share is underreported here, but by no more than a percentage point or so. It should also be noted that changes in bike and walk modes may have been impacted by the fact that respondents were asked to compare their mode of the previous summer (August) with the present year’s fall (when the survey was administered).

TABLE 3: COMMUTE SHARES BEFORE AND AFTER METER INSTALLATION
PASSport EMPLOYEES, N = 238 (before) 281 (after)
 (Source: PSU Survey, 1998)

Commute Method	Percent Before	Percent After	Percentage Change
Drive alone	50.4	40.6	-19%
Carpool	12.6	17.8	+41%
Bus/MAX	27.0	30.2	+12%
Bicycle	3.8	2.8	-26%
Walk	1.7	2.5	+47%
Other	4.6	6.0	+30%

Again, the other modes – bike, walking, and “other” – show large changes, but the actual percents and numbers are unsubstantial. Here, the impressive findings are that those employees who are participating in Tri-Met’s **PASSport** program are exhibiting major shifts away from the drive alone mode and toward either carpooling or transit for the commute to work.¹³ Table 3 shows the mode shares, while Figure 3 at the end of this chapter gives an illustration of the mode to which those diverted from auto shifted.

Mode Shares for Non-PASSport Employees

The transportation management program has not had a positive impact on the non-**PASSport** employees, who actually show a **2-percent increase in the drive-alone mode** and a **36-percent decrease in transit**, although carpooling has increased by 20 percent.

TABLE 4: COMMUTE SHARES BEFORE AND AFTER METER INSTALLATION
 NON-**PASSport** EMPLOYEES, N = 118 (before) 170 (after)
 (Source: PSU Survey, 1998)

Commute Method	Percent Before	Percent After	Percentage Change
Drive alone	72.0	73.5	+2%
Carpool	12.7	15.3	+20%
Bus/MAX	10.1	6.5	-36%
Bicycle	3.4	1.7	-47%
Walk	0.8	2.4	+200%
Other	0.8	0.6	-25%

¹³ Our numbers are not comparable with those of Tri-Met, which looked at changes in the number of *trips* not in mode shares. Their analyses, like ours, indicate substantial decreases in the drive alone mode, but place transit ahead of carpooling as the primary mode to which SOV commuters diverted.

Changes in Transit Use Frequency

Although this study did not measure number of trips *per se*, we did ask respondents how often they took transit (bus or MAX) for their trip to or from work, both before and after the parking meters were in place. Responses were converted to **number of roundtrips per month**.

For the trip to work, all employees making between 9 and 19 transit roundtrips per month increased their number of transit trips by between 19 and 28 percent. Overall, the number of transit roundtrips per month increased for the District as a whole; results were most impressive for **PASSport** employees and least impressive for non-**PASSport** employees. See Figure 5 at the end of this chapter for an illustration of these results.

Transit Trips for All District Employees

As Table 5 indicates, for the journey to work, transit roundtrips increased by 19 percent for those District employees making between 9 and 19 roundtrips per month. There was a slight decrease in the number of transit trips for those making fewer than 9 roundtrips per month. Overall, there was an 8-percent increase in the number of transit trips made by all employees in the District. See Figure 5 for a comparison of all categories of employees.

TABLE 5: TRANSIT USE FREQUENCY BEFORE AND AFTER METERS
ENTIRE SAMPLE, N = 391 (before) 395 (after)
(Source: PSU Survey, 1998)

Transit Roundtrips Per Month	Number Before	Number After	Percentage Change
1-8	185	183	-1%
9-19	381	473	19%
20 or more	1167	1224	5%
Totals	1733	1880	8%

Transit Trips for **PASSport** Employees

Table 6 shows that for the journey to work for **PASSport** employees, the number of transit roundtrips increased by 22 percent for those making between 9 and 19 roundtrips per month, followed by a 13-percent increase for those making between 1 and 8 roundtrips per month. Overall, for **PASSport** employees in the District, there was an 11-percent increase in transit roundtrips per month.¹⁴ See Figure 5 for a comparison of this category of employees with the others.

¹⁴ Our figures are not comparable with Tri-Met's, which used a different methodology, sampling method, and sample size to report a 72-percent increase in transit trips for **PASSport** participants in the Lloyd District.

TABLE 6: TRANSIT USE FREQUENCY
PASSport EMPLOYEES ONLY, N = 234 (before) 236 (after)
 (Source: PSU Survey, 1998)

Transit Roundtrips Per Month	Number Before	Number After	Percentage Change
1-8	135	156	13%
9-19	309	396	22%
20 or more	1027	1104	7%
Totals	1471	1656	11%

Transit Trips for Non-*PASSport* Employees

The change in transit roundtrips for non-*PASSport* employees for their journey to work was negative in each of the trip categories except the 9-19 roundtrip-per-month category, which saw an increase of 28 percent. Otherwise, non-*PASSport* employees tended to decrease the number of transit roundtrips to an extent that at first glance may seem unexpected. There may be some explanations for this unexpected behavior when sociodemographic factors are taken into consideration. See Figure 5 for a comparison of this category of employees with the others.

TABLE 7: TRANSIT USE FREQUENCY
 NON-*PASSport* EMPLOYEES ONLY, N = 113 (before) 115 (after)
 (Source: PSU Survey, 1998)

Transit Roundtrips Per Month	Number Before	Number After	Percentage Change
1-8	40	21	-90%
9-19	44	61	28%
20 or more	120	80	-50%
Totals	204	162	-26%

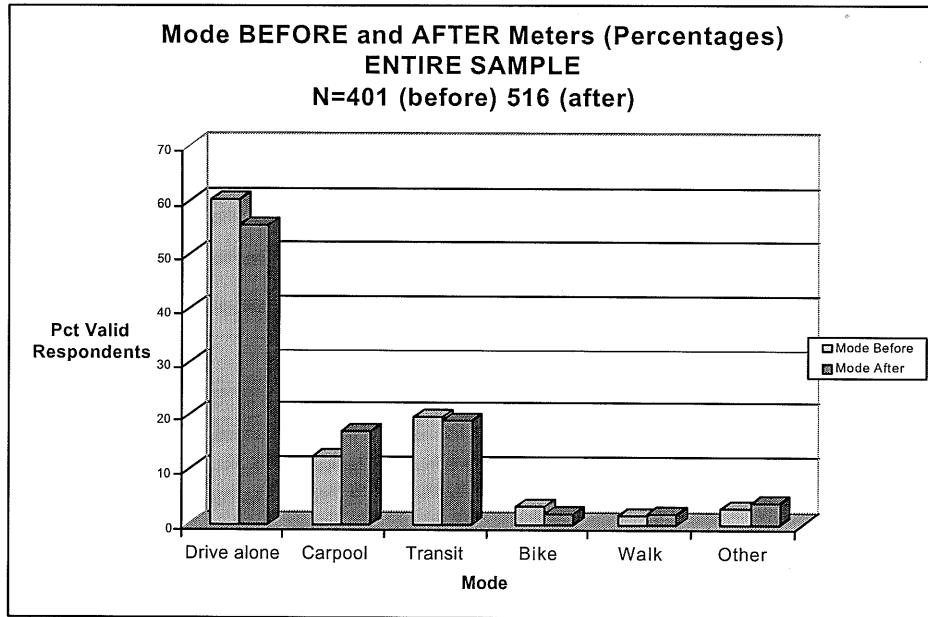


Figure 2. Mode Before and After Meters, Entire Sample (Source: PSU Survey, 1998).

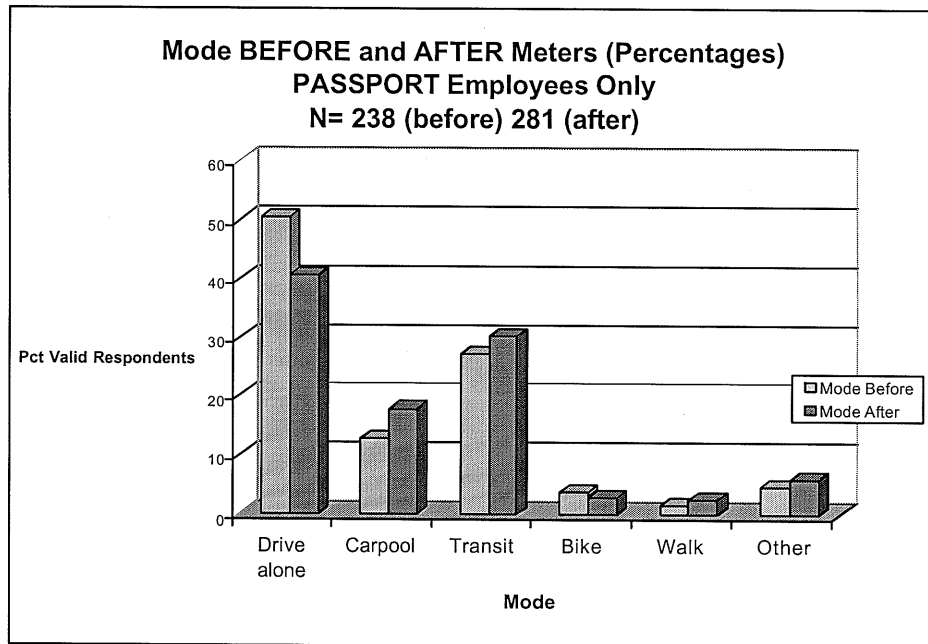


Figure 3: Mode Before and After Meters, *PASSport* Employees Only (Source: PSU Survey, 1998).

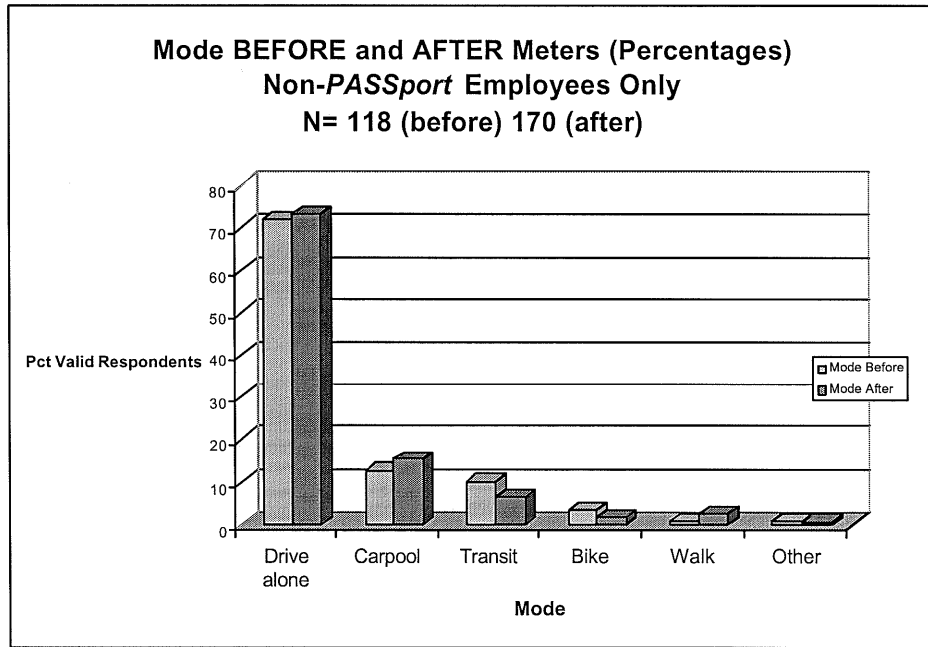


Figure 4: Mode Before and After Meters, Non-PASSport Employees (Source: PSU Survey, 1998).

**Number of Transit Roundtrips Per Month
Percentage Change BEFORE and AFTER Meters
N=Number of Monthly Roundtrips (before) & (after), indicated below**

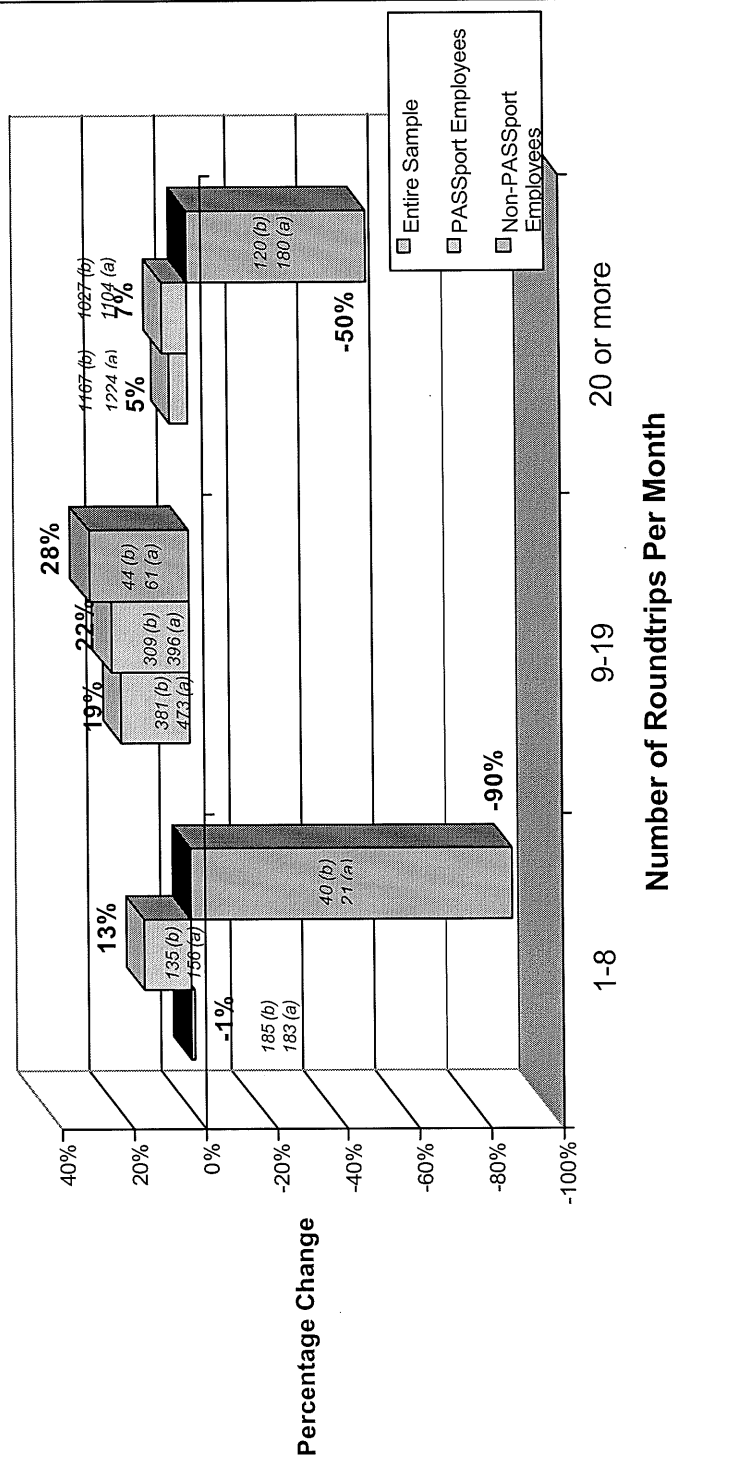


Figure 5. Percentage Change in Number of Transit Commute Roundtrips Per Month Before and After Meters (Source: PSU Survey, 1998).

IV. Findings with Respect to Parking

Conditions Relating to Parking in the Lloyd District

Meters

As discussed earlier, on-street parking within the District had been free until the installation of meters in the fall of 1997. At that time, the City installed short-term (two-hour) meters on most streets within the District, at a rate of \$0.75 per hour, which is 20 to 30 percent less than the pricing of meters in the Central Business District (CBD).

Long-term (five-hour) meters were installed at the outer fringes of the district and, until 10 a.m., are reserved for carpoolers (who must display a carpool permit costing \$30 per month). Thereafter the cost for other drivers is \$0.35 per hour.

There are no meters on the two major commercial thoroughfares, Broadway and Weidler. The lack of meters on these streets is a combined result of the fact that business owners expressed significant concern about how meters might affect retail business and the fact that along many portions of those thoroughfares, there are no parking lanes anyway.

Surface and Structure Parking

There is one major shopping center in the District, the Lloyd Center Mall, which has free surface and structured parking for its employees and customers. The Lloyd Cinema, located across the street from the Mall, has a large (free) surface lot, open to theater and Mall customers and employees. Both facilities restrict access to their parking accommodations until 9 a.m., which discourages CBD-destined commuter "park-and-ride" parking.

There are a number of parking structures in the District located near or on the site of other District employers. Most of these have been charging for parking, although the rates have, again, been 20 to 30 percent lower than CBD parking rates.

The Central City Transportation Management Plan (CCTMP) for the District has instituted maximum parking ratios of 2 spaces per 1000 square feet on new office building development in the District and a mandatory review process for parking supply for any other type of new development.

There is also a prohibition of any new commuter parking, although 4-hour shopper parking continues to be allowed, with review.

Surface lots greater than 40,000 square feet are prohibited.

Residential Parking

Residential Parking in the Metered Area

There are several residential buildings and houses within the metered area. Some of these have adequate off-street parking, although in many cases, residents still rely on on-street parking. The Lloyd District Partnership Plan provides residents within the metered portion of the District with two-and-a-half-year parking permits that allow them to park at long-term meters without time limit and without payment.

Residential Area Parking Permit Programs

Three residential neighborhoods are included within the Lloyd District, although are not in the metered area. There was concern that on-street pricing in the metered area would result in spillover parking into the residential neighborhoods of Eliot, Sullivan's Gulch, and Irvington. It was not the purpose of this study to assess this concern.

The City has a thorough assessment process for determining whether any residential neighborhood should participate in a Residential Area Parking Permit Program (RAPPP). RAPPPs allow unlimited on-street parking to residents and their visitors with a special permit (usually at no or nominal cost). All other parking is either prohibited or limited to two hours, thus discouraging the use of residential areas for commuter parking.

Changes with Respect to Parking Location

This research looked at changes in where people parked and how much they paid for parking. Again, we have divided the respondents into three groups: the entire sample, **PASSport** employees, and non-**PASSport** employees.

In terms of location, we gave respondents the following choices for parking before and after the installation of the meters:

- ◆ Do not drive and park
- ◆ Park at park-and-ride facility
- ◆ Park in employer-provided off-street accommodations (includes both free and not free)
- ◆ Park in off-street accommodations, but not provided by employer
- ◆ Park on the street, at meters
- ◆ Park on the street, but at nonmetered locations
- ◆ Park at on-street carpool spaces

The key finding with respect to parking location is that most employees have apparently responded to the installation of the parking meters not by diverting to another mode, but by moving to another parking location – in some cases demonstrating a willingness to pay for what was once free (parking). For all employees, of those who drive and park, the percentage of those who park in off-street parking – either employer provided or non-employer provided – has increased. As expected, the percentage of those who park on the street, but not at meters, has dropped significantly (because the number of on-street nonmetered spots has dropped significantly). Other categories of parking, such as carpool and park-and-ride, are summarized in a later section.

Employees Who Park in Employer-Provided Off-Street Parking

Of those Lloyd District employees who do drive and park, a large percent park in employer-provided off-street accommodations. Even in the case of *PASSport* employees, a large percent drive to work and park in employer-provided facilities. For all employees, the percent of employees who park in such facilities increased from the period before to the period after the installation of the on-street meters.

As Table 8 indicates, among all employees who drive and park, a majority of non-*PASSport* employees have parked, and continue to park, in employer-provided parking accommodations.

TABLE 8: EMPLOYEES WHO PARK IN EMPLOYER-PROVIDED PARKING BEFORE AND AFTER METER INSTALLATION

(Source: PSU Survey, 1998)

Employee Category	Percent Before (N)	Percent After (N)	Percentage Change
All Employees	47.9 (147)	50.6 (165)	+6%
<i>PASSport</i> Employees	37.7 (63)	39.4 (71)	+5%
Non- <i>PASSport</i> Employees	59.6 (59)	63.8 (67)	+7%

Employees Who Park on the Street, but Not at Meters

This category of parker dropped as expected for all employees by a large percentage. It will be recalled that for the most part, at present, the only unmetered on-street parking is outside the limits of the district, and thus at some distance from most work locations.¹⁵

¹⁵ A number of employers are close enough to the boundaries of the metered district, that employees can still park on-street and walk. For example, Metro is only a few blocks from the end of the metered area.

TABLE 9: EMPLOYEES WHO PARK ON THE STREET, BUT NOT AT METERS
BEFORE AND AFTER METER INSTALLATION

(Source: PSU Survey, 1998)

Employee Category	Percent Before (N)	Percent After (N)	Percentage Change
All Employees	28.3 (87)	13.2 (43)	-53%
<i>PASSport</i> Employees	31.1 (52)	11.7 (21)	-62%
Non- <i>PASSport</i> Employees	24.2 (24)	14.3 (15)	-41%

As Table 9 indicates, the *PASSport* employees who drove and parked were the most likely to park at unmetered spaces on the street before the meters (31 percent of those employees did so). The same group is now the least likely to park at unmetered spaces. Non-*PASSport* employees who drove and parked were the least likely to take advantage of this type of parking (about 24 percent of them parked at unmetered spots before), but are now the *most* likely to do so (14 percent of non-*PASSport* employees who drive and park now park at unmetered spots).

Employees Who Park in Non-Employer-Provided Off-Street Parking

Like the category of those employees who park at employer-provided off-street parking, this category of parker increased as well. Unlike that category, these parkers were and are still most likely to be *PASSport* employees. Of those *PASSport* employees who drove and parked, 24 percent parked in non-employer-provided off-street parking; this has increased by 28 percent to 31 percent. Non-*PASSport* employees who drive and park appear to be the least likely to use park in this type of facility, although their use of non-employer-provided off-street parking increased as well (by 15 percent).

TABLE 10: EMPLOYEES WHO PARK IN NON-EMPLOYER-PROVIDED OFF-STREET PARKING
BEFORE AND AFTER METER INSTALLATION

(Source: PSU Survey, 1998)

Employee Category	Percent Before (N)	Percent After (N)	Percentage Change
All Employees	19.2 (59)	24.2 (79)	+26%
<i>PASSport</i> Employees	24.0 (40)	30.6 (55)	+28%
Non- <i>PASSport</i> Employees	14.1 (14)	16.2 (17)	+15%

Employees Who Park at Meters, Carpool Spots, or Park-and-Ride Locations

Figures 6-8 show that only a small percentage of employees have been parking at other types of locations than those discussed above. For the entire sample, of those who drive and park, those who park at meters has increased from about 1 to 5 percent. About 8 percent of all *PASSport* employees who drive and park now park at meters—up from about 2 percent—and about 5 percent now park at park-and-ride facilities—also up from about 2 percent. Non-*PASSport* employees who drive and park report no use of park-and-ride facilities either before or after the installation of the parking meters. Use of on-street carpool spaces has not changed significantly and remains low in terms of percentage of all those who drive and park (less than 1 percent for the entire sample).

Metered Locations

Since there are now many more on-street metered spots, this category has seen a jump across all types of employee. For the sample as a whole, of those who drive and park, those who park at meters increased from 1.3 to 5.2 percent – an increase of over 300 percent. Of *PASSport* employees who drive and park, those who park at meters increased from 2.4 to 7.8 percent – an increase of over 200 percent. Of the non-*PASSport* employees who drive and park, those who park at meters increased from nil to 2.9 – again, an increase of nearly 300 percent.

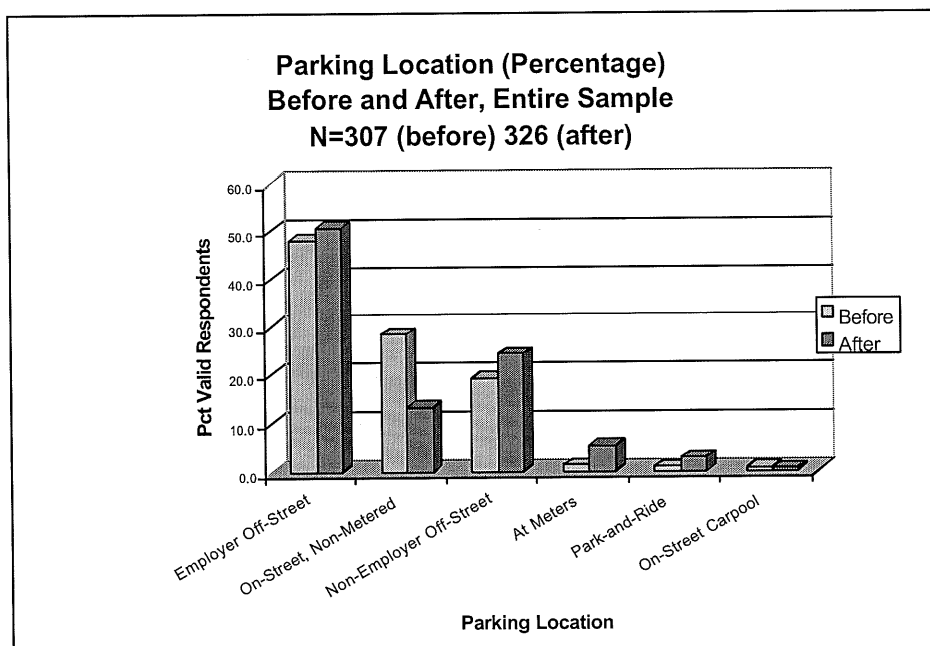


Figure 6. Parking Location, Before and After, Entire Sample (Source: PSU Survey, 1998).

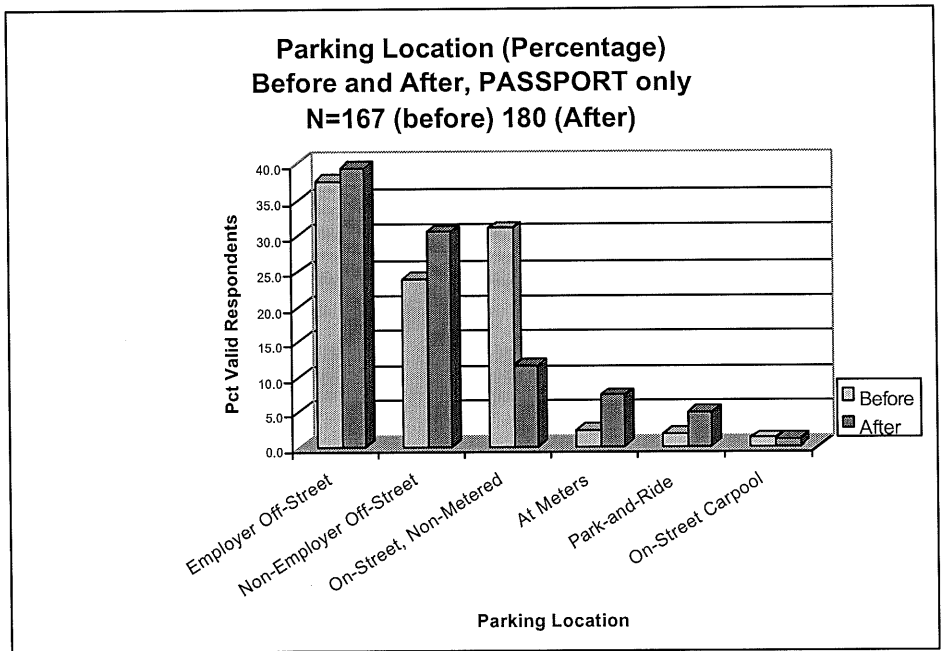


Figure 7. Parking Location, Before and After, *PASSport* Employees (Source: PSU Survey, 1998).

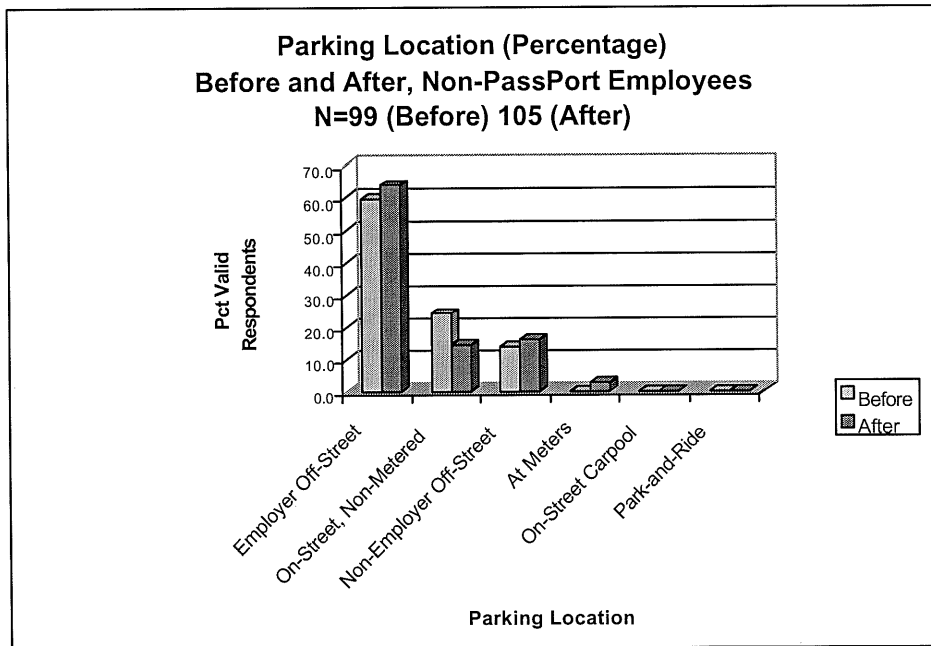


Figure 8. Parking Location, Before and After, Non-*PASSport* Employees (Source: PSU Survey, 1998).

On-Street Carpool Spots

Prior to the implementation of the transportation management program, carpool permits were available free of charge for use at specified on-street locations. With the implementation of the program, the permits became available only at a monthly fee, currently \$30 per month. This has apparently not served to deter the use of on-street carpool spaces in the district. However, while

the pricing of the permits has had no negative effect on the use of carpool spaces, the program as a whole has not appeared to have much of a positive effect. **PASSport** employees have been the most likely to park in these locations (about 1 percent of all such employees who drive and park do so in carpool spots – this percentage has not changed). Non-**PASSport** employees who drove and parked apparently did not park at on-street carpool spaces before, nor do they now.

Park-and-Ride

We assumed that some employees who used to drive into work and park for free on the street would now switch to transit, but still use their car to drive to a park-and-ride facility. This was in fact the case for the **PASSport** employees, whose use of park-and-ride facilities increased from 1.8 to 5.0 percent – an increase of almost 200 percent. Non-**PASSport** employees, however, none reported using park-and-ride either before or after the meters were installed.

Changes with Respect to Parking Prices Paid

Parking Prices Paid Before and After Meter Installation

Before the parking meters were installed in the Lloyd District, 61 percent of employees who drove parked for free; this figure declined by 24 percent, to 46 percent of all those who currently drive and park. For the District as a whole, the average hourly parking price paid before the meters were installed was about \$0.34 and is now about \$0.37. **PASSport** employees showed more effect than the entire sample, with only 28 percent now parking for free (compared with 47 percent prior to the meter installation). A very large majority of non-**PASSport** employees parked free both before (82 percent) and after (74 percent) meter installation and, as a matter of fact, the average hourly price paid by non-**PASSport** employees who do pay something has actually decreased, whereas it increased for other employees.

All Lloyd District Employees in the Sample

As Table 11 and Figure 9 indicate, before the parking meters were installed, the majority (61 percent) of employees who drove and parked in the Lloyd District paid nothing to park. This declined by 24 percent to only 46 percent of all those who currently drive and park. Now a majority of employees who drive and park in the Lloyd District are paying *something*. Whereas the average hourly parking price paid before meter installation was about \$0.34, it is now \$0.37.¹⁶

¹⁶ These are the average hourly rates for employees who paid a nonzero price. The averages for all employees, including those who paid zero, was \$0.13 before the installation of the meters and \$0.21 after.

TABLE 11. HOURLY PARKING PRICE PAID BEFORE AND AFTER METER INSTALLATION
ENTIRE SAMPLE, N= 306 (before) 322 (after)

(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Percent Before	Percent After	Percentage Change
Zero	60.8	46.3	-24%
\$0.01 to \$0.24	7.5	8.7	+16%
\$0.24 to \$0.40	24.2	25.2	+4%
\$0.41 to \$0.50	5.6	15.2	+171%
More than \$0.50	2.0	4.7	+135%

PASSport Employees

Even among *PASSport* employees who drove and parked, a large percentage (47 percent) parked for free before the installation of the meters (a majority, however, did pay *something* – an average of \$0.34 per hour). As Table 12 and Figure 10 show, after the meter installation, this group responded much more strikingly than did the sample as a whole, with only 28 percent now parking for free, and the remainder paying an average of \$0.36 per hour to park.¹⁷

TABLE 12: HOURLY PARKING PRICE PAID BEFORE AND AFTER METER INSTALLATION
PASSport EMPLOYEES ONLY, N = 167 (before) 177 (after)

(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Percent Before	Percent After	Percentage Change
Zero	46.7	28.2	-40%
\$0.01 to \$0.24	11.4	11.3	-1%
\$0.24 to \$0.40	31.7	30.5	-4%
\$0.41 to \$0.50	8.4	23.7	+182%
More than \$0.50	1.8	6.2	+244%

Non-PASSport Employees

Finally, as Table 13 and Figure 11 illustrate, the installation of meters has had the least remarkable impact on non-*PASSport* employees who drive and park, a vast majority of whom parked for free both before (82 percent) and after (74 percent) the installation of the meters. Although the number of non-*PASSport* employees who drive and park for free has decreased by 10 percent, the average hourly price paid has actually dropped, from an average of \$0.39 to \$0.36.¹⁸

¹⁷ Again, the averages reported here are for those who paid a nonzero price. Average hourly parking prices, when those who parked for free are included, were \$0.18 before the meters and \$0.28 after the meters.

¹⁸ Because the percentage of employees in this category who pay zero is so large, the averages calculated to include the zero prices are infinitesimal. These before and after averages of \$0.39 and \$0.36 are based on those few employees who have been paying a price.

TABLE 13: HOURLY PARKING PRICE PAID BEFORE AND AFTER METER INSTALLATION
 NON-PASSport EMPLOYEES ONLY, N = 99 (before) 104 (after)
 (Source: PSU Survey, 1998)

Hourly Parking Price Paid	Percent Before	Percent After	Percentage Change
Zero	81.8	74	-10%
\$0.01 to \$0.24	2.0	4.8	+140%
\$0.24 to \$0.40	11.1	15.4	+39%
\$0.41 to \$0.50	2.0	2.9	+45%
More than \$0.50	3.0	2.9	-3%

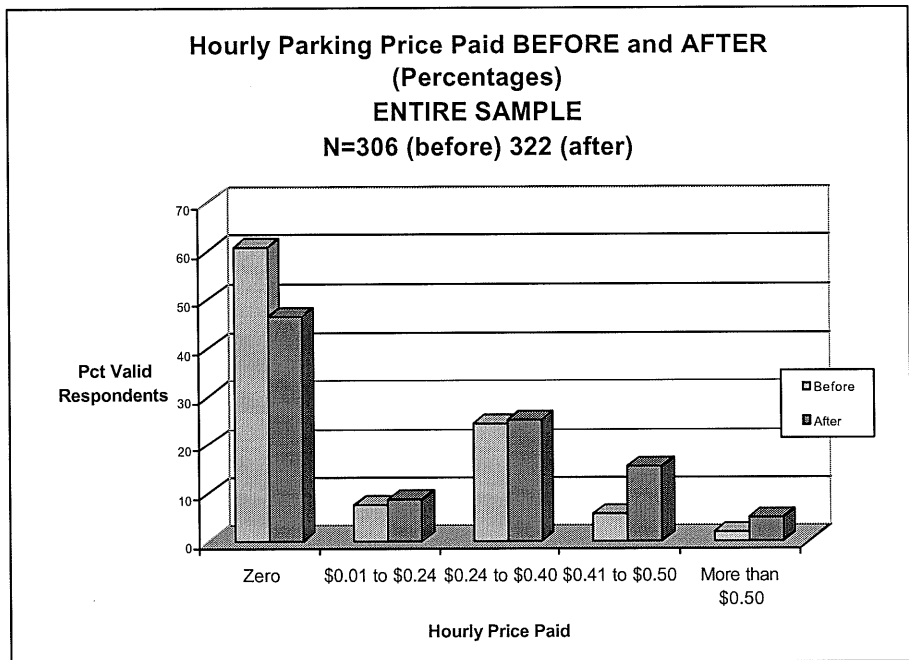


Figure 9: Hourly Parking Price Paid Before and After, Entire Sample (Source: PSU Survey, 1998).

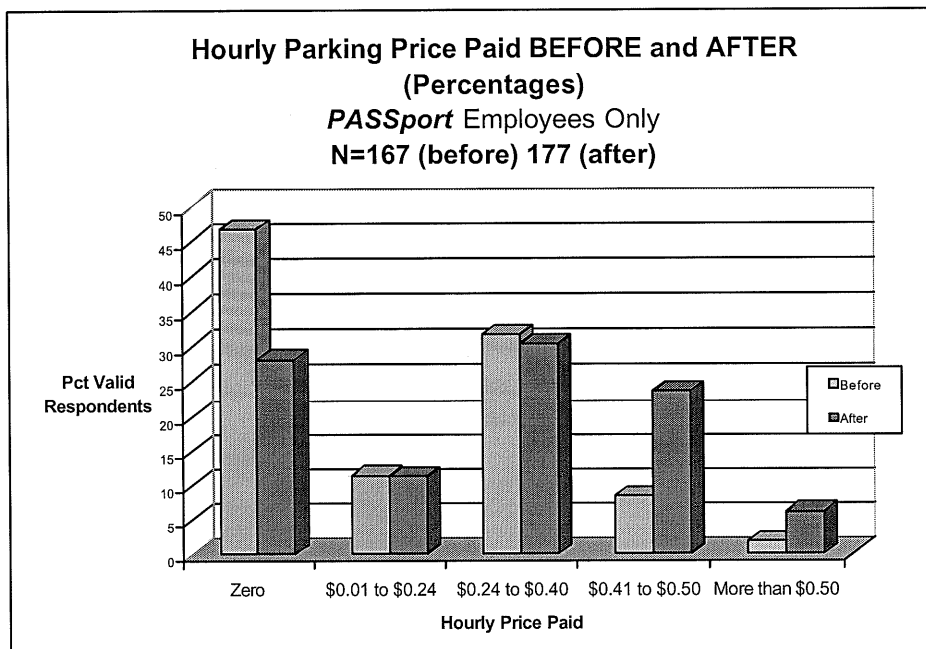


Figure 10. Hourly Parking Price Paid Before and After, *PASSport* Employees
(Source: PSU Survey, 1998).

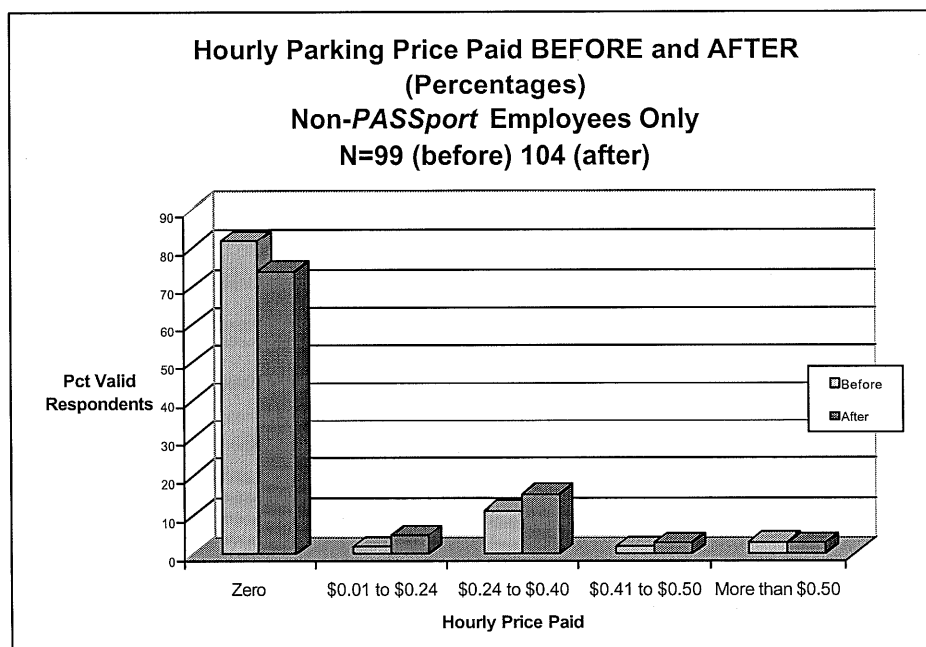


Figure 11. Hourly Parking Price Paid Before and After, Non-*PASSport* Employees
(Source: PSU Survey, 1998).

Relationship Between Parking Location, Mode and Parking Price Paid

In this section, we look only at the entire sample, before and after the installation of the meters. In analyzing the relationship between two variables, such as parking price and parking location, the ability to determine statistical significance depends on there being a fairly high number of observations. However, because so few people paid for parking either before or after the meters, we did not want to compromise the sample size further by dividing the sample into *PASSport* and non-*PASSport* groups. Our interest here was in assessing whether the price of parking paid affected where employees in the district park and how they commute, for both the before and after periods.

Those who currently park for free are most likely to be parking in employer-provided, off-street accommodations; in fact, they are *more* likely to be parking in such facilities than before the meters were installed. In terms of the relationship between parking price paid and mode, those who park for free were and are more likely to drive alone than to use any other mode in the commute to work. **However, the likelihood that a commuter will drive alone has declined somewhat at all pricing levels.**

Parking Location and Parking Price

As Tables 14 and 15 indicate, of those employees who drive and park in the Lloyd District, 48 percent of those parking for free parked in employer-provided off-street accommodations, compared with 64 percent after the meter installation. Of those who paid in the range containing the average for the District (\$0.24 to \$0.40 per hour), a large percentage parked in non-employer-provided accommodations before (49 percent) and after (47 percent) meter installation. Of those paying well above average (the "more than \$0.50" category), 50 percent had been parking in employer-provided accommodations before the meters; after the meters the percentages were somewhat more evenly distributed among all parking locations. Perhaps the most important finding of this analysis is that those who currently park for free are most likely to be parking in employer-provided, off-street accommodations.¹⁹

¹⁹ These findings are all statistically significant, with a Pearson χ^2 value of 113 or better (12 d.f.), $p < .001$. Because there were sparse cells—i.e., few observations in some categories, such as employees paying more than \$0.50 per hour in any but employer-provided accommodations—these results should be interpreted with some caution.

TABLE 14: HOURLY PARKING LOCATION BY HOURLY PARKING PRICE PAID (PERCENTAGE)
BEFORE METER INSTALLATION, ENTIRE SAMPLE, N=303
 (Source: PSU Survey, 1998)

Hourly Parking Price	Zero	\$0.01- \$0.24	\$0.24- \$0.40	\$0.41- \$0.50	More than \$0.50
Parking Location					
Employer-Provided Off-Street	47.8	47.8	47.3	25.0	50.0
Non-Employer-Provided Off-Street	5.4	17.4	48.6	37.5	33.3
Other (park-and-ride, carpool, free on-street)	46.7	30.4	4.1	25.0	16.7

TABLE 15: HOURLY PARKING LOCATION BY HOURLY PARKING PRICE PAID (PERCENTAGE),
AFTER METER INSTALLATION, ENTIRE SAMPLE, N=321
 (Source: PSU Survey, 1998)

Hourly Parking Price	Zero	\$0.01- \$0.24	\$0.25- \$0.40	\$0.41- \$0.50	More than \$0.50
Parking Location					
Employer-Provided Off-Street	64.2	46.4	38.3	56.5	40.0
Non-Employer-Provided Off-Street	2.7	17.9	46.9	57.1	20.0
Other (park-and-ride, carpool, free on-street)	32.4	25.0	7.4	10.2	20.0
On-Street Meters	0.7	10.7	7.4	6.1	20.0

Commute Mode and Parking Price

Looking at the relationship between parking price paid and commute mode, we see from Tables 16 and 17 that those who paid nothing for parking prior to the meter installation were clearly more likely to drive alone than use any other mode to work. The only pricing category where the likelihood that employees would use transit (31 percent) was at all similar to the likelihood that they would drive alone (44 percent) was in the higher pricing category of \$0.41 to \$0.50 per hour (the highest category had so few respondents – 6 altogether – that we shouldn't be given too much weight to this analysis).²⁰

Comparing these trends with the period *after* the meter installation reveals that at all but the top two pricing levels, the drive-alone mode is still the most likely mode, although the likelihood that a commuter will drive alone has declined somewhat at all price levels (except the \$0.41 to \$0.50 level).

At the zero price, commuters are more likely to be carpoolers than before the meters; this is interesting, given that now carpool permits cost \$30 per month. Some carpool respondents may either not consider the cost of the monthly permit as a parking fee or may in fact not be parking in carpool-permit spots.

²⁰ As with the previous analyses, these findings are all statistically significant, with a Pearson χ^2 value of 29 or better (12 d.f.), $p < .005$. Again, because there were few observations in some categories (e.g., employees paying more than \$0.50 per hour prior to the meter installation), these results should be interpreted with some caution.

The other noteworthy finding here is that at the top pricing category, commuters are now somewhat more equally likely to drive alone (40 percent), take transit (27 percent), or use some other form (20 percent); they are least likely to carpool (13 percent). This is not unexpected, given the fact that carpoolers are usually least able to afford higher parking prices. We will look at the relationship between these and other findings with sociodemographic factors such as income in Chapter 6.

TABLE 16: COMMUTE MODE BY HOURLY PARKING PRICE PAID (PERCENTAGE)
BEFORE METER INSTALLATION, ENTIRE SAMPLE, N=301
 (Source: PSU Survey, 1998)

Hourly Parking Price Mode	Zero	\$0.01- \$0.24	\$0.25- \$0.40	\$0.41- \$0.50	More than \$0.50
Drive alone	77.2	72.7	83.6	43.8	66.7
Carpool or vanpool	13.0	18.2	13.7	12.5	16.7
Transit	5.4	9.1	1.4	31.3	16.7
Other	4.3	0.0	1.4	12.5	0.0

TABLE 17: COMMUTE MODE BY HOURLY PARKING PRICE PAID (PERCENTAGE)
AFTER METER INSTALLATION, ENTIRE SAMPLE, N=321
 (Source: PSU Survey, 1998)

Parking Price Mode	Zero	\$0.01- \$0.24	\$0.25- \$0.40	\$0.41- \$0.50	More than \$0.50
Drive alone	68.5	64.3	79.0	45.8	40.0
Carpool or vanpool	18.8	21.4	14.8	14.6	13.3
Transit	8.1	10.7	4.9	33.3	26.7
Other	4.7	3.6	1.2	6.3	20.0

V. Why Employees Changed their Behavior

The researchers asked employees to rank the top three reasons for changes, if any, in travel (i.e., mode) and parking behavior (both parking location and price paid). The reasons from which employees could choose were as follows:

- ◆ New parking meters (no longer free on-street parking)
- ◆ Transit availability
- ◆ Employer-provided free or discounted transit pass
- ◆ Employer-accommodated alternative forms of transportation
- ◆ Employer-accommodated telecommuting or reduced workweek
- ◆ Cost of auto ownership and operation
- ◆ Changes in household car ownership or licensing
- ◆ Changes in household life-style, residence, etc.
- ◆ Other (please specify) _____

We also asked respondents to rank the top three reasons that their usual *time* for leaving for or from work changed, if it did. The choices we gave them were:

- ◆ To find parking
- ◆ Bus or MAX schedule
- ◆ Rush-hour traffic
- ◆ Change in means of travel
- ◆ Changes in household life-style, residence, or job
- ◆ Other (please specify) _____

Finally, we asked for a ranking of the existing Lloyd District transportation management programs that employees felt were most responsible for their present work-related travel habits. For this section of the survey, employees—even those who had not worked in the District prior to the installation of the meters—could choose from the following list:

- ◆ Parking meters
- ◆ Transit availability
- ◆ Tri-Met **PASSport** program (a Tri-Met sticker on photo ID card)
- ◆ Employer accommodation of alternative transportation
- ◆ Increased availability of carpool spaces
- ◆ None
- ◆ Other (please specify) _____

Reasons for Changes in Travel Behavior

Respondents were asked to rank the top three reasons (from the first list above) for any changes in their travel habits. We assume that, because of the placement of this question in the survey, most respondents interpreted this question as a question about changes in the commute *mode* (although we did not use the term “mode” in the survey). Later in the survey, we asked

respondents to rank the top three reasons for changes in their *usual time* for leaving for or from work, as well as their parking habits, as noted above and as discussed below.

For the entire sample, 25 percent said their No. 1 reason for changing their travel habits was changes in life-style, residence, or job—factors unrelated to the transportation management program. Nearly 22 percent reported the new meters and 19 percent the **PASSport** program as the No. 1 reason for their change. Nearly 36 percent cited the **PASSport** program as their No. 2 reason for change, while 7 percent cited the new meters as their No. 2 reason.

For **PASSport** employees, an equal percentage (24 percent) cited both the **PASSport** program and the new meters as their No. 1 reason for change. A large percentage (44 percent) cited the **PASSport** as their No. 2 reason for change.

Few non-**PASSport** employees reported a change in travel habits. Of the few who did, the most noteworthy finding is that the largest percentage cited changes in life-style, residence, and job as their No. 1 and No. 2 reasons.

Mode Change Reasons for the Entire Sample

Looking at the entire sample of respondents who did report a change in mode for the trip to work, 25 percent said that their No. 1 reason for doing so was unconnected to any transportation demand management (TDM) program – that is, they changed for reasons related to their life-style and, therefore, presumably not subject to impact by TDM. Nearly 22 percent, however, reported that the existence of the new meters was the No. 1 reason behind their mode change, followed by nearly 19 percent who cited the **PASSport** program as the chief reason. These results are shown in Figure 12.

In ranking their No. 2 reasons for mode change, nearly 36 percent of the employees who changed mode indicated the **PASSport** program as their No. 2 reason, while about 7 percent cited the parking meters as their second reason.

Transit availability ranked moderately high as both a first choice (about 12 percent of the respondents cited this factor) and as a second choice (16 percent). It should be noted, however, that “transit availability” (the phrase used on the survey) could be interpreted by respondents both positively (greater availability) or negatively (less availability). Auto costs (not shown in Figure 12) were not cited at all as a first choice, although about 11 percent of the respondents did cite it as a No. 2 reason.

Mode Change Reasons for the **PASSport** Employees

Figure 13 focuses only on **PASSport** employees who changed their travel habits (i.e., mode). Interestingly, the same percentage – about 24 percent – reported the new meters and the **PASSport** as being the No. 1 reason for the change in their travel habits. A slightly smaller percentage – 21 percent – reported that changes in life-style, residence, job, etc., were the No. 1 reason for their change.

In terms of the No. 2 reason, the **PASSport** looms far above any of the other programs, with 44 percent of the respondents choosing this as their No. 2 reason for the change in their travel habits, far ahead of either transit availability (12 percent) or the new meters (8 percent). Only 8 percent reported changes in lifestyle, residence, job, etc., as their No. 2 reason for change.

Mode Change Reasons for the Non-PASSport Employees

Fewer than 20 non-PASSport employees reported a change in their travel habits to work before and after the meter installation. Thus, Figure 14 must be interpreted with caution. The most striking finding here is that a large percentage of respondents chose changes in life-style, residence, and job—factors having nothing to do with the District’s transportation management programs—as both their No. 1 and No. 2 reasons for changing their travel habits. A very large percentage—42 percent—wrote “auto costs” in the “other” category as their No. 2 reason, but it’s difficult to know which auto costs (maintenance, fuel, parking, licensing, etc.) these respondents had in mind. All of these are non-PASSport employees, so understandably no one selected the **PASSport** program itself as a reason for change, although transit availability did figure for 11 percent as their No. 1 reason and 33 percent as their No. 2 reason. The transit meters figured as a No. 1 reason for about 16 percent of the respondents, but for no one as a No. 2 reason.

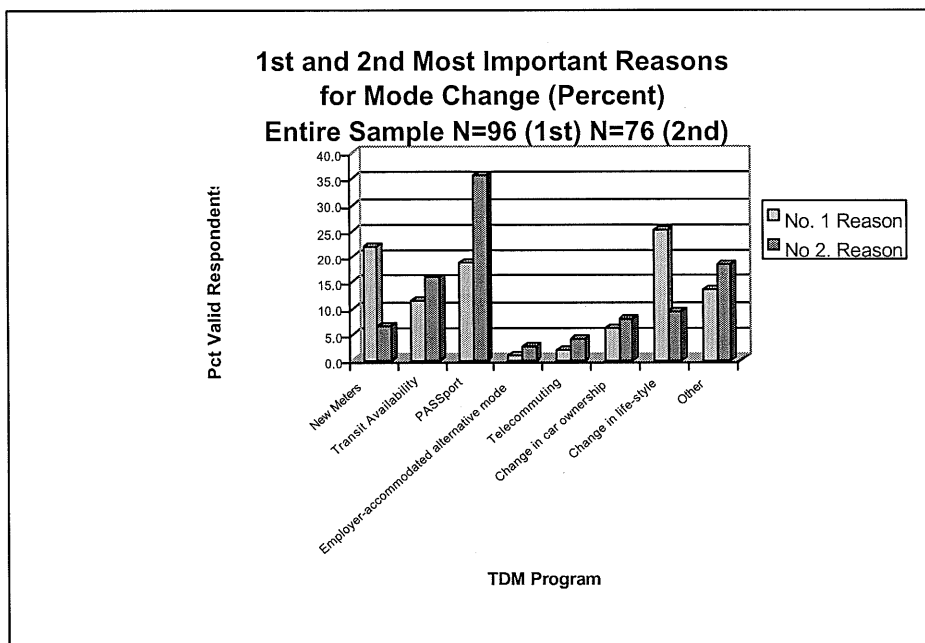


Figure 12. First and Second Most Important Reasons for Mode Change, Entire Sample (Source: PSU Survey, 1998).

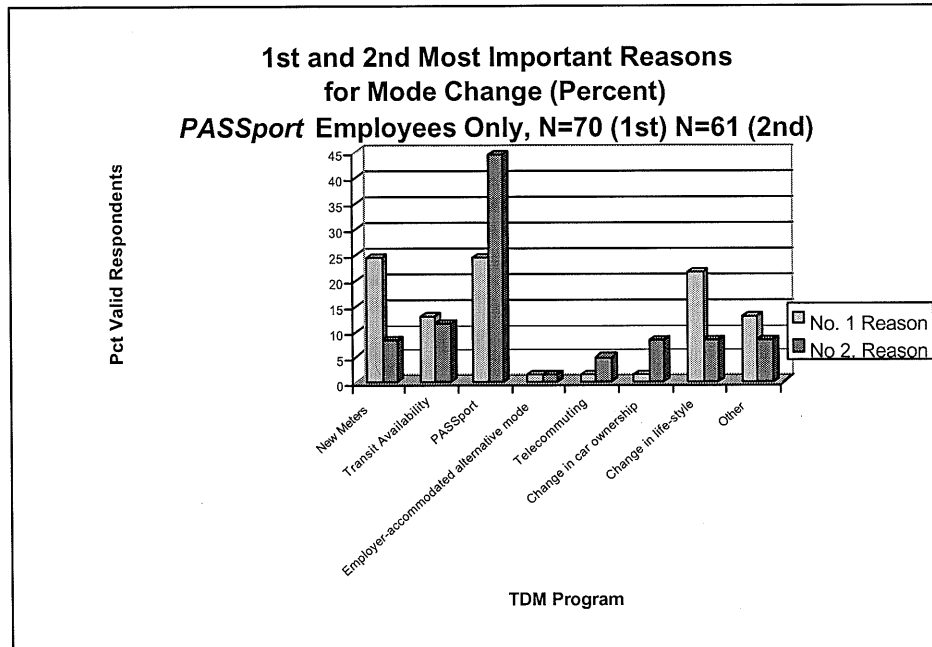


Figure 13. First and Second Most Important Reasons for Mode Change, *PASSport* Employees (Source: PSU Survey, 1998).

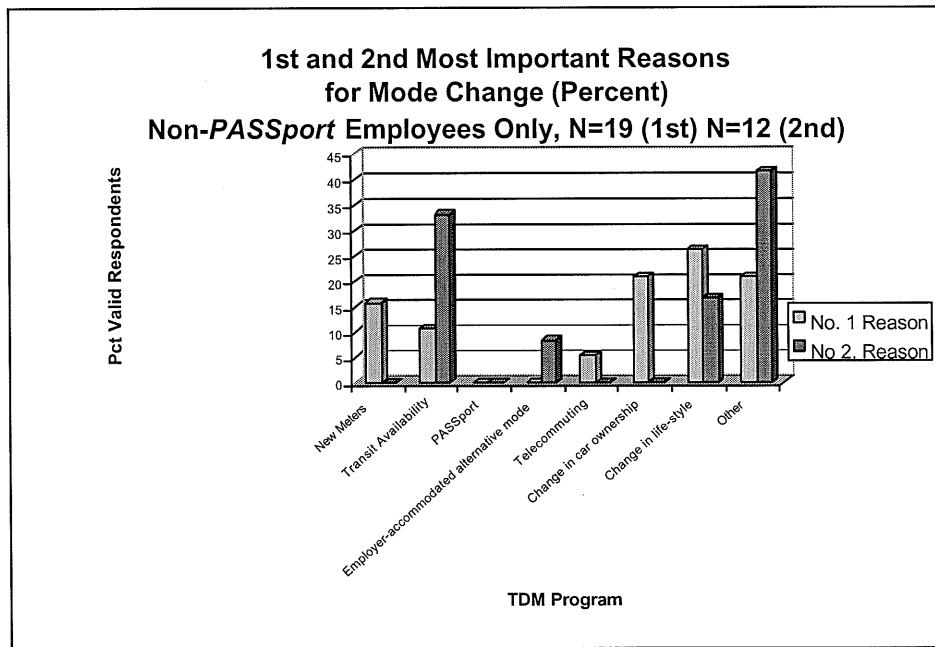


Figure 14. First and Second Most Important Reasons for Mode Change, Non-*PASSport* Employees (Source: PSU Survey, 1998).

Reasons for Changes in Departure Time to or from Work

Although 30 percent of the respondents reported that they had changed their departure time during the period before and after the meter installation, the changes in time were not meaningful in terms of spreading the peak: changes in departure time were small. For 37 percent of these employees, the No. 1 reason they changed their departure time was a life-style reason unrelated to the transportation programs. About 15 percent said the No.1 reason they changed their departure time was "to find parking," while 12 percent gave "bus or MAX schedule" as their No. 1 reason. As for No. 2 reasons, 27 percent cited "rush-hour traffic," and 19 percent cited "change in mode."

About 30 percent of all respondents reported that they have changed the time that they depart for or from work. However, we found that there was no meaningful change in the percentage of employees commuting during the peak, shoulder, or off-peak periods either during the a.m. or p.m. periods. Any changes in departure times were therefore small – for example, people leaving 15 minutes earlier or later – rather than large – for example, people shifting from peak to off-peak.

Figure 15 illustrates the No. 1 and No. 2 reasons that the 30 percent of the employees gave for changing their departure time, even though the size of the time change itself was not large. For 37 percent of the employees who did change their departure time, the No. 1 reason was changes in life-style, residence, or job – factors unrelated to any of the transportation programs. Other than this, the most notable finding is that about 15 percent of the employees reported that the No. 1 reason they have changed their departure time was "to find parking"—thus suggesting that the meters have affected perceptions regarding parking supply, as would be expected.

Another noteworthy finding is that 12 percent of the employees chose "bus or MAX schedule" as their No. 1 reason, and 19 percent as their No. 2 reason for changing departure time. This could be interpreted in a number of ways. Commuters diverted from auto to transit may have to leave for or from work at a different time to meet a transit schedule. It could also mean that because of improvements in transit availability, existing transit riders have some greater flexibility and may, for example, be able to leave home somewhat later than they did before the transit improvements were in place.

Also noteworthy is that 19 percent of those who changed their departure time cited "change in mode" as their No. 2 reason. Finally, 27 percent of the employees who reported changing their departure time gave "rush-hour traffic" as their No. 2 reason (although only 8 percent gave it as a No. 1 reason).

Again, because the change in commute time was not significant in terms of shifting people away or toward the peak, we have not analyzed the time effects in depth, nor are we presenting a comparison of *PASSport* versus non-*PASSport* employees. The results are presented because they suggest the possibility that expanded transportation management programs (e.g., even less availability of free parking and/or even greater transit availability) may begin to move people from peak to shoulder to off-peak – in other words, may begin to have the effect of spreading the peak. At present, however, this does not appear to have occurred.

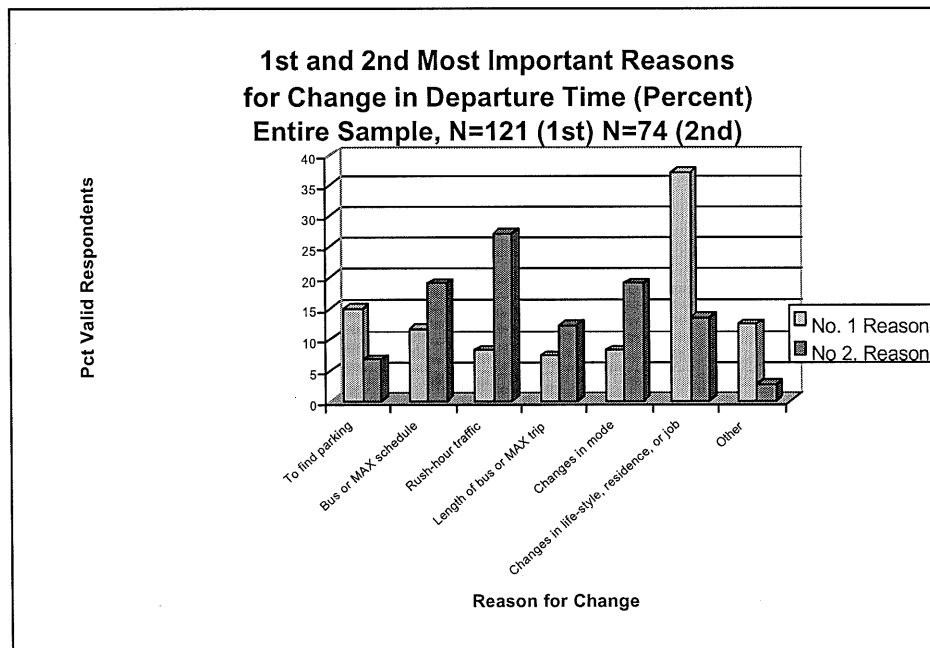


Figure 15. First and Second Most Important Reasons for Change in Departure Time, Entire Sample Figure (Source: PSU Survey, 1998).

Reasons for Changes in Parking Habits

As discussed in Chapter 4, we asked respondents questions about *where they parked* and *how much they paid for parking* before and after the installation of the meters. In general, these questions applied only if employees drove and parked at work. We then asked everyone who had worked in the District both before and after the meters were installed a summary yes-or-no question: "Have any of your work-related parking habits changed during the period before and after the installation of the meters?" To this, 27 percent (N=400) said yes. We then asked those 27 percent who said their parking habits—whether location or price—had changed to rank the top three reasons for the change, just as we had with the questions about mode and departure time.

In terms of changes in parking habits—whether location or price paid—the No. 1 reason cited by the largest percentage of respondents (51 percent) was the new meters. Even for *PASSport* employees, this was cited as the No. 1 reason by 48 percent of the respondents. The percentage was even greater (65 percent) for non-*PASSport* employees (keeping in mind that few non-*PASSport* employees reported changing their parking habits at all). The *PASSport* program was cited as a No. 2 reason by 32 percent of the *PASSport* employees. For non-*PASSport* employees, transit availability was listed as a No. 2 reason by 30 percent of the respondents.

Parking Change Reasons for the Entire Sample

Figure 16 indicates that, for the entire sample, a majority (51 percent) cited the new meters as the No. 1 reason for the changes in their parking habits—either where they park or how much they

pay. About 14 percent cited the *PASSport* or life-style reasons as the No. 1 reason, although the *PASSport* figured more prominently as a No. 2 reason, cited by 26 percent of the respondents. The new meters and transit availability were cited by 16 and 18 percent, respectively, as their No.2 reason. Interestingly, telecommuting, which was written in as one of the “other” options, was cited by nearly 10 percent of the respondents (about 7 people) as the No. 2 reason for changing their parking habits.

Parking Change Reasons for *PASSport* Employees

Figure 17 shows that the patterns for the *PASSport* employees reflect those of the sample as a whole. The largest percentage—48 percent—cite the new meters as their No. 1 reason for changes in parking habits. The *PASSport* program is a distant second, cited by 17 percent of these employees as the No. 1 reason their parking habits have changed. It is, however, cited by 32 percent as the No. 2 reason for changes in their parking habits.

Parking Change Reasons for Non-*PASSport* Employees

As is the case with change in mode, very few (about 20) non-*PASSport* employees report any change in their parking habits. This should be kept in mind when looking at the findings with respect to this group. For this group, the *PASSport* program was obviously not chosen as either a first or second reason for any change in parking habits. The installation of the new meters was cited by a large majority—65 percent—as their No. 1 reason for change. Interestingly, transit availability and “other” were listed by 30 percent (about 3 people) each as the No. 2 reason (with “other” including “auto costs”).

Most Important Transportation Demand Management Programs

We asked *all* respondents—whether or not they had worked in the District in the period before the meter installation—to rank the top three aspects of the Lloyd District transportation programs that they felt were the most important for their *present* work-related travel habits. This was not a question about factors responsible for *change*, only a question about present behaviors.

A large percentage of employees (41 percent) do not consider *any* of the transportation demand management programs (TDM) in the Lloyd District to be responsible for their present work-related travel habits. This situation is the most marked among non-*PASSport* employees, 64 percent of whom indicated that none of the TDM programs in place were affecting their present habits.

Nearly 19 percent of all respondents cited the *PASSport* program as the No. 1 TDM program, followed by nearly 13 percent citing transit availability and 11 percent citing the parking meters. The *PASSport* was cited as a No. 1 TDM program by a large percentage of the *PASSport* employees (32 percent), but even among this group, it is notable that 24 percent said that none of the TDM programs was responsible for their present work-related travel habits.

The *PASSport* and transit availability options also were cited by a larger percentage of respondents as the No. 2 TDM program responsible for their present work-related travel habits. Parking meters and employer-accommodated alternative modes came in next, with 10 percent of the respondents citing each as a No. 2 reason.

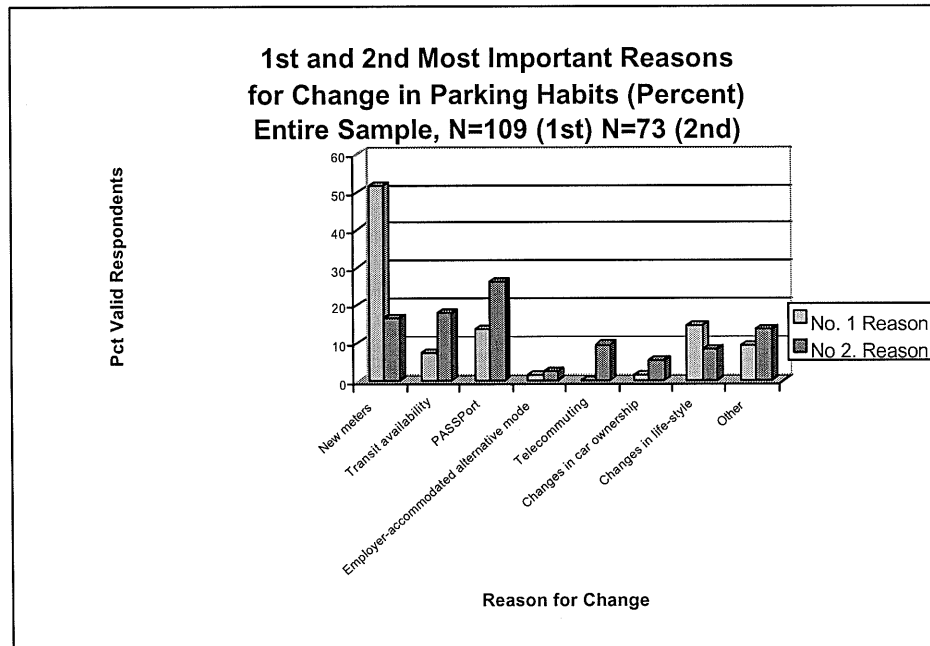


Figure 16. First and Second Most Important Reasons for Change in Parking Habits, Entire Sample (Source: PSU Survey, 1998).

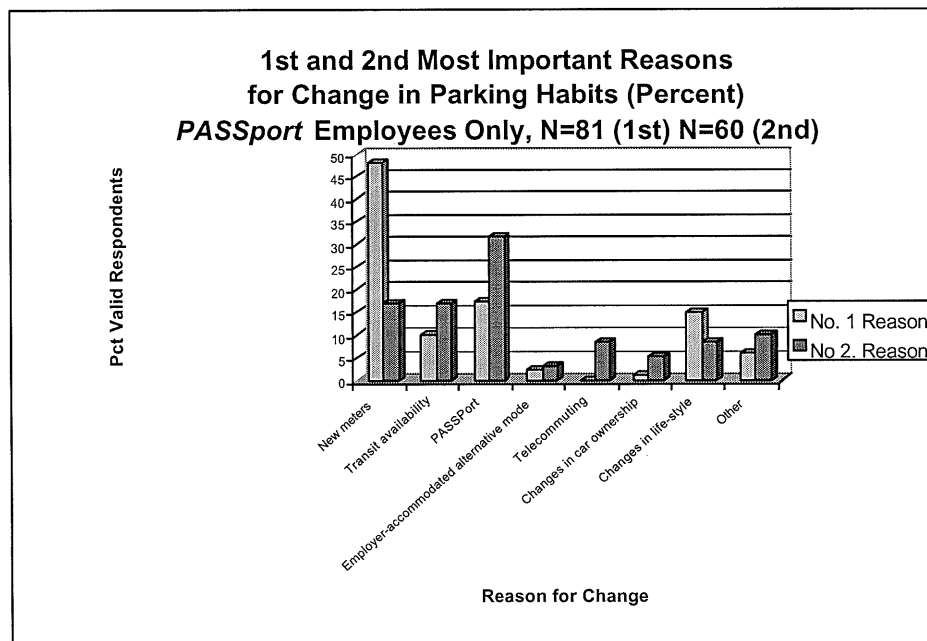


Figure 17. First and Second Most Important Reasons for Change in Parking Habits, *PASSport* Employees (Source: PSU Survey, 1998).

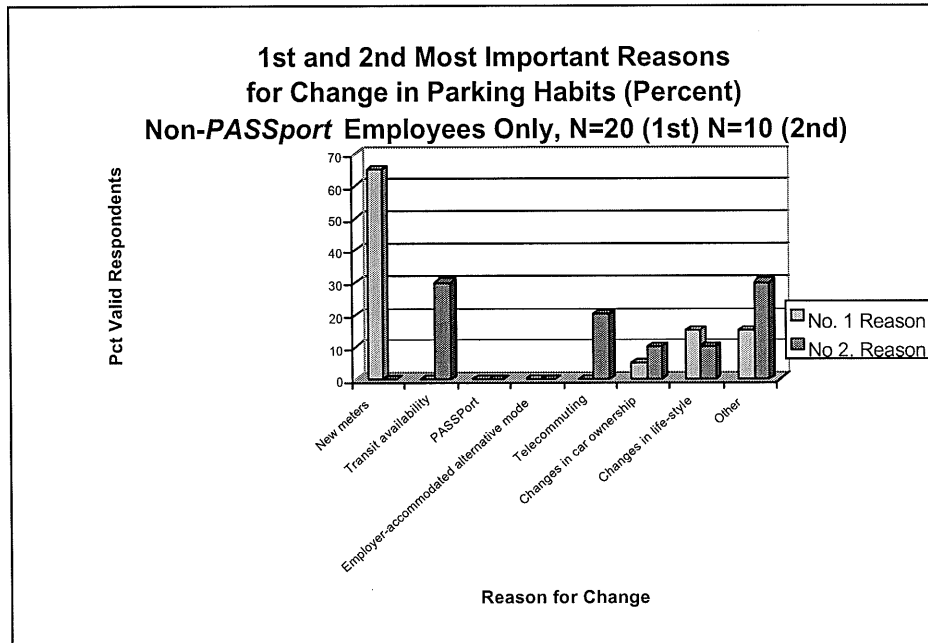


Figure 18. First and Second Most Important Reasons for Change in Parking Habits, Non-PASSport Employees (Source: PSU Survey, 1998).

Most Important TDM Programs for All Employees

As Figure 19 reveals, nearly 41 percent of all present employees sampled do not consider any of the transportation demand management (TDM) programs in place to be responsible for their present work-related travel habits. This reflects other analyses we conducted showing that large percentages of employees listed changes in life-style, residence, job, etc., as responsible for any changes they may have made in their travel or parking habits.

Nevertheless, the results also indicate that nearly 19 percent of the respondents cited the **PASSport** program as the No. 1 program responsible for their present work-related travel habits, followed by nearly 13 percent citing transit availability, and 11 percent citing the parking meters.

The **PASSport** and transit availability figure prominently as second choices, with 40 percent of the respondents citing the **PASSport** as the No. 2 program responsible for their present work-related travel habits, and 31 percent citing transit availability. Parking meters and employer accommodation of alternative modes tied, at 10 percent each, as No. 2 reasons.

Most Important TDM Programs for PASSport Employees

For **PASSport** employees, as Figure 20 illustrates, the **PASSport** is clearly the most important TDM program responsible for their present work-related travel habits, with 32 percent of these

employees citing this as the No. 1 program. Still, a large percentage (24 percent) said none of the TDM programs was responsible for the travel habits. This was followed by transit availability (16 percent) and the parking meters (12 percent) as choices for the No. 1 TDM program. The **PASSport** ranked even higher among this group as the No. 2 program (36 percent) responsible for their present work-related travel habits, but transit availability outranked the **PASSport** as the No. 2 program, cited by 39 percent of these employees. Programs such as employer-accommodation of alternatives (which could include telecommuting, flextime, as well as modes such as biking) and the existence of carpool spaces figured as No. 1 and No. 2 programs, but among a minority of the respondents.

Most Important TDM Programs for Non-PASSport Employees

As Figure 21 shows, it is the non-**PASSport** employees who are most likely (64 percent) to indicate that none of the Lloyd District TDM programs are responsible for their present work-related travel habits. As the No. 1 program, the parking meters are a distant second, cited by 11 percent of these employees. While 153 non-**PASSport** employees gave some response regarding the No. 1 program responsible for their work-related travel habits, only 26 went on to cite a No. 2 program. Of these, 46 percent (about 12 people) indicated transit availability as the most important reason, followed by a tie, at 19 percent (about 5 people) each, between the parking meters and employer accommodation of alternatives.

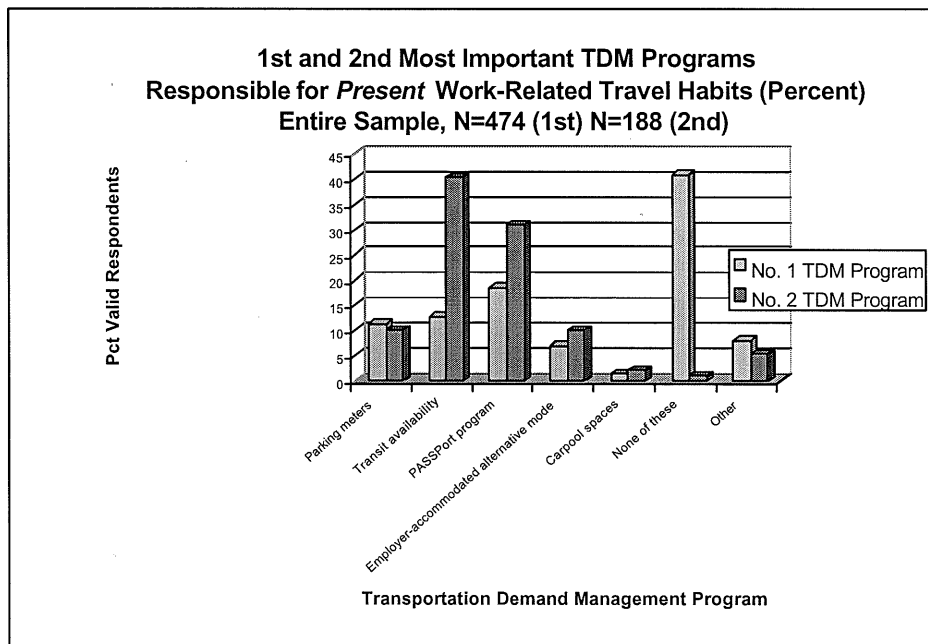


Figure 19. First and Second Most Important TDM Programs, Entire Sample (Source: PSU Survey, 1998).

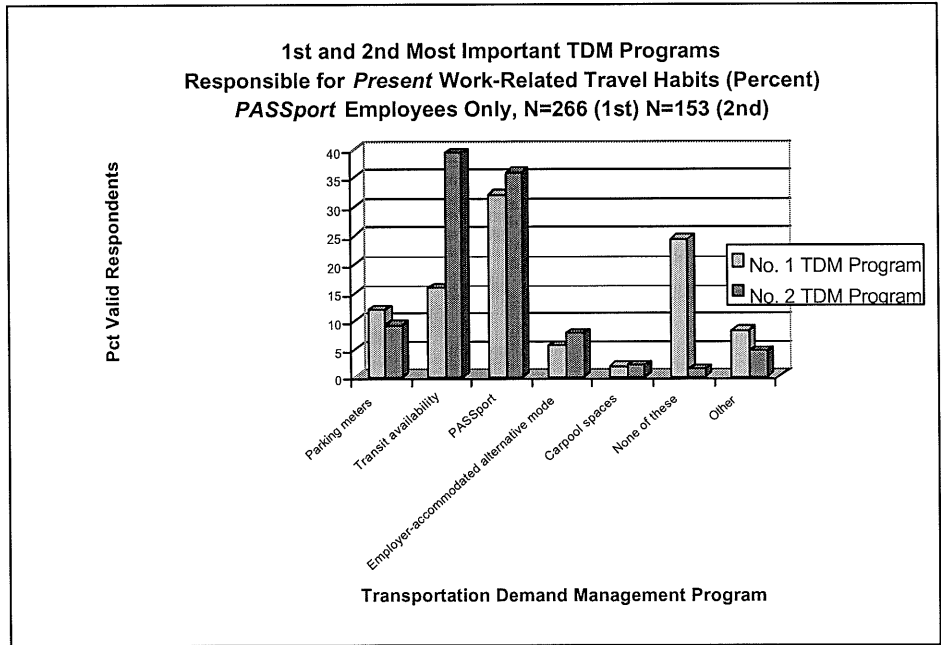


Figure 20. First and Second Most Important TDM Programs, *PASSport* Employees (Source: PSU Survey, 1998).

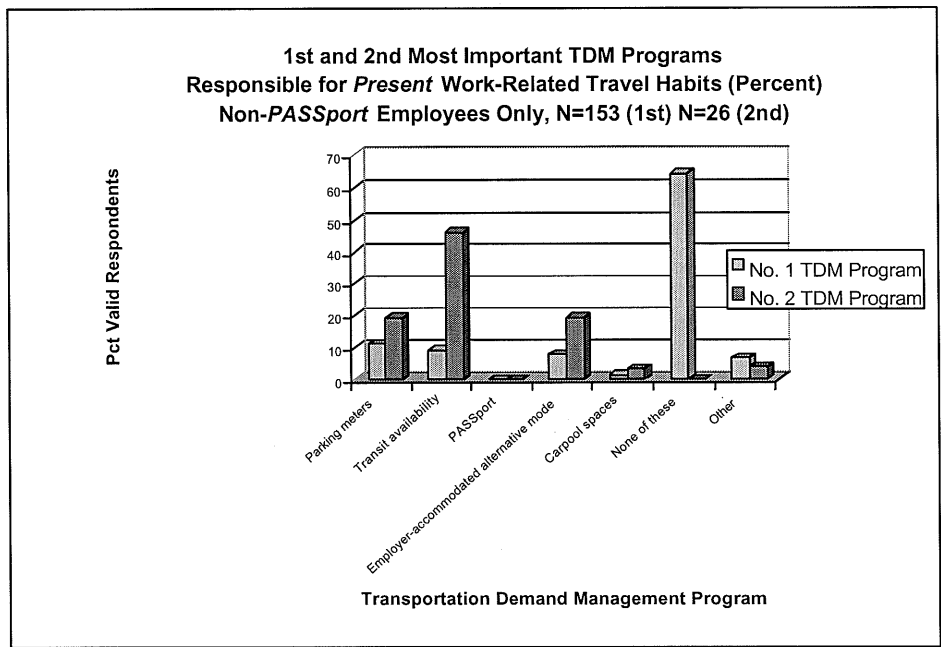


Figure 21. First and Second Most Important TDM Programs, Non-*PASSport* Employees (Source: PSU Survey, 1998).

VI. Sociodemographic Implications

The researchers asked the survey respondents questions about gender, work status (part time or full time), marital status, monthly income, household size, and race. We also asked for the Zip Code of respondents' home address to allow for geocoding of responses at a later date.

The first section of this chapter presents descriptive sociodemographic information, while the second section draws some correlations between sociodemographics and the effects of the Lloyd District transportation programs.

Sociodemographic Characteristics of Respondents in this Study

Figures 22 – 28, found later in this chapter provide illustrations of the sociodemographic makeup of this sample.

In general, the majority of respondents to this survey report that they

- are female work full time
- are married or partnered
- are white
- are in the upper-income categories
- live in households of either one or two members, and
- do not have children under 18 years of age living at home

Gender, Work, and Marital Status

The majority (56 percent) of the respondents are female; this may reflect the true employee makeup in the District or it may reflect women's greater proclivity to respond to surveys.

The vast majority of the respondents to this survey (90 percent) said they worked full time.

A minority of the respondents (33 percent) are single, with 67 percent reporting being married or partnered (living together).

Race

The vast majority of the respondents (88 percent) are white, with 3 percent reporting as black, slightly less than 3 percent as Asian or Pacific Islander, about 2 percent as Hispanic, and 3 percent as American Indian, Eskimo, or Aleut.

Household Composition and Income

Household Composition

Household composition was calculated based on household size, marital status, and number of dependent children under the age of 18 living in the household. Household size was defined as the respondent plus family members or dependents.

The majority of these respondents are in households of either one or two, with less than half (43 percent) having a household size of three or more.

In terms of respondents who reported having children under 18 years of age living at home, the majority (61 percent) said they did not. These data suggest that a majority of respondents are singles or childless couples, but a correlation between household marital status and number of children under 18 provides more detailed information. This information is presented in Table 18.

Table 18 presents data indicating that 35 percent of the respondents are married or partnered with no children and 20 percent who are single with no children—thus confirming that the majority of the respondents are singles or childless couples.²¹ About 18 percent are married or partnered with two children, followed by about 12 percent who are married or partnered with one child. Nearly 9 percent who said they were single or married/partnered with five or more children. At least 6 percent of the respondents indicated that they were single with at least one child under 18 living at home.²²

²¹ Out of the total sample of 516 respondents, 96 (19 percent) did not fit into any of these categories. For example, 15 respondents indicated that they were single, had no dependent children, but lived in a household of 3 or more. Another 20 responded that they were married or partnered, with no dependent children, but in a household of 3 or more. Although respondents were asked to include only relatives or dependents in their count of "household size," we can't conclude that one or more of the adults were dependents—for example, dependent children over 18 or an aged parent. Because of the difficulty of interpreting the nature of these 96 households, they were not included as valid cases for purposes of analysis.

²² The researchers made no differentiation between single and married/partnered status for households with five or more children under 18 living at home. The total percentage of such households was 8.7.

TABLE 18: HOUSEHOLD COMPOSITION, BASED ON MARITAL STATUS, NUMBER OF DEPENDENT CHILDREN UNDER 18, AND HOUSEHOLD SIZE (PERCENTAGE)
 ENTIRE SAMPLE, N=423
 (Source: PSU Survey, 1998)

Household Composition	Percentage of Respondents
Single, No Children	20.3
Single, One Child	2.6
Single, Two Children	3.1
Single, Three Children	0.7
Single, Four Children	0.0
Married or Partnered, No Children	34.5
Married or Partnered, One Child	12.3
Married or Partnered, Two Children	17.7
Married or Partnered, Three Children	0.0
Married or Partnered, Four Children	0.0
Single or Married/Partnered, Five or More Children	8.7

Household Income

As Figure 26 indicates, a majority of the respondents reported that their total pretax monthly household income was in the higher categories of \$3,700 to \$6,000 (25 percent) or \$6,000 and above (27 percent). Only a small percentage of respondents reported a monthly income of \$1,299 or less, with a total of about 40 percent falling in what might be considered the "middle ranges" of \$1,300 to \$2,299 and \$2,300 to \$3,699. At the outset, it appears that the respondents to this survey are in the higher income categories, but reported income should be correlated with household composition to determine whether this observation holds.

Table 19 presents data showing the relationship between household composition and monthly household income. A majority of the respondents remain in the upper income categories, even when household composition is taken into consideration. What is interesting is to look at how households are distributed across income categories. Married or partnered respondents with no children are most likely to be in the two highest income categories. Married or partnered respondents with one or two children are even more likely to be in the two highest income categories. Single respondents with no children are most likely to be in the middle income range of \$2,300 to \$3,699 per month, as are single parents with one or two children.

TABLE 19: HOUSEHOLD SIZE, WITH RESPECT TO MARITAL STATUS AND NUMBER OF DEPENDENTS BY MONTHLY PRETAX HOUSEHOLD INCOME (PERCENTAGES)

ENTIRE SAMPLE, N=397

(Source: PSU Survey, 1998)

Monthly Household Income	Less than \$1,299	\$1,300-\$2,299	\$2,300-\$3,699	\$3,700-\$6,000	Greater than \$6,000	Total % in Household Comp. Rows
Single, No Children	8.6	29.6	43.2	13.6	4.9	100.0
Married or Partnered, No Children	3.6	10.1	20.9	29.5	36.0	100.0
Married or Partnered, One Child	0.0	12.5	14.6	41.7	31.3	100.0
Married or Partnered, Two Children	0.0	8.6	10.0	38.6	42.9	100.0
Single, One Child	11.1	22.2	55.6	11.1	0.0	100.0
Single, Two Children	8.3	41.7	50.0	0.0	0.0	100.0
Single, Three Children	0.0	66.7	33.3	0.0	0.0	100.0
Single or Married/Partnered, Five+ Children	8.6	8.6	14.3	34.3	34.3	100.0
Total Percentage at Income Level	4.3	15.6	23.9	28.2	28.0	Total N = 397

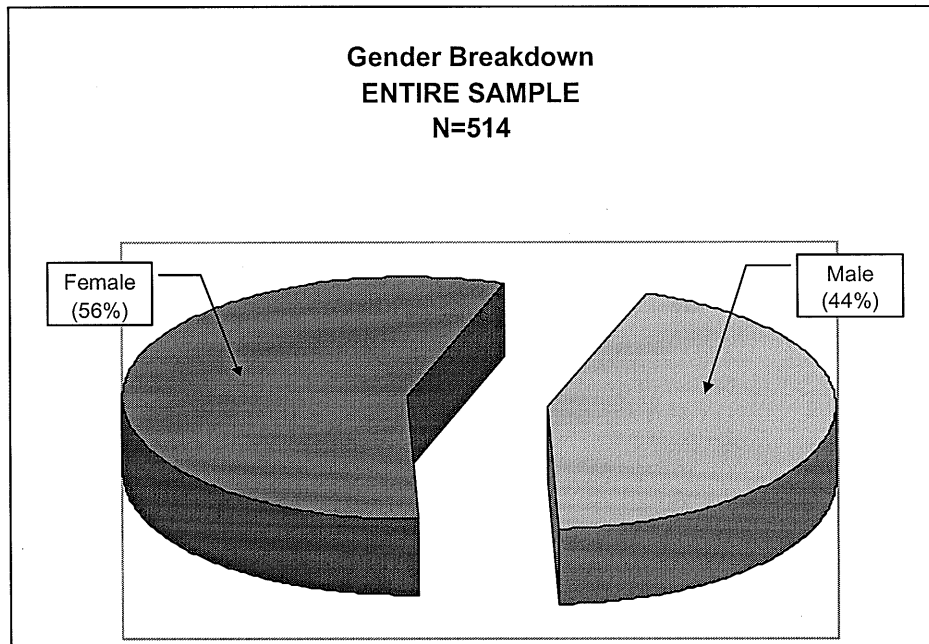


Figure 22. Percentage Female and Male, Entire Sample (Source: PSU Survey, 1998).

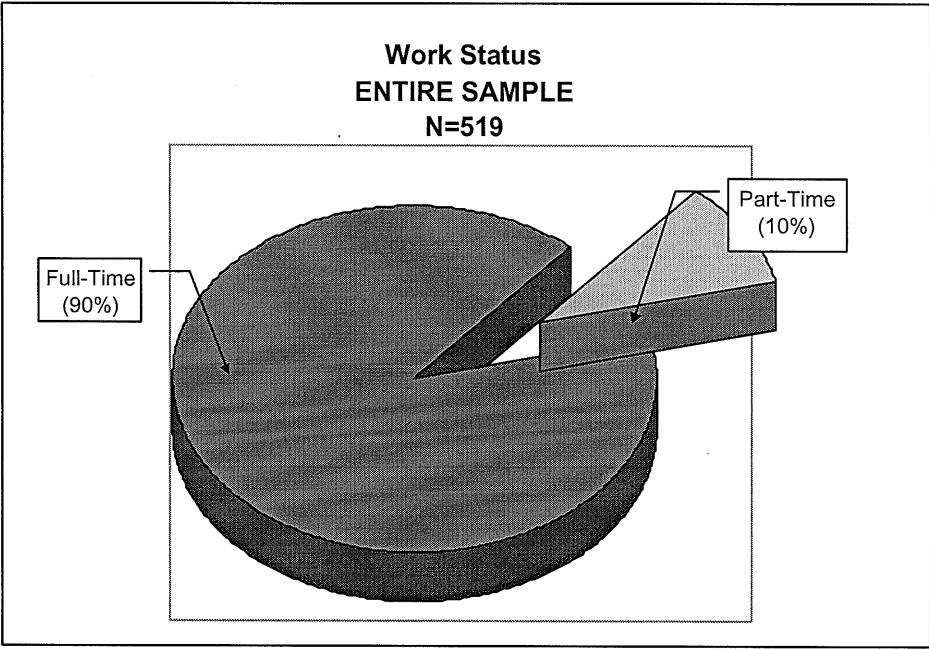


Figure 23. Percentage Full-Time and Part-Time Employment, Entire Sample (Source: PSU Survey, 1998).

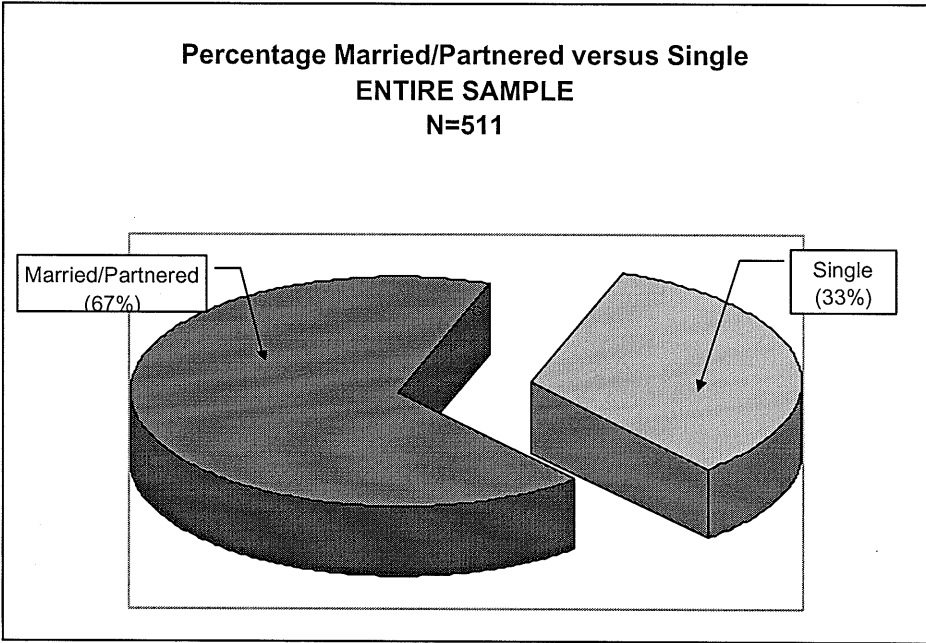


Figure 24. Percentage Married/Partnered and Single, Entire Sample (Source: PSU Survey, 1998).

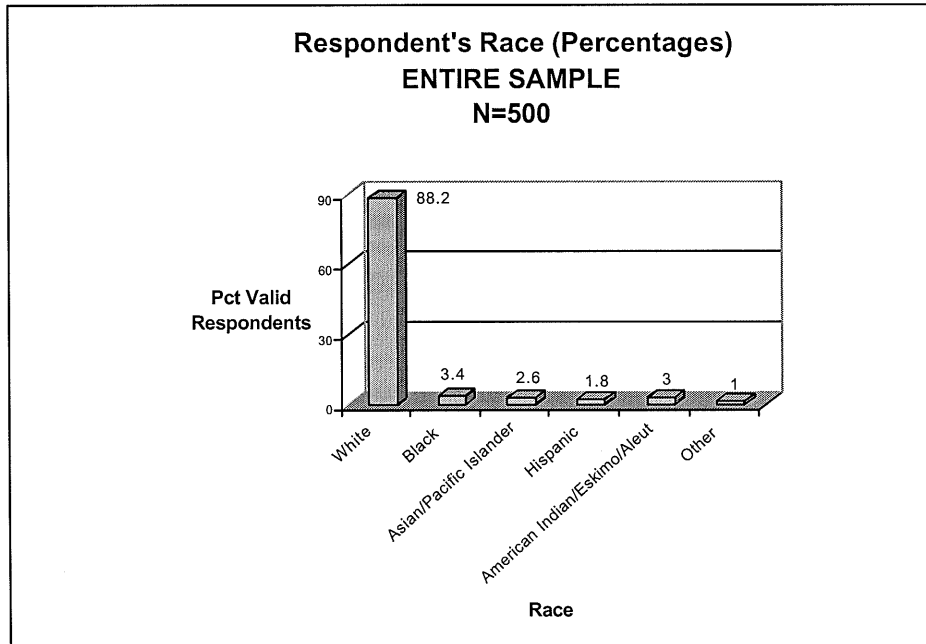


Figure 25. Percentage of Respondents by Race, Entire Sample (Source: PSU Survey, 1998).

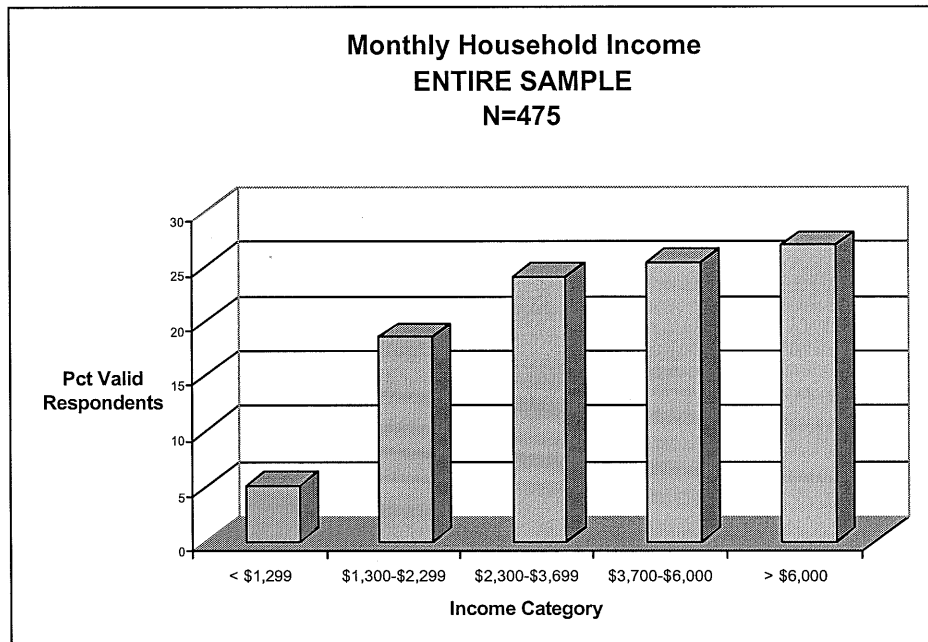


Figure 26. Monthly Household Income, Entire Sample (Source: PSU Survey, 1998).

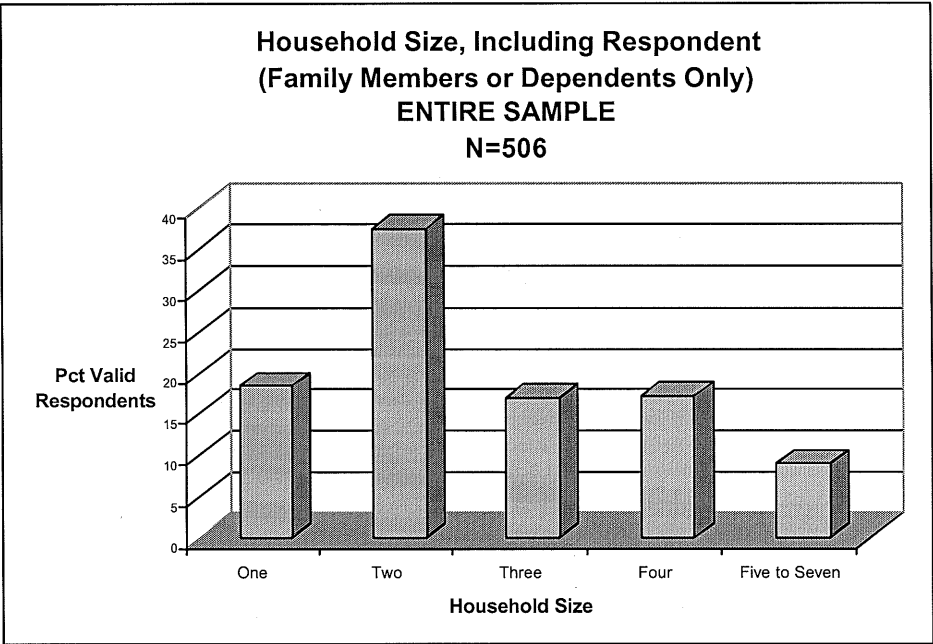


Figure 27. Household Size, Entire Sample (Source: PSU Survey, 1998).

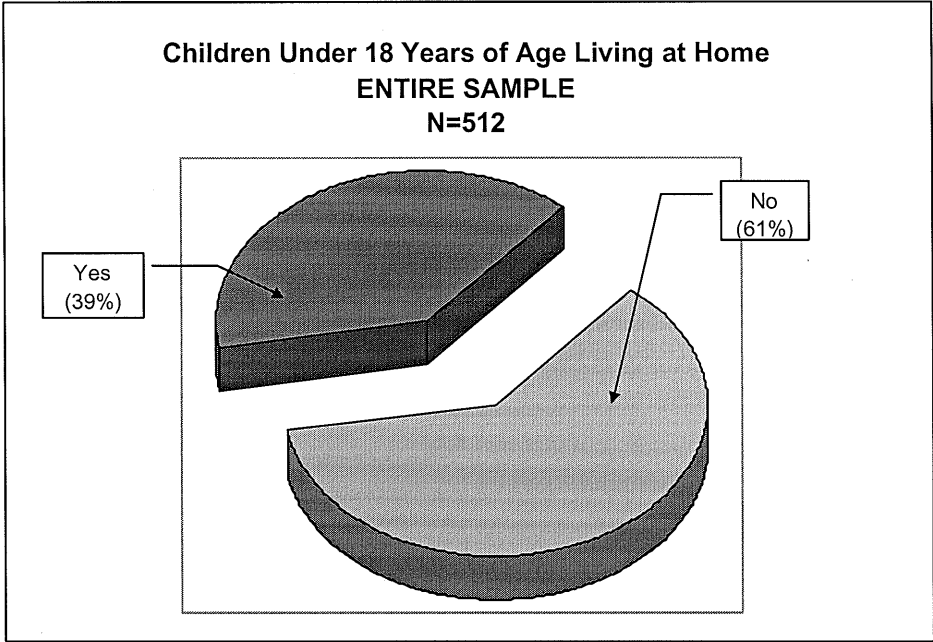


Figure 28. Percentage with Children Under 18 Living at Home, Entire Sample (Source: PSU Survey, 1998).

The Relationship Between Sociodemographics and the Transportation Programs in the Lloyd District

This section looks at the relationship between several characteristics of the Lloyd District transportation programs and certain sociodemographic variables. In particular, this section examines the relationship between the following, both before and after the installation of the meters:

- ◆ Mode and income quintile, controlling for household composition
- ◆ Mode and gender
- ◆ Mode and household composition
- ◆ Parking price paid and income quintile, controlling for household composition
- ◆ Parking price paid and gender
- ◆ Whether or not employer provides a **PASSport** and employee's income quintile
- ◆ Whether or not employer provides a **PASSport** and employee's gender

Mode

At all income levels, before the installation of the meters, the majority of respondents chose to drive alone. Those in the top income quintile were more likely than others to drive alone, whereas those in the bottom income quintile were more likely to choose transit relative to the other quintiles. After the installation of the meters, those in the top quintile remained the most inclined to continue to drive alone. In fact, for this quintile, the drive alone mode has increased, while it has decreased for the other quintiles. Nevertheless, for all quintiles except the third, the majority of respondents still drive alone (for the third quintile, the majority are divided among carpooling, transit, and other). Those in the bottom and third quintiles seem to have been more likely to move from drive alone to carpool than to transit. Those in the fourth income quintile seem more likely to have moved from drive alone to transit than to any of the other options. Those in third income quintile are more likely than the other income quintiles to bike, walk, or other.

As for gender, before the meter installation, there was little difference between males' and females' proclivity to drive alone. After the meter installation, however, women appear less likely than men to drive alone and more likely to carpool.

In looking at household composition, those who are most likely to drive alone, both before and after the meter installation are married or partnered respondents with no children and married/partnered or single respondents with five or more children. Both groups did, however, reduce their drive alone share, with a resulting increase in carpool and/or transit. In fact, in all categories—except single with no children and single with one child—the drive alone share declined, with carpool or vanpool seeing a corresponding increase. Only in two cases did transit see an increase: married or partnered with no children or married or partnered with one child.

Parking Price Paid

Before the meter installation, those in the lower income quintiles were the least likely to pay for parking. This remained true after the meter installation, although for all income quintiles, respondents are more likely to pay for parking than before. Those most likely to pay the highest prices for parking are in the third, fourth, and fifth quintiles.

In terms of gender, males were and still are more likely to park for free than females. Still, both genders are more likely to pay now after the meter installation than they were before. For males, however, the majority are more likely to continue to park for free, while for females, the majority are more likely to pay at least \$0.25 per hour.

PASSport Availability

Those in the lowest income quintile are about as likely to report *PASSport* availability as not, while those in the remaining quintiles are much more likely to report *PASSport* availability. Differentiation appears the greatest in the upper income quintiles, where the majority not only report *PASSport* availability, but a smaller percentage say they "don't know" that the program exists. In the other income categories, there appears to be less awareness of the *PASSport* program.

In terms of gender, there is little differentiation between males and females in awareness of their employer offering the *PASSport*. In both cases, the majority report being aware that their employer participates in the program.

Household Income Quintiles Controlling for Household Composition

To assess the effect of household income, we calculated income quintiles based on monthly household income, controlling for household composition.²³ Although the income quintiles do correspond to income ranges that control for household composition, it is more useful to think of the quintiles in terms of percentage of the population. Thus, the first (or bottom) quintile comprises those respondents who are at about the 20th income percentile and below; i.e., about 80 percent of the respondents have higher monthly household incomes (again, controlling for household composition). Similarly, the fifth (or top) quintile comprises those respondents who are at or above the 80th percentile, with 79 percent of the respondents having lower monthly household incomes.

Mode by Income Quintile

Before Meter Installation

Table 20 reveals information for those respondents who (a) worked in the Lloyd District prior to the installation of the meters and (b) provided answers to the survey questions about income and household composition. The fact that the latter are sensitive questions has reduced the sample size for this analysis to 312 respondents. This small sample size may account for the fact that the mode splits are somewhat different from the "before" mode splits calculated on a larger sample of about 400 in Chapter 3. It also may contribute to the lack of variability among income quintiles in terms of mode choice prior to the meter installation.²⁴

²³ We first created a quasi-interval-level household composition variable, **hhsizdep**, which classified respondents into categories based on marital status (single or married/partnered), household size (including the respondent), and whether or not the respondent had children under the age of 18 living at home. The values ranged from 1 (single, no children) to 11 (single or married/partnered, with five or more children). We then calculated a midpoint value for each of the five income categories and treated this midpoint value as an interval-level variable, **incinter**. To arrive at a proxy variable (**hhsizin**) that would capture both income and household composition, we divided **incinter** by **hhsizdep** to arrive at an index, **hhsizin**, household monthly pretax income, controlling for household composition. Based on a frequencies tabulation, we then divided this new income variable into five categories comprising roughly 20 percent of the respondents, and used this to create the income quintiles.

²⁴ In fact, the Pearson χ^2 for this analysis is 14.35, 12 d.f., $p < .30$, thus indicating little differentiation.

Despite the lack of variability and statistical significance, there does appear to be a trend toward those in the top income quintile to have been more likely than others to choose the drive alone mode, whereas a greater percentage of those at the bottom income quintile were likely to choose bus or MAX relative to the other quintiles. It is noteworthy, however, that those in the bottom two quintiles were the next most likely (after the top quintile) to drive alone, while those in the fourth highest quintile were the next most likely (after the bottom quintile) to use transit. Those in the third highest quintile were more likely than those in other quintiles to choose carpool or vanpool, but they were equally as likely to choose transit as they were to choose carpool or vanpool. At all income levels, the majority of the respondents chose the drove alone mode.

TABLE 20: MODE TO WORK **BEFORE** METERS BY INCOME QUINTILES
 ENTIRE SAMPLE, N=312
 (Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Mode Rows
Mode Before Meters						
Drive Alone	59.3	67.7	51.7	57.0	68.5	60.6
Carpool or Vanpool	13.0	6.2	18.3	12.7	11.1	12.2
Bus or MAX	25.9	16.9	18.3	24.1	11.1	19.6
Bike, Walk, or Other	1.9	9.2	11.7	6.3	9.3	7.7
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N = 312

After Meter Installation

The sample size for this analysis, at 395, is also smaller than the sample used in Chapter 3, where 516 respondents answered the "after" mode questions. Nevertheless, the mode shares here are closer to those reported in Chapter 3, with the larger sample size. More importantly, this analysis shows a fair amount of variability among the income quintiles in terms of mode choice after the meter installation, and this variability is statistically significant.²⁵

This analysis indicates that those in the top quintile have a much more pronounced proclivity to drive alone now that the meters and other transportation programs are in place. For this quintile, the drive alone mode has increased, while it has decreased for the other quintiles, although at the other income quintiles, a majority of respondents are still likely to drive alone (except at the third income quintile, where the majority are divided among carpooling, transit, or other).

Those in the bottom and third income quintiles seem to have been more likely to move from drive alone to carpool than to transit. Those in the fourth income quintile seem more likely to have moved from drive alone to transit than to any of the other options. Those in third income quintile are more likely than the other income quintiles to commute by bike, walk, or other.

The most likely explanation for these results is that those who need their car either for trip-chaining or childcare purposes have continued to drive or have shifted to carpool, while those in the upper income quintile who either need their car for work-related purposes or can afford to pay increased parking prices are now driving more. Single respondents with no children may be among those who have shifted to transit, as well as to bike, walk, or other. Transit remains the most popular choice among those in the second highest income quintile. Whether these are single or partnered

²⁵ Pearson $\chi^2 = 18.66$, 12 d.f., $p < .10$.

respondents, it is likely that these respondents did not themselves have a significant trip-chaining, childcare, or work-related need for a car (thus also explaining the relatively low share of carpool for this income quintile).

TABLE 21: MODE TO WORK **AFTER** METERS BY INCOME QUINTILES
 ENTIRE SAMPLE, N=394
 (Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Mode Rows
Mode Before Meters						
Drive Alone	53.8	54.0	47.3	54.4	70.8	55.6
Carpool or Vanpool	24.4	18.4	23.0	11.1	10.8	17.5
Bus or MAX	17.9	18.4	18.9	26.7	10.8	19.0
Bike, Walk, or Other	3.8	9.2	10.8	7.8	7.7	7.9
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N = 394

Mode by Gender

As Table 22 indicates, the variability in mode choice between the genders before the meter installation was not very marked and, in fact, despite a large sample size, statistically insignificant.²⁶ Although before the meters about 62 percent of the males said they drove alone, compared with 59 percent of the females, the difference in the probability that males would be more likely than females to drive alone was not significantly significant.

After the meter installation, however, the variability increases markedly.²⁷ Women now appear less likely than men to drive alone and more likely to carpool. Their proclivity to use transit, bike, walk or "other" seems about the same as that of the males in the sample. These results also suggest that the parking meter installation may have made females more likely to move toward carpooling (which saw a 41-percent increase for females), rather than toward transit (which saw a 5—percent increase for females). These findings may, again, reflect their trip-chaining and childcare needs.

²⁶ Pearson $\chi^2 = 1.5$, 3 d.f., $p < .70$.

²⁷ Pearson $\chi^2 = 3.93$, 3 d.f., $p < .30$.

TABLE 22. MODE TO WORK BEFORE AND AFTER METERS BY GENDER
ENTIRE SAMPLE, N=401 (BEFORE); N=516 (AFTER)

(Source: PSU Survey, 1998)

Mode	Gender	Male		Female	
		Before	After	Before	After
Drive Alone		61.6	60.1	58.5	52.3
Carpool or Vanpool		10.5	13.9	13.8	19.5
Bus or MAX		20.9	18.4	19.2	20.2
Bike, Walk, or Other		7.0	7.6	8.5	8.0
Total Percentage		100.0	100.0	100.0	100.0

Mode by Household Composition

Tables 23 and 24 reveal that those most likely to drive alone, both before and after the meter installation, are married/partnered respondents with no children and married/partnered or single respondents with five or more children. Both groups did, however, reduce their drive alone share, with a resulting increase in carpool and/or transit. In fact, in all categories—except single with no children and single with one child—the drive alone share declined, with carpool or vanpool seeing a corresponding increase. Only in two cases did transit see an increase: married or partnered with no children or married or partnered with one child. Single with no children and single with one child both saw increases in the drive alone share, with the increase being greater for those who are single with no children.²⁸

TABLE 23. MODE BEFORE METER INSTALLATION BY HOUSEHOLD COMPOSITION
(PERCENTAGES) ENTIRE SAMPLE, N=328

(Source: PSU Survey, 1998)

Household Composition	Single, No Children	Partnered, No Children	Partnered, One Child	Partnered, Two Children	Single, One Child	Single, Two Children	Single, Three Children	Single or Partnered, 5+ Children	Total % in Mode Rows
Drive Alone	50.7	64.3	60.5	56.9	50.0	44.4	33.3	81.5	60.1
Carpool or Vanpool	4.5	9.6	20.9	22.4	16.7	33.3	33.3	0.0	12.5
Bus or MAX	26.9	20.0	9.3	17.2	33.3	22.2	33.3	14.8	19.5
Bike, Walk, or Other	17.9	6.1	9.3	3.4	0.0	0.0	0.0	3.7	7.9
Total Percentage	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	Total N = 328

²⁸ For the "before" analysis, Pearson $\chi^2 = 41.24$, 21 d.f., $p < .01$. For the "after" analysis, Pearson $\chi^2 = 42.95$, 21 d.f., $p < .005$. However, in both cases, at least 35 percent of the cells are sparse, suggesting that these results should be interpreted with caution.

TABLE 24: MODE AFTER METER INSTALLATION BY HOUSEHOLD COMPOSITION
(PERCENTAGES) ENTIRE SAMPLE, N=420

(Source: PSU Survey, 1998)

Household Composition	Single, No Children	Partnered, No Children	Partnered, One Child	Partnered, Two Children	Single, One Child	Single, Two Children	Single, Three Children	Single or Partnered, 5 + Children	Total % in Mode Rows
Drive Alone	57.0	57.6	55.8	51.4	54.5	23.1	33.3	73.0	56.2
Carpool or Vanpool	4.7	13.2	23.1	29.7	27.3	46.2	33.3	16.2	17.4
Bus or MAX	24.4	21.5	13.5	13.5	18.2	23.1	33.3	8.1	18.6
Bike, Walk, or Other	14.0	7.6	7.7	5.4	0.0	7.7	0.0	2.7	7.9
Total Percentage	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	Total N = 420

Hourly Parking Price Paid and Income Quintile, Controlling for Household Composition

As Tables 25 and 26 indicate, before the meter installation, those in the lower quintiles were the least likely to pay for parking. After the meter installation, the situation remains essentially the same, although for all income quintiles, respondents are more likely to pay for parking than they were before meter installation. In the third, fourth, and fifth quintiles, respondents are now more likely to pay at least \$0.25 per hour than to park for free, whereas before the meter installation these same respondents were generally more inclined to pay nothing (except for the top quintile, for whom slightly less than half paid nothing). These results, however, are not statistically significant and only suggest trends.²⁹ Those most likely to pay the highest prices for parking are in the third, fourth, and fifth quintiles, where approximately 24 percent of the respondents in each quintile now report paying more than \$0.41 per hour for parking. For all incomes, next to parking for free, the most likely hourly price being paid has been in the \$0.25 to \$0.40 range, which is where the average for the district lies.

²⁹ For the "before" analysis, Pearson $\chi^2 = 20.85$, 16 d.f., $p < .20$. For the "after" analysis, Pearson $\chi^2 = 17.09$, 16 d.f., $p < .40$. In both cases, about 50 percent of the cells are sparse, suggesting that these results should be interpreted with caution.

TABLE 25: HOURLY PARKING RATE PAID **BEFORE** METER INTALLATION BY INCOME QUINTILE, ADJUSTED FOR HOUSEHOLD SIZE, MARITAL STATUS, AND DEPENDENT CHILDREN (PERCENTAGES) N = 236
(Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Pricing Rows
Hourly Parking Price Paid						
Zero	80.0	67.4	61.4	53.4	48.8	61.0
\$0.01 to \$0.24 per hour	2.5	7.8	4.5	6.9	11.6	6.8
\$0.25 to \$0.40 per hour	10.0	23.5	25.0	27.6	37.2	25.0
\$0.41 to \$0.50 per hour	5.0	2.0	9.1	8.6	0.0	5.1
More than \$0.50 per hour	2.5	2.0	0.0	3.4	2.3	2.1
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N =236

TABLE 26: HOURLY PARKING RATE PAID **AFTER** METER INSTALLATION BY INCOME QUINTILES, ADJUSTED FOR HOUSEHOLD SIZE, MARITAL STATUS, AND DEPENDENT CHILDREN (PERCENTAGES) ENTIRE SAMPLE, N=249
(Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in Pricing Rows
Hourly Parking Price Paid						
Zero	62.2	49.0	44.4	39.7	33.3	45.4
\$0.01 to \$0.24 per hour	6.7	3.9	2.2	6.3	13.3	6.4
\$0.25 to \$0.40 per hour	22.2	25.5	26.7	30.2	28.9	26.9
\$0.41 to \$0.50 per hour	8.9	15.7	22.2	15.9	20.0	16.5
More than \$0.50 per hour	0.0	5.9	4.4	7.9	4.4	4.8
Total Percentage	100.0	100.0	100.0	100.0	100.0	Total N =249

Hourly Parking Price Paid and Gender

As Table 27 indicates, males were more likely to park for free than were females, both before and after the meter installation. However, in both cases, the majority of respondents were more likely to park for free than to pay.

Respondents of both genders are more likely to pay for parking now than before the meter installation, but for males the majority are more likely to continue to park for free, while for females the majority are more likely to pay at least \$0.25 per hour.³⁰

³⁰ For the "before" analysis, Pearson $\chi^2 = 12.67$, 4 d.f., $p < .05$. For the "after" analysis, Pearson $\chi^2 = 8.71$, 4 d.f., $p < .10$. In both cases, at least 50 percent of the cells are sparse, suggesting that these results should be interpreted with caution.

TABLE 27: HOURLY PARKING PRICE PAID **BEFORE** AND **AFTER** METER INSTALLATION BY GENDER (PERCENTAGE) ENTIRE SAMPLE, N=306 (BEFORE); N=322 (AFTER)

(Source: PSU Survey, 1998)

Hourly Parking Price Paid	Male		Female	
	Before	After	Before	After
Zero	69.0	53.2	54.6	40.8
\$0.01 to \$0.24 per hour	8.5	8.6	6.9	8.4
\$0.25 to \$0.40 per hour	19.4	18.0	27.6	31.3
\$0.41 to \$0.50 per hour	1.6	14.4	8.6	15.6
More than \$0.50 per hour	1.6	5.8	2.3	3.9
Total Percentage	100.0	100.0	100.02	100.0

PASSport Availability and Income Quintile, Controlling for Household Composition

There is a differentiation in employees' income quintile, adjusted for household size, marital status, and dependent children, and their reporting that their employer provides a **PASSport**. Recall, however, that our survey asked only if the employer provided a **PASSport**, not whether the employee actually used one.

Those in the lowest income quintile are about as likely to report **PASSport** availability as not, while those in the remaining quintiles are much more likely to report **PASSport** availability. Differentiation appears the greatest in the upper income quintiles, where the majority not only report **PASSport** availability, but a smaller percentage say they "don't know" that the program exists. In the other income categories, there appears to be less awareness of the **PASSport** program.³¹

TABLE 28: **PASSport** AVAILABILITY BY INCOME QUINTILE, ADJUSTED FOR HOUSEHOLD SIZE, MARITAL STATUS, AND DEPENDENT CHILDREN (PERCENTAGES) ENTIRE SAMPLE, N=397

(Source: PSU Survey, 1998)

Income Quintile	Bottom	Second	Third	Fourth	Top	Total % in PASSport Rows
PASSport Availability						
No	47.4	23.6	33.8	23.1	29.2	31.0
Yes	44.9	56.2	52.7	71.4	60.0	57.4
Don't Know	6.4	18.0	10.8	5.5	6.2	9.6
Total Percentage	98.7	98.7	97.3	100.0	95.4	98.0

³¹ These results are fairly robust: Pearson $\chi^2 = 33.92$, 16 d.f., $p < .01$. About 40 percent of the cells are sparse, however, suggesting that these results should be interpreted with caution.

PASSport Availability and Gender

Table 29 reveals that there is little differentiation between males and females in awareness of their employer offering the *PASSport*. The majority of males and females report that their employer does offer the *PASSport*, with females being slightly more likely to report both that their employer offers the program or that they don't know.³²

TABLE 29: *PASSport* AVAILABILITY BY GENDER
(PERCENTAGES) ENTIRE SAMPLE, N=513
(Source: PSU Survey, 1998)

Gender <i>PASSport</i> Availability	Male	Female
No	36.4	30.9
Yes	52.0	56.9
Don't Know	9.8	10.8
Total Percentage	98.2	98.6

³² Pearson $\chi^2 = 3.13$, 4 d.f., $p < .50$. About 40 percent of the cells are sparse, however, suggesting that these results should be interpreted with caution.

VII. Conclusions

During the one year that had elapsed between the implementation of the Lloyd District transportation management programs and the survey information collected by this study, the drive alone mode for the trip to work by employees in the Lloyd District had decreased by 7 percent. For the District as a whole, the drive alone commute share is now about 56 percent. These are remarkable achievements.

The majority of the respondents to our survey indicated that their employers participate in Tri-Met's **PASSport** program. For these respondents, results were even more striking: the drive-alone mode decreased by 19 percentage points to only 41 percent of the total commute share. For this group, transit use has risen by 12 percentage points, to over 30 percent of the commute share. Clearly, the presence of a **PASSport** program at these respondents' place of employment is a strong indicator of the hoped-for shifts in mode—even if all of the employees at these firms are not using the **PASSport** themselves all of the time. The fact that many of these employees indicate that they have *increased* their use of parking in non-employer-provided off-street parking suggests that what is valuable for these employees is the flexibility and availability of options. Some days they may use transit; other days, they may drive and pay to park.

Those employees who indicated that their employer did not offer a **PASSport** appear to be the most intransigent in terms of hoped-for mode shifts. Not only has this group *increased* their drive-alone share, but they seem to have adjusted to the installation of the parking meters by parking in either employer- or non-employer-provided off-street parking, rather than by shifting to another mode. However, this group of employee has also indicated an increase in the number of transit roundtrips per month for trips in the "9 to 19 per month" category (unfortunately, transit trips appear to have declined in the "1 to 8 per month" and "20 or more" categories).

The presence of the parking meters has clearly made a difference for all employees working in the Lloyd District. Before the meters were in place, 61 percent of all District employees who drove parked for free. Of those 61 percent who parked for free, 77 percent drove alone. After the meters were in place, 46 percent of all District employees who drive park for free. Of those 46 percent who continue to park for free, about 69 percent drive alone.

Despite the integrated and reinforcing "package" approach of the Lloyd District's transportation management programs, there are still groups of employees who have not made a significant shift in their commute mode as a result of any one or a combination of parking pricing, increased transit availability, and the **PASSport**. For the most part, these people appear to fall into one or more of three groups:

- ◆ Those who need their car for either trip-chaining purposes related to household maintenance, such as childcare, or for purposes related to their job
- ◆ Those who report not having convenient access to transit
- ◆ Those who can afford to pay for off-street parking

In this regard, it is important to bear in mind that there may be individuals who feel they need their car for trip-chaining, childcare, or work, but who really *cannot* afford to pay for parking. Yet, because they consider themselves so auto-dependent, they pay to park even though they cannot afford to. However, a number of such individuals express a willingness or desire to use transit, if they could, and some even do, when their schedule allows.

"I drive to work because there is no other way from where I live, and if my child needs me, I can't depend on Tri-Met. I need my car!"

"If I didn't have to drive my son to school, I would probably ride MAX frequently."

"I would try Tri-Met, but I have classes 3 days a week after work. I need my car."

"My job requires a car. I work at different facilities at different times and different hours almost on a daily basis."

"I drive to work. However, I use my pass for any meetings downtown."

The one alternative these individuals seem willing to consider is carpooling, which still allows them access to a vehicle. Many individuals seem reluctant to shift from auto to transit, which they consider too slow, unsafe, or inconvenient for their needs.

"I drive to and from work. Work for 10-hour days. Dark in mornings and evenings. Would have to walk in rain and dark. Don't feel safe."

"I live within 8-12 minutes of work, driving; 30-40 (including walk) if taking bus (and getting wet)."

"I would love to use the train, but it is not possible from my house to work. Bus is far too inefficient and I found it to be unreliable."

There are also a large number of respondents whose commute behavior is determined by life-style concerns that the District's transportation management programs simply cannot address.

"My work travel habit is determined by children and errands, not by Lloyd District transportation programs."

"I actually drive now because the home I moved to doesn't have a yard, so I have to walk my dog a half an hour each morning, which is the amount of time it takes to ride to bus, s-o-o-o, it's my dog's fault!"

"I only work a half day per week at Lloyd Center area, so I'm not a typical sample—I don't want to drive, but I have to due to my schedule."

A number of people seem to have increased their use of transit for trips other than the commute or on occasions for the commute. In this regard, they express an appreciation of the **PASSport**.

"I frequently use MAX for downtown/zoo meetings because of the sticker pass. I also commute a bit more [by transit] because of the pass."

"If I'm using the bus, I need to take 2 buses and it takes 3 times as long as driving. However, I do use it sometimes, and the *PASSport* helps."

While a number of people expressed satisfaction with Tri-Met, most people were not happy about the new meters.

"*PASSport* program is one of the most useful things I have ever had. I do not have a driver's license; I have epilepsy, which keeps me from owning one. Tri-Met and MAX are true lifesavers for me."

"MAX is great! Because of the wonderful service, I do not own a car. The *PASSport* program is another huge reason I do not have a car—even on weekends, I can get where I need to go using public transportation."

"I now lose my temper on a regular basis when I see the meters."

"The meters suck! Now I have to pay \$57/month to drive to work. It's b - - - sh - - -."

The surveys also revealed a lack of information among some respondents, despite the significant attempts made by the Lloyd District Transportation Management Association, the City, and Tri-Met to disseminate information. These comments suggest that ongoing public relations activity may be important if mode shifts are to continue.

"Parking meters put in to pad the pockets of Tri-Met and the ARENA project! Put things back the way they were and everybody would be happier."

"Parking meters are not in the best interests of preserving any sense of community. Motivation seems to be to get money from people who shop or attend convention events. Spots are hardly ever full. Meters are inconsistently monitored."

"What happened to the promise of the City Council to extend the no-fare Tri-Met zone to the Lloyd District? That was supposed to be the trade off for parking meters. The City Council and Tri-Met did not honor their promises."

"It would be great if Tri-Met offered the discounted pass to small employers, too! We have three people in our office."

There is also an indication that for mode shift to increase, parking restrictions (including increased pricing), however unpopular, need to be expanded.

"Since the parking meters went in at Lloyd Center, the employees have been parking on the south side of the freeway and walking."

"If employer-provided parking would end, I would most likely find monthly lot parking close to my building and continue to drive."

The sociodemographic analyses revealed some differences among income quintiles, household types, and gender with respect to how people are responding to the transportation management

programs. People in the higher income quintiles were and still are the most likely to drive alone. People in the lowest quintile were the most likely to use transit, although before the meters, the majority drove alone. After the meter installation, these individuals were more likely to shift to carpool than to transit. Another group more likely to shift to carpool than to transit are women, when compared to men. Women are also more likely to pay for parking than are men. One group particularly inclined to increase its use of transit was married or partnered with no children or just one child. Single individuals or single with one child actually increased their drive-alone share.

These sociodemographic relationships are difficult to interpret, but suggest that a “one-size-fits-all” approach cannot work. The Lloyd District program has recognized that from the beginning, by emphasizing commute options (including bicycling and telecommuting) and by being flexible enough so that those who need to drive can, even if they don’t do so every day and even if they incur some financial hardship. The challenge continues to be to reach those individuals who may not be particularly auto dependent, but can afford to pay the increased parking prices, so drive anyway. These individuals may not respond until pricing reaches such a high level that the resulting inequity for lower-income groups outweighs the societal gain of the mode shift.

Another challenge is to reach those individuals who have misconceptions about the availability of the **PASSport**, transit service, or transit safety. In this case, continued educational outreach may be the answer.

As mentioned, the Lloyd District program consists of a “package” of complementary and reinforcing strategies. The ones that have emerged as the most significant are the installation of the meters and the **PASSport** program. For the entire sample, nearly 22 percent cited the new meters as the No. 1 reason they have changed their travel habits, with 19 percent citing the **PASSport**. As a No. 2 reason, nearly 36 percent cited the **PASSport** program.

Clearly, the two programs are equally essential in a transportation management program. The meters provide the drive-alone disincentive, while the **PASSport** provides the transit incentive. Without the **PASSport**, and the increased transit service, those diverted from the drive-alone mode would have fewer choices. Without the meters—even with a **PASSport** program in place—there would be little incentive for many individuals to give up the drive-alone mode.

The coordinated efforts of the City and Tri-Met have been crucial to the success of the Lloyd District programs. In addition, the role of the Lloyd District Transportation Management Association (LDTMA) in helping coordinate outreach and educational efforts cannot be overemphasized. The same is true of the transportation coordinators (TCs) who work at the individual firms to assist their employees with understanding and participating in the LDTMA programs. While the Lloyd District program is, again, a package of reinforcing strategies that have depended on coordination by the City and Tri-Met, the LDTMA and the individual TCs are the folks that bring it all together.

In sum, the successes of the Lloyd District programs have depended on multiple and coordinated efforts by several partners and many individual dedicated front-line TCs. With continued attention at all levels and in all areas (specifically pricing and transit improvements), the drive alone mode share should continue to decline and achieve hoped-for levels in a timely manner.