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Household, Gender, and Travel

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HOUSEHOLD, GENDER, AND TRAVEL

INTRODUCTION

With air pollution and traffic congestion becoming a serious concern nationwide, policy makers have experimented with various programs and policies aimed at reducing travel, shifting travel away from rush-hour peaks, and promoting carpooling and transit use. However, the travel demand management programs that have so far been implemented (e.g. ridesharing programs and staggered work hours) proved costly and ineffective in changing travel behavior. In most cases, the programs have targeted the general working population, overlooking differences in the household circumstances and travel constraints of different demographic subgroups — particularly, working women.

Transportation measures do not affect the population uniformly because each individual faces a different set of constraints. Some constraints are a function of income and other economic factors, and these have received considerable attention in the literature. Other constraints are a function of household composition, the male/female division of labor in the household, and the individual's roles in the household. These have received relatively little attention until recently.

Travel is part of a larger structure of household activities (Giuliano, 1992). We take trips to go grocery shopping, to go to the bank, to take clothes to the dry cleaner, and to do many other errands. In bigger households, the constraints are even more complex. The circumstances of other household members affect one's travel choices. Children have to be shuttled to and from the school or day care. A sick family member has to be taken to the doctor. Some household activities need to be performed together with other household members. These impose additional constraints in scheduling individual activities including travel. Gender is an issue to the extent that the division of labor in the household differs between men and women.

Section 2 examines the trends in the division of labor in the household between men and women. The household is a crucial aspect in understanding the environment of women's travel. Understanding women's roles in the household helps us put women's travel behavior into context. Section 3 reviews empirical findings on gender differences in travel patterns. Section 4 presents some results of an empirical test of the effect of household responsibility on travel behavior using Southern California commuting data.

THE DIVISION OF HOUSEHOLD TASKS

Until recent decades, men and women adopted distinct economic roles. (Blau and Ferber, 1986, pp.14-66, and Becker, 1991, pp. 30-53, present interesting expositions on how these roles evolved.) Men worked outside the home, and were solely responsible for earning an income for the household. Women stayed home, and were solely responsible for managing household affairs. They kept their homes clean, cooked food, bore children and raised them.

In the United States throughout the twentieth century and particularly in recent decades, women have been joining the work force, and have been increasingly sharing the responsibility of earning an income for the family (see Figure 1). Between 1950 and 1990 the proportion of adult women working increased from 32 percent to 54.8 percent. In contrast, the proportion of adult men working decreased from 85.1 percent to 73.6 percent (see Figure 1). Most of the growth in women's employment occurred in the past two decades, while the decline in men's employment occurred prior to the 1980s (Table 1).

Figure 1
Civilian Employment Population Ratio, 1950-90 Men & Women Aged 20 and Over

Source: http://www.bls.gov
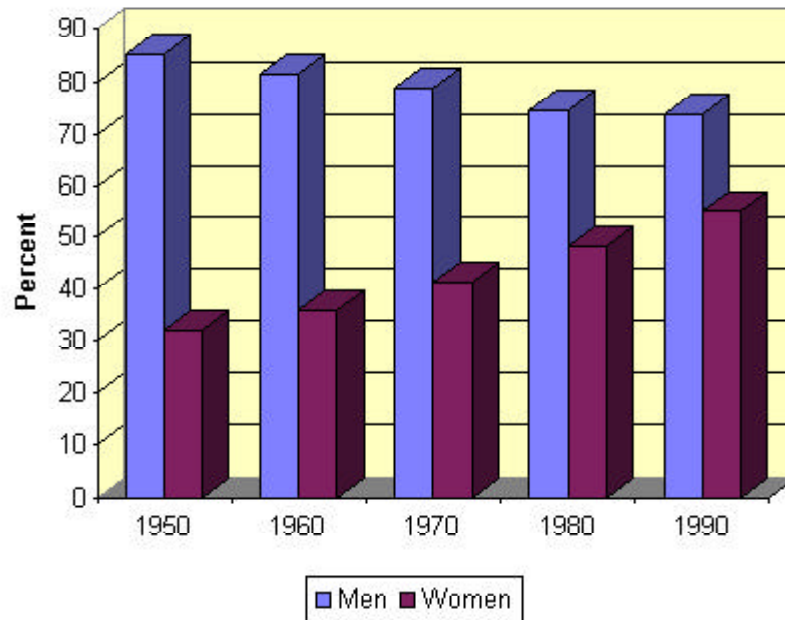
Table 1
Percentage Point Change in the Civilian-
Employment Population Ratio Men and Women 20 and Over

Period	Men	Women
Between 1950-70	-6.4	9
Between 1970-90	-5.1	13.8
Between 1950-90	-11.5	22.8

Source: http://www.bls.gov

As a result of the growth in women's participation in the work force, the division of labor between men and women in the market is fast becoming more equal. Yet corresponding changes in the division of household responsibilities have been slower to occur. Women, including those who work full-time, continue to retain primary responsibility for housework (Blau and Ferber, 1986, pp. 39, 125-130; Firestone and Shelton, 1988; Hamilton and Jenkins, 1989, p. 25), child care, and even elderly care (Gibeau and Anastas, 1989; Anastas, Gibeau and Larson, 1990). While research findings vary widely depending on the sample and survey method used, estimates of time spent on housework range from 6 to 14 hours a week for men, and 20 to 30 hours a week for women (Hersch and Stratton, 1994, p. 120). Hercsh and Stratton finds the same pattern even when the sample is restricted to white, married workers aged 20-64 from the Michigan Panel Study of Income Dynamics for the period 1979-1987 (see Figure 2). Overall men average about 7 hours per week on housework, while the wives average around 20 hours. In households where both spouses work full-time, men average 7 hours per week on housework while women average 17 hours. The gap is even wider when there are children. Working wives spend 5 hours more on housework when they have children, while husbands spend only 1 hour more.

Figure 2
Mean Hours Spent on Housework, White, Married Workers 20-64
Michigan Panel Study of Income Dynamics, 1979-87
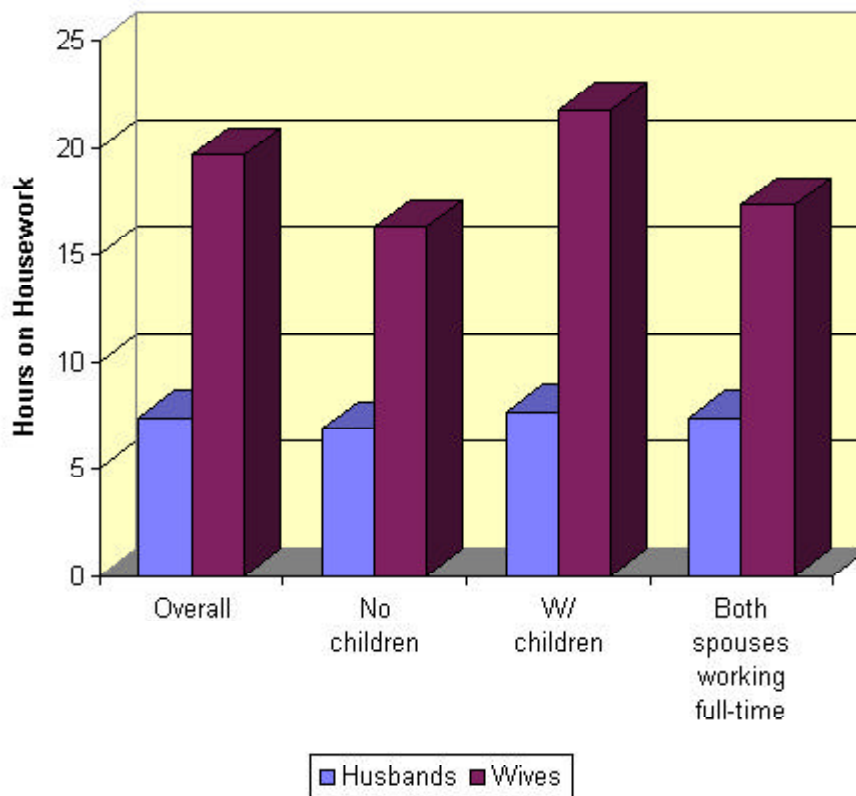
Table 2
Hours Spent on Housework per Week

| | Hours Spent on Housework per Week | | | | | | Ratio Done by Women (%) | | |
| | Men | | | Women | | | | | |
	1965	1975	1985	1965	1975	1985	1965	1975	1985
Overall	4.8	7.0	9.8	27.0	21.7	19.5	85	76	67
Working	4.4	5.8	8.1	17.5	14.5	14.7	80	70	64
Nonworking	9.8	10.8	14.7	34.0	26.3	23.6	78	71	62
Married	4.5	6.8	11.1	31.8	24.2	22.4	87	78	66
Unmarried	4.7	7.8	7.9	15.5	17.1	14.8	77	68	65
No childres	4.7	7.1	10.4	21.3	20.3	17.9	82	74	63
All children 5 & older	5.3	7.5	10.4	30.3	23.9	19.9	85	76	66
Children under 5	3.9	5.8	9.0	32.0	25.1	22.0	90	82	71

The time men spend on housework tends to increase with the level of the wife's education, employment and earnings (Bumpass, 1990; Blair and Lichter, 1991). The time fathers spend on child care also increases with the mother's hours of work. Husbands and wives agree that the division of household tasks is unfair to working wives; it is most unfair when the wife works part-time (Bumpass, 1990; Dutchin-Eglash, 1988).

Evidence shows that women generally spent more time working at home compared to men. However the gap is narrowing down over time. Men are doing more housework than they used to, and women are doing less. Robinson (1988) compiled the results of three comprehensive surveys of Americans' use of time. The Survey Research Center of the University of Michigan conducted two, one in 1965 and another in 1975. The Survey Research Center of the University of Maryland conducted one in 1985.

Figure 3
Overall Trends in Men and Women's Housework 1965, 1975, and 1985
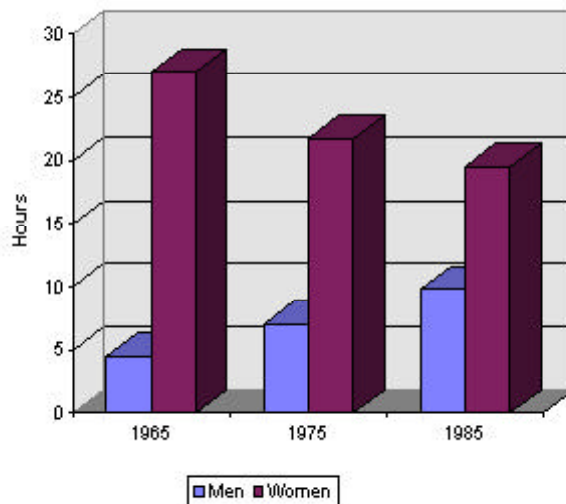
Overall men aged 18 to 65 spent 5.2 hours more on housework in 1985 than they did in 1965. On the other hand, women in the same age group spent 7.5 fewer hours on housework in 1985 compared to 1965, as more of them took paying jobs and had fewer children. Hence, their share of the housework has gone down from 85 percent in 1965 to 67 percent in 1985 (see Figure 3). What made the difference? <u>One</u>, more women are working; and working women worked less at home than nonworking women. <u>Two</u>, fewer households contain married couples. This has cut housework time overall because married women do much more housework than unmarried women (surprisingly even cohabiting unmarried women (Shelton and John, 1993). But married women also worked fewer hours than they did in 1965 while their husbands worked more hours at home. <u>Three</u>, households now have fewer children (see Table 2).

DIFFERENCES IN MEN AND WOMEN S TRAVEL PATTERNS

Research in the past two decades found significant differences in the travel patterns of men and women (Rosenbloom and Burns, 1989, p. 83), particularly among those who are married with children. The travel choices of women seem to reflect the need to juggle work and household responsibilities (Wachs, 1988; Hanson and Johnston, 1985).

Total trips

Analyzing 1990 National Personal Transportation Survey (NPTS) data, Rosenbloom (1994) finds that women aged 16-64 years, in both urban and rural areas, made 6-9 percent more person trips per day than men. Using the same data, Al-Kazily, Barnes and Coontz (1994) examine the effect of household structure on men and women's travel, and found that nonworking women over 35 years old made 70 percent more person trips than comparable men. Married women with dependents made over 20 percent more person trips than their male counterparts. On the other hand, single women without dependents made over 20 percent fewer person trips than single men.

Commute distance

Women make shorter work-trips (Hanson and Johnston, 1985; Wachs, 1988; Gordon, Kumar and Richardson, 1989; Rosenbloom and Burns, 1993; Rosenbloom, 1994; Al-Kazily, Barnes and Coontz, 1994). They generally earn lower incomes and work shorter hours, so it does not pay to commute long distances (Madden, 1981). But most of all, they work closer to home because they need to balance work and household responsibilities, and promptly respond to family emergencies (Ericksen, 1977; Madden, 1981; Wachs, 1988; Johnston-Anumonwo, 1992; Rosenbloom, 1994). Data from the 1967 Longitudinal Survey of Work Experience show that married women have shorter commutes than unmarried women, and women's commute distance tends to decrease with the presence of children especially at younger ages (Ericksen, 1977).

Other researchers, however, do not find household concerns a cause of observed gender differences in commuting distance. Using 1977 Baltimore Travel Demand Data, Hanson and Johnston (1985) find that part-time or full-time work status, occupational group, and household responsibility do not explain observed gender differences in commuting distance. Instead women's lower incomes, their concentration in female-dominated occupations, and their greater reliance on the bus and auto-passenger modes explain women's shorter work trip distances. In the extreme case, Gordon, Kumar and

Richardson (1989) find that women tend to have shorter worktrips regardless of marital status, household structure, income, occupation, travel mode, and location using 1977 and 1983 NPTS data. But married workers, especially those coming from two-worker households, generally have longer work trips than unmarried workers. Kim (1993) provides a more thorough review of studies on gender differences in commuting distance.

Non-work trips

With the increased participation of women in the work force, market goods and services have become available to substitute for time spent on housework and child care. However, most of these goods and services are geographically dispersed, so that part of the savings in housework time is offset by time spent on non-work travel (Pickup, 1989). One consistent finding in the literature is that women make more non-work trips than men (Hanson and Hanson, 1980; Rosenbloom, 1988; Gordon, Kumar and Richardson, 1989; Prevedouros and Schofer, 1991). Employed married women in Sweden made more shopping and domestic trips than their spouses, but fewer social and recreational trips (Hanson and Hanson, 1980). Employed women in four Chicago suburbs made twice as many trips as comparable men for errands, groceries, shopping, and chauffeuring children (Prevedouros and Schofer, 1991).

Trip chains

Linking different trips is called trip chaining. A chain can be simple or complex. Complex chains are chains between different anchors (e.g. home and work) consisting of more than one trip, or chains between two like anchors (e.g. home and home) consisting of more than two trips (Al-Kazily, Barnes and Coontz, 1994). Single-person households are the most likely to form complex trip chains. Complex work chains decrease and simple non-work chains increase with the number of persons in the household. Single adults with young children have the highest propensity to form complex trip chains on the way to and from work. They are followed by single adults with school-age children, dual income couples without children, and dual income couples with preschoolers (Strathman and Dueker, 1994; Al-Kazily, Barnes and Coontz, 1994).

Compared to men, women are more likely to trip chain on the way to and from work (Rosenbloom, 1988; Rosenbloom, 1989; Strathman and Dueker, 1994; Al-Kazily, Barnes and Coontz, 1994). Based on 1990 NPTS data, women make stops on their way to and from work 42 percent of the time, while men make stops 30 percent of the time. Even on non-work trips, women link trips 30 percent of the time, while men do only 26 percent of the time (Strathman and Dueker, 1994).

Working mothers are more likely to link trips than working fathers. And they are more likely to link trips when the children are younger. Based on 1982 and 1985 data from France, Netherlands and the United States, 65 percent of working women with children under six years old linked trips to work, while only 42 percent of comparable men did. Men's trip chaining does not seem to be affected by children's age (Rosenbloom, 1989).

Day-to-day Travel Variability

Based on a 1973 seven-day travel diary data from Reading, England, Pas and Koppelman (1987) find that employed married women have substantially more variability in their day-to-day trip frequencies than employed married men. There is little difference in trip variability between employed single men and women.

Travel Mode

In choosing a travel mode, individuals often trade off money for time and flexibility. For example, women generally have lower incomes than men so that they may find cheaper modes like carpooling more attractive. However, women with families and children traditionally have more domestic responsibilities and face more demands on their schedule. Therefore one would expect them to favor solo driving. The evidence on women's mode choices is mixed. The 1977 Baltimore Travel Demand Data used by Hanson and Johnston (1985) show more women relying on bus and auto-passenger modes. The 1990 Southern California commuting data show that women carpool more than men (Brownstone and Golob, 1992). However, women carpooled mostly with household members rather than with other people (Teal, 1987).

The 1983 NPTS data show a higher proportion of women commuting by car, either as drivers or passengers (Gordon, Kumar and Richardson, 1989). The 1990 and 1991 commuting data from Phoenix and Tucson, Arizona show that women are more likely to drive alone than men because of time pressures (Rosenbloom and Burns, 1992 and 1994). Working women with children are even more auto dependent because their multiple obligations require them to combine work trips with nonwork trips. When asked about the effectiveness of policies designed to increase the use of alternative modes, women were more responsive to those addressing domestic responsibilities, e.g. arrangements for child care and guaranteed rides home. Hence the findings on women's mode choices are varied and location-specific. The mode choices depend a lot on the transportation options available in each location.

Trip scheduling

Southern California data show that women's work trips are more clustered around the peak, compared to men (Sarmiento, 1995). And this is particularly true for working women with children. Unmarried mothers have the least flexibility in scheduling work trips (Gordon, Kumar and Richardson, 1989). A third or more of all their daily work trips occur only within two hours, i.e., 7:00-8:00 a.m. and 4:00-5:00 p.m.

TESTING THE EFFECT OF THE HOUSEHOLD AND GENDER ON TRAVEL: SOME EVIDENCE FROM SOUTHERN CALIFORNIA

The literature abounds with evidence of differences in the travel patterns of men and women, particularly among those who have families and children. Using data from the a survey of Southern California Commuters, this study further examines differences in commuting patterns between men and women as a function of differences in household composition and household division of labor. I estimate discrete choice models of side tripmaking, mode choice, and home-to-work departure times to test whether gender differences are statistically significant, and to determine precisely the contribution of household constraints in explaining gender differences in travel behavior.

The data come from the Panel Study of Southern California Commuters which was conducted by the Institute of Transportation Studies (ITS) at the University of California, Irvine. The mail survey ran from 1990 to 1994 completing ten waves. The sample was employer-based. Half of the respondents worked at the Irvine Business Complex, a diversified employment center near Orange County Airport, and the remaining half worked elsewhere throughout the Greater Los Angeles Area. I use data from the first wave of survey which was conducted in February 1990. The first wave respondents were over 2,200, about equally divided between men and women. Men and women who

live only with other adults constitute more than half of the sample; and those who live with children constitute about a third. Most of the respondents drove alone on their most recent trip, and less than one-fifth carpooled to work. Most of the respondents live or work in Orange County where public transit is not a popular mode, and so bus riders constituted an insignificant proportion. Hence I focus only on the choice between solo driving and carpooling, and among different carpool alternatives in examining mode choice.

SIDE TRIPS

Table 3 shows the results of a reduced-form binomial logit model of side trips. Positive coefficients increase the probability of making a side trip. Gender differences in the probability of making a side trip arise mainly from the differential effects of household composition between men and women. For example, the presence of children increases the probability of making a sidetrip for women, but has no effect for men. The presence of another adult in the household generally decreases the probability of making a side trip for men, but not for women. Given the same number of adults, the presence of other workers in the household increases the probability of making a side trip, but not for women. In other words, a man with a nonworking adult household member, say, a wife, can get his wife to make most of his side trips; but a woman with a nonworking adult member in her household does not get a similar advantage. These results confirm that gender differences in side trip making arise mainly from gender differences in household division of labor.

Age, education, and household income are unimportant in explaining the incidence of side trips. Race seems to matter — nonwhites show a lower probability of making a side trip. The other factors that explain side trip making are work schedule and commute characteristics. Commuters who go to work in the morning and those whose work schedules change everyday are more likely to make a side trip. Those who commute longer distances are less likely to make a side trip.

Mode Choice

Table 4 shows the results of a reduced-form multinomial logit model of mode choice. I consider the following alternatives: drive alone, drive with a household member, ride with a household member, driver with a non-household member, and ride with a non-household member. Table 4 shows estimates for the different carpooling alternatives with the drive alone alternative as reference. Positive coefficients increase the probability of an individual choosing a specific carpooling alternative compared to driving alone. On the other hand, negative coefficients decrease the probability of carpooling, and hence, increase the probability of driving alone.

In general, gender differences are significant only when choosing between solo driving and riding with family; and they are explained fully by interaction with the presence of other adults in the household. Having children makes both men and women drive with family, and the presence of other workers makes them drive with family and ride with others.

Commuters are less likely to carpool with family members or ride with others when there are many cars available. In general, they are less likely to carpool when they have a fixed work schedule and their schedule changes everyday. They are more likely to carpool when they commute long distances and, in some cases, when carpooling incentives are available.

Table 4

Conditional Logit Model of Mode Choice (The Reference is Driving Alone)

Explanatory Variables	Drive with family		Ride with family		Drive with others(a)		Ride with others(a)	
	Coeff.	t-statistic	Coeff.	t-statistic	Coeff.	t-statistic	Coeff.	t-statistic
Constant	-3.178	-1.922 *	-2.187	-1.405	-4.619	-3.287 **	-1.997	-1.657 *
Age	-0.036	-2.304 **	0.001	0.058	0.013	1.135	-0.003	-0.255
Income	-0.010	-0.187	0.200	3.073 **	0.069	1.347	0.078	1.389
Education	0.047	0.936	-0.060	-1.045	-0.117	-2.616	-0.128	-2.610 **
Nonwhite race	0.066	0.197	-0.144	-0.328	-0.0005	-0.002	-0.983	-2.068 **
Female	(b)		(b)		0.774	0.880	-0.080	-0.104
Presence of children (c)	0.595	1.706 *	0.128	0.190	0.408	1.094	-0.350	-0.874
Presence of children interacted with female	-0.204	-0.388	-0.578	-0.765	-0.080	-0.163	-0.084	-0.149
Presence of another adult	-0.117	-0.131	-1.079	-0.866	0.500	0.617	0.249	0.369
Presence of another adult interacted with female	-0.052	-0.100	1.458	2.020 **	0.123	0.125	0.451	0.491
No. of workers	0.688	3.543 **	0.301	0.701	-0.105	-0.501	0.392	1.749 *
No. of workers interacted with female	-0.042	-0.158	0.476	1.052	-0.300	-0.985	-0.143	-0.415
No. of cars in the household	-0.703	-3.753 **	-0.862	-4.122 **	0.153	1.088	-0.657	-3.706 **
No. of years in present job	0.074	2.995 **	-0.002	-0.054	0.022	1.140	0.002	0.088
Has fixed work schedule	-0.763	-2.762 **	-0.966	-3.167 **	-0.055	-0.208	-0.911	-3.445 **
Work schedule changes everyday	-0.716	-2.228 **	-0.638	-1.745 *	-1.089	-3.272 **	-1.360	-3.635 **
Worksite size	0.043	1.823 *	0.039	1.530	-0.001	-0.036	0.030	1.304
Reserved parking for carpoolers	0.071	0.231	0.446	1.335	0.489	1.754 *	1.369	4.245 **
Guaranteed ride home for carpoolers	-0.244	-0.530	-0.291	-0.619	0.189	0.546	0.890	2.931 **
Cost subsidy to carpoolers	0.382	1.018	-0.092	-0.194	0.123	0.349	-0.770	-1.502
Other incentives to carpoolers	0.839	2.778 **	0.720	2.086 **	0.726	2.622 **	0.623	2.082 **
Carpool lanes available	0.420	1.489	-0.136	-0.422	0.702	2.913 **	0.966	3.776 **
Commuting distance	0.026	2.874 **	0.034	3.342 **	0.041	5.865 **	0.062	8.793 **
Weekend commute	-1.114	-1.048	(d)		-0.075	-0.102	(d)	
Friday commute	-0.091	-0.329	0.387	1.339	0.237	1.002	-0.074	-0.289
Afternoon commute	-0.803	-0.762	(e)		-0.278	-0.361	(e)	

Log likelihood value = -958.31   Chi-squared (106) = 3,366   Prob > Chi-squared = 0
Pseudo R-squared = 0.6372
No. of observations = 8,090 (f)

** Significant at 95 percent.
* Significant at 90 percent.
(a) The model constrains the choice set of persons who live alone to only 3 alternatives: drive alone, drive with others, and ride with others.
(b) A female dummy was excluded from the explanatory variables for the drive with family and ride with family alternatives because it is collinear with the dummy variables interacting female with the number of children and presence of other adults in the household.
(c) Those who are 15 years old and under are considered children.
(d) In the sample, none of the weekend commuters chose to ride with family or ride with others; hence I excluded these two alternatives from their choice set.
(e) In the sample, none of the afternoon commuters chose to ride with family or ride with others; hence I excluded these two alternatives from their choice set.
(f) The sample consists of 1,735 persons. However, in a conditional logit model, each persons attributes are replicated as many times as the number of alternatives in their choice sets. This is why the number of observations in the estimation sample is a much bigger number.

HOME-TO-WORK DEPARTURE TIME

Table 5 shows the results of a reduced-form multinomial logit model of home-to-work departure times. I consider the following morning departure times: before 6:00, 6:00 to 6:59, 7:00 to 7:59, 8:00 to 8:59, 9:00 and after. The reference departure time is 7:00 to 7:59, which corresponds to the peak period in the sample. Positive coefficients increase the probability of an individual choosing the corresponding departure time compared to the sample peak period. Negative coefficients favor commuting during the peak period.

In general, gender and household composition are unimportant in explaining home-to-work departure times. Departure times are explained mainly by occupation, work characteristics, commute characteristics, and demographic characteristics such as age, income and education. Those in management/administration, secretarial/clerical, and professional/technical occupations are more likely to commute during the peak period over any other times. Those who work full time and have fixed schedules are more likely to leave between 7:00 and 7:59 a.m. than later. Those who work in large worksites, carpool, use freeways, and commute long distances are more likely to leave before 6:00 a.m.

Table 5
Conditional Logit Model of Morning Home to Work Departure Time

Explanatory Variables	Leave before 6:00		Leave 6:00-6:59		Leave 8:00-8:59		Leave 9:00 and after	
	Coeff.	t-statistic	Coeff.	t-statistic	Coeff.	t-statistic	Coeff.	t-statistic
Constant	-1.740	-1.631	-1.058	-1.228	1.395	1.623	1.289	1.074
Age	0.019	2.086 **	0.011	1.654 *	-0.010	-1.247	0.018	1.555
Household Income	0.094	2.422 **	0.024	0.881	0.002	0.063	0.011	0.215
Years of education	-0.130	-3.572 **	-0.025	-0.925	0.012	0.361	-0.091	-1.903 *
Nonwhite race	0.156	0.574	0.002	0.010	0.156	0.621	0.460	1.285
Female	-0.379	-0.738	-0.333	-0.927	-0.161	-0.405	-0.430	-0.616
Presence of children (a)	-0.119	-0.448	-0.107	-0.516	-0.130	-0.474	0.326	0.904
Presence of children interacted with female	-0.004	-0.011	0.206	0.697	0.369	1.029	-0.757	-1.361
Presence of another adult	0.129	0.300	-0.148	-0.463	-0.473	-1.227	-0.151	-0.256
Presence of another adult interacted with female	-0.599	-0.979	0.170	0.385	0.201	0.394	1.020	1.212
No. of workers	-0.176	-1.219	-0.046	-0.412	-0.035	-0.237	-0.020	-0.113
No. of workers interacted with female	0.212	0.993	-0.287	-1.619	0.036	0.182	-0.451	-1.459
Management/administrative occupation	-1.055	-2.288 **	-0.644	-1.781 *	-0.706	-1.861 *	-2.422	-4.397 **
Production/manufacturing occupation	1.332	2.308 **	0.746	1.469	(b)		0.405	0.632
Sales occupation	-1.099	-1.538	-0.586	-1.290	-0.430	-0.960	-0.921	-1.550
Secretarial/clerical occupation	-1.396	-2.829 **	-0.762	-2.026 **	0.952	-2.420 **	-2.552	-4.343 **
Construction occupation	0.952	1.069	0.192	0.233	-0.748	-0.613	0.487	0.493
Professional/technical occupation	-0.921	-2.049 **	-0.436	-1.235	-0.475	-1.291	-1.129	-2.465 **
Years in present job	0.056	3.384 **	0.015	1.086	0.041	2.322 **	0.049	2.276 **
Works full time	-0.882	-1.492	0.408	0.759	-0.908	-2.429 **	-2.674	-6.062 **
Work schedule is fixed	0.094	0.468	-0.120	-0.805	-0.677	-3.909 **	-0.361	-1.377
Work schedule changes everyday	-0.140	-0.669	-0.180	-1.154	0.255	1.442	0.722	2.768 **
Worksite size	0.044	2.678 **	0.019	1.461	-0.0007	-0.038	0.029	1.216
Carpool	0.537	2.291 **	0.123	0.620	0.053	0.205	-0.948	-1.946 *
Use freeway	1.071	4.115 **	0.294	1.660 *	-0.211	-0.958	0.396	1.180
Carpool lanes available	-0.503	-2.369 **	-0.176	-1.027	0.258	1.155	0.307	1.002
Commute distance	0.072	9.221 **	0.034	4.796 **	-0.007	-0.675	0.038	3.420 **
Weekend commute	1.546	2.417	0.464	0.750	-0.400	-0.476	3.042	5.414 **
Friday commute	0.252	1.373	0.085	0.621	0.008	0.047	-0.449	-1.599

Log likelihood value = -2,008.07   Chi-squared (131) = 1,525.32   Prob > Chi-squared = 0
Pseudo R-squared = 0.2753
No. of observations = 8,578 (c)

** Significant at 95 percent.
* Significant at 90 percent.
(a) Those who are 15 years old and under are considered children.
(b) None of the production/manufacturing workers chose to leave from 8:00-8:59 a.m.; hence, this alternative was excluded from their choice s•
(c) The sample consists of 1,735 persons. However, in a conditional logit model, each persons attributes are replicated as many times as the number of alternatives in their choice sets. This explains why the number of observations in the estimation sample is a much bigger numbe

SUMMARY AND CONCLUSION

Different demographic subgroups face different circumstances and constraints that could affect their travel behavior. Working women, in particular, often face income and social constraints arising from the multiplicity of roles in the market and in the household. Although the division of labor between men and women is fast becoming more equal, corresponding changes in the division of household responsibilities have been slower to occur. Women continue to retain primary responsibility for housework. However, the gap is narrowing down over time. Men are doing more housework than they used to, and women are doing less.

Research in the past two decades found significant differences in the travel patterns of men and women, particularly among those who are married with children. The findings on women's travel choices seem to reflect women's need to juggle work and household responsibilities. Women made more trips than men. They make shorter commute trips, and more nonwork trips. Women are more likely to trip chain on the way to and from work, especially when they have younger children. Employed married women show more variability in their day-to-day trip frequencies than employed married men. The findings on women's mode choices are mixed and location-specific; they must depend largely on the transportation options available in each location. Women's work trip schedules tend to be more clustered around the peak; and this particularly true for women with children.

The discrete choice models using Southern California data help explain the different determinants of travel behavior, and clarify observed differences in travel behavior between men and women with different household composition. The results show significant gender differences in the probability of making a side trip. And these gender differences arise mainly from the differential effects of household composition on men and women. In particular, having children increases the probability of making a side trip for women, but not for men. Men are less likely to make a side trip when there is another adult in the household, especially when the other adult does not work. Women do not seem to have a similar advantage.

In general, gender differences are significant only when choosing between solo driving and riding with family; and they are explained fully by interaction with the presence of other adults in the household. Having children makes both men and women drive with family, and the presence of other workers makes them drive with family and ride with others. Mode choice is largely determined by the number of cars available in the household, work characteristics, commuting distance, the presence of carpooling incentives, and individual characteristics such as age, income, eduction and race.

In general, gender and household composition are unimportant in explaining home-to-work departure times. Departure times are explained mainly by occupation, work characteristics, commute characteristics, and demographic characteristics such as age, income and education. The results are useful in assessing the distributional impact of policy. They are also useful to policymakers in designing programs and policies that are more responsive to individual circumstances.

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