

Effects of Married-Couple Dual-Earner Households on Metropolitan Commuting: Evidence from the Atlanta Metropolitan Area

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Abstract:

The idea of creating a balance between jobs and housing within different commuter catchment areas of a metropolis has been a prominent approach for reducing traffic congestion, air pollution, and journey-to-work times. Married-couple, dual-earner households, in which both spouses are employed, have been identified as an obstacle to the job-housing balance concept because of their constrained ability to choose a residential location near both workplaces. However, this has not yet been conclusively tested. Drawing on the 2000 5% PUMS dataset for metropolitan Atlanta, this article examines the commuting behavior of such households relative to single-earner households. The results challenge the dominant assumption that the average commutes of married-couple, dual-earner households are necessarily longer than those of single-earner households. In fact, after controlling for all forms of socioeconomic factors in the analysis, this study shows there are either no significant differences, or if there are, the average commutes of single-earner households are longer. It is a lack of affordable housing near job locations, or vice versa, and not the presence of dual-earner households, that should be blamed for lengthening commuting time and difficulties in implementing job-housing balances.

Keywords: dual-earner households | job-housing balance | commuting | Atlanta | gender

Article:

Over the last several decades, urban and transport researchers have offered many land-use based approaches to reduce traffic congestion, air pollution, and commuting times. Among others, the idea of creating a balance between jobs and housing within different commuting catchment areas of a metropolitan area has been prominent (Breheny, 2004). This job-housing balance concept requires that all areas of a metropolis should have sufficient and appropriately priced housing for employees near employment locations, and vice versa. The price and other characteristics of the housing in an area must also be suitable for the workers who hold jobs there. The argument for implementing this policy is that the more balanced the jobs and housing are in an area, the shorter the commutes of residents can be, because they can locate close to their workplace (for

further insights on the job-housing balance concept, see Cervero, 1989; Frank and Pivo, 1994; Sultana, 2002).

Several researchers (e.g., Giuliano, 1991; Giuliano and Small, 1993; Levine, 1998; Dieleman et al., 2002) have observed that job-housing balances will be difficult to implement. Married-couple, dual-earner households, in which both spouses are employed either full-time or part-time, are identified as a major obstacle. It is implicitly assumed that because of job heterogeneity the location decisions made by dual-earner households are more complex than standard household location theory describes (Hanson and Pratt, 1988). Traditional urban models assume that households attempt to minimize the time they spend commuting to work when they choose jobs and/or residential locations. In the past, when households typically had only one wage earner, this was relatively easy. However, with two wage earners it may become difficult for families to reduce their commuting times because they will be limited in their abilities to locate near both workplaces. As a result, dual-earner households may be a constraint on the goal of reducing aggregate commuting times in metropolitan areas (Cervero, 1989; Giuliano and Small, 1993; Merriman et al., 1995; Ommeren et al., 1998), despite the fact that an area within the metropolis may be balanced in jobs and housing. This has been a prominent argument against the concept of trying to create a jobs-housing balance in each metropolitan subarea; but it has yet to be conclusively tested.

The argument that dual-earner households are an obstacle in creating a jobs-housing balance arose from the increasing size of the female labor force, one of the most notable changes in the U.S. economy over the past several decades. Since the 1970s, female labor force participation has increased from 40 to 61%, with the most dramatic rise occurring among married women, resulting in a growing number of dual-earner households (U.S. Department of Labor, 2002). Indeed, 51 % of all married-couple households in the United States are now dual earners (U. S. Department of Labor, 2003). Consequently, the traditional American model of “breadwinner” husband and a “homemaker” wife is continuing to be replaced by dual-earner couples. The rapid rise of dual-earner couples has created a growing complexity in household arrangements (Waddell, 1996), and it therefore becomes crucial to better understand the commuting behaviors of dual-earner families and discover whether their average commuting time substantially differ from one-earner families.

It is unfortunate, however, that despite the assumptions and ambiguity about the important role of dual-earner households on lengthening commuting patterns in metropolitan areas, researchers have not paid much attention to understanding the extent of commuting time differences between single- and dual-earner households, and how they have affect overall metropolitan commuting time. A growing body of literature over the last three decades has documented gender differences in commuting time in general, but a gap in knowledge still remains as to how these times vary by household types after controlling for all forms of socioeconomic factors. It is especially important to understand how average commuting times differ between households with single- or dual-earners. It is also necessary to explore the extent to which commuting flow volumes increasingly result from the presence of dual-earner households when other important explanatory variables for commuting are also taken into account. These answers are fundamental to the success of the implementation of job-housing balance concepts.

This research is an attempt to inquire into these issues, using an empirically based analysis of metropolitan Atlanta with the most comprehensive commuting dataset, the 5% Public-Use Microdata Samples (PUMS) from the 2000 Census. Specifically, this article answers the questions of (1) whether or not the average travel time from home to work varies by household types with single- or dual-earners when all forms of socioeconomic status and individual characteristics of workers are similar (matched); (2) if commutes are not the same, how the commuting characteristics of dual- and single-earner families differ across the metropolitan area; and (3) the extent to which commuter flow volumes increase as a result of dual-earner households in metropolitan areas when other important explanatory variables for commuting are taken into consideration. The assumption, based on theories of urban economics, is that dual-earner households choose a residential location by taking into account both the husband's and wife's workplaces in order to maximize their accessibility. This choice determines the price of the household's residence, the quality of the residential environment, and the commuting time of both spouses.

The results empirically challenge the conceptually dominant assumptions of commuting behavior of dual-earner households, which hold that households with two earners are more constrained in balancing home and work locations, and therefore contribute to longer aggregate commutes for the entire metropolitan area. This article directly indicates that dual-earner households are more prone to reduce their commuting time compared to single-earner households, despite the fact that they purportedly face problems in balancing home and work locations.

The remainder of this article is organized into six sections. First, the literature on the location decisions of dual-earner households and their implications for commuting time is summarized. The second section discusses the study area, research design, and dataset employed for this research. The third, fourth, and fifth sections present the results of the analysis of variance and multivariate regression analyses. The final section synthesizes the results and offers concluding remarks.

PRIOR RESEARCH ON THE LOCATION DECISIONS OF DUAL-EARNER HOUSEHOLDS AND COMMUTING BEHAVIOR

The continuing growth of female labor force participation has stimulated theoretical and empirical research on gender differences in travel behavior in general, but few studies have made comparisons involving dual-earner households. Within the handful of theoretical and empirical investigations on the commuting behaviors of two-earner families, results strongly support human capital theory concepts for understanding the location decisions of these families. According to this theory, males are breadwinners and females are homemakers and, because of that, even in today's society when both spouses work (whether full-time or part-time), there may be a conventional division of labor in which the man's career is expected to take precedence over the woman's job. For that reason, the residential location decisions of dual-earner households do not differ from those of single-earner households (Madden, 1981), in which these decisions are mainly based on the male's job locations and proximity to work. Studies on commuting patterns of dual-earner households also indicate that the location decisions of these households are made with the husband's job location in mind (Vickerman, 1984; Singell and Lillydahl, 1986). Women

typically take jobs near the household's residential location in order to maximize their financial benefits.

Consistent with location decision theory, findings regarding gender differences in urban travel behavior show that women tend to have shorter trips than men (Taaffe et al., 1963; Wheeler, 1967; White, 1977; Andrew, 1978; Madden, 1981; Hanson and Johnston, 1985; Levinson and Kumar, 1994; Freedman and Kern, 1997), even when they have the same income, travel mode, and occupation type. Research based on gender differences in the commuting patterns of dual-earner families (e.g., Singell and Lillydahl, 1986; Johnston-Anumonwo, 1992; Rouwendal and Rietveld, 1994; Wyly, 1998) in both the United States and Europe also found that married women continued to have shorter commute distances than their husbands. The interpretation is that women face a more spatially constrained labor market than men because of their greater household responsibilities (White, 1977; England, 1993; Wyly, 1998). Indeed, much research specifically confirmed that married women with children at home commute shorter distances (Madden, 1981; Singell and Lillydahl, 1986; Preston and McLafferty, 1993; Davis, 1993). In contrast, Hanson and Johnston (1985) found that the length of women's work trips in Baltimore did not vary with numbers and ages of children present in the households. And Gordon et al. (1989) concluded that the presence of children accounts for few of the gender differences in commuting times. Similarly, Freedman and Kern (1997) introduced evidence from five U.S. metropolitan areas that suggested commuting time was always shorter for wives than for their husbands, even in childless households. On the other hand, most recent trends suggest the presence of children adds extra commuting time because these families may be forced into multipurpose commuting that combines work with dropping off children at day-care centers and schools (Wyly, 1998).

In contrast, Kim's (1995) findings from the Los Angeles metropolitan area suggested that even though households, both dual- and single-earner, attempt to minimize commuting distance, two-worker households account for "excess" commuting than single-earner households. Similarly, using a longitudinal dataset of commuting behavior from the greater Seattle area, Clark et al. (2003) investigated whether households minimize commuting distance when they change residences, and if so what differences can be found between dual- and single-earner households. This research indicated that both single- and dual-earner households reduce commuting distances when they change their residences, but pre- and post-move commutes were always slightly higher for dual-earner households compared to single-earner households. Even though neither Kim (1995) nor Clark et al. (2003) took all socioeconomic factors into consideration for both types of households, their analyses may be interpreted as a confirmation of the hypothesis that households with two earners have more problems in balancing home and work locations. Hence, because of their constraint in locating in proximity to work, this may indicate an obstacle for implementing a job-housing balance.

In sum, although dual-earner families can be expected to exhibit longer commutes, there is a discrepancy between the European and U.S. findings, and the weight of empirical evidence of shorter work trips for wives seems to contradict the hypothesis that dual-worker households have a more difficult time minimizing their commuting times. The debate surrounding these interpretations may persist because direct comparison of average commutes between dual- and single-earner families are incomplete if researchers do not control for all forms of socioeconomic

status related to household types, individual characteristics of workers, and geographic settings. Therefore, comparison of dual- and single-earner households requires matched pairs of groups to obtain the most meaningful results.

STUDY AREA, DATA, AND RESEARCH DESIGN

Large metropolitan areas increasingly attract dual-earner households because of their large labor markets (Costa and Kahn, 2000). Atlanta, the second fastest-growing large metropolitan statistical area (MSA) and the economic heart of the United States Southeast, was selected for this study in order to obtain an adequate sample size. The Atlanta urban region is also well known for the lengthening of its commuting times over the past few decades (U.S. Department of Transportation, 2003). Atlanta's traffic congestion is one of the worst in the nation, and Atlantans commute farther than most urban American commuters (Nasser and Overberg, 2001).

The study area consists of the 28 counties that make up 31 Public-Use Microdata Sample Areas (PUMAs; Fig. 1). At the beginning of this decade, the 28-county Atlanta MSA contained 4.5 million people and 2.2 million jobs (U.S. Census Bureau, 2001). According to the U.S. Census Bureau (2001), the women's labor force participation rate in the Atlanta MSA in 2000 was 46%. Married-couple families made up 48% of the households, and among those families 52% of households were two-earner, and 23% of the households were single-earner.

The 5% Public Use Microdata Samples (PUMS) from the 2000 U.S. Census are used in this research. The PUMS files provide stratified, random samples of all responses to the long-form questionnaire of the Census of Population and Housing, thereby permitting scrutiny of social and demographic relations at the individual and household level. Unlike other commuting data (e.g., Census Transportation Planning Package and Census Summary Tape File 3), the greatest advantage of using the PUMS database is that it provides an opportunity to identify dual-earner, married-couple families from the census questions on marital status and labor force participation. Another advantage of using this dataset is that the results are an unbiased estimate because of the absence of the Modifiable Areal Unit Problem (MAUP). Unfortunately, there are some disadvantages in using the PUMS dataset, because these are sample data that cannot represent the entire population as zonal data do. PUMS also provides only limited geographic resolution: samples are issued for Public-Use Microdata Areas (PUMAs), consisting of specially defined municipal aggregations with a minimum population of 100,000.

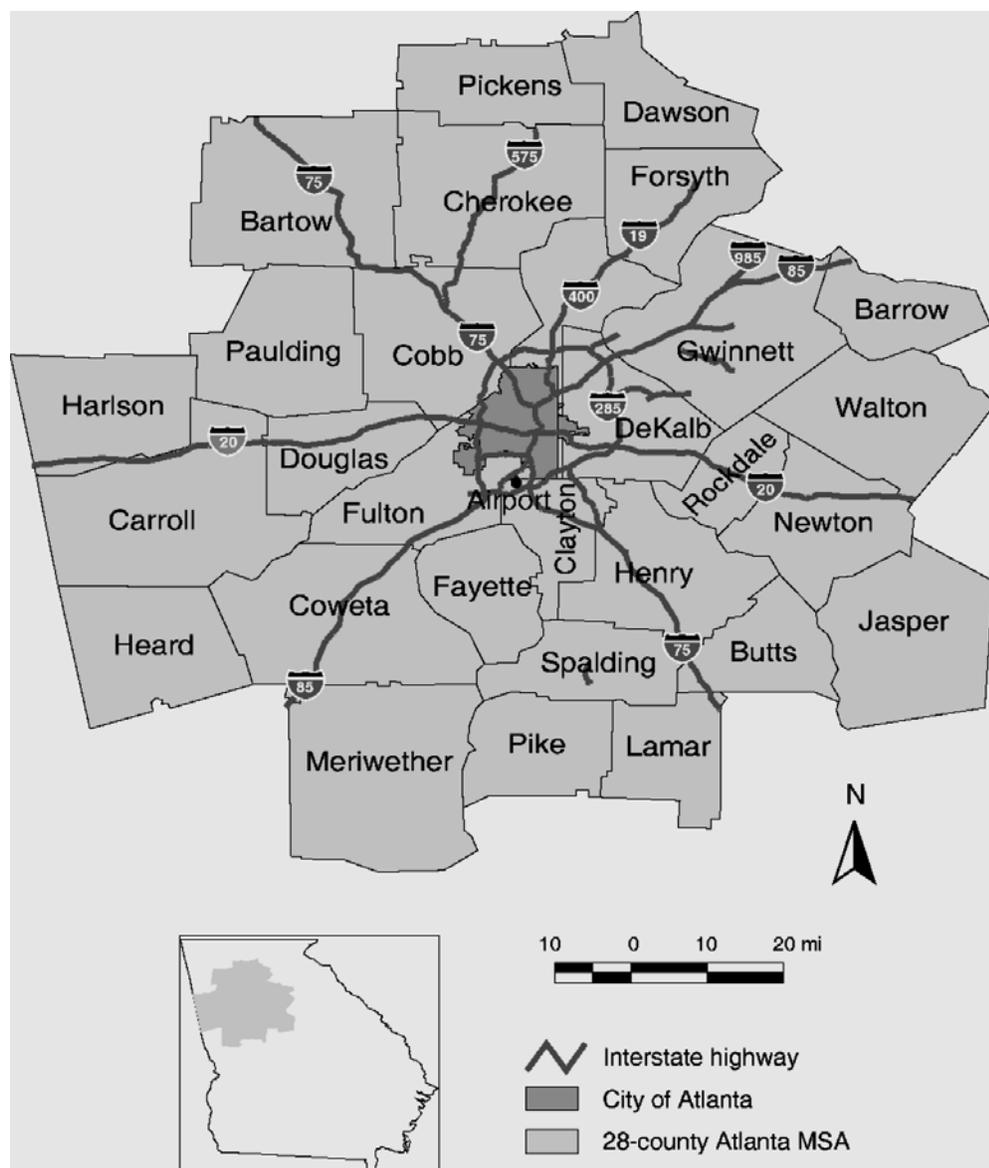


Fig. 1. Counties of Atlanta metropolitan statistical area (2000), with central city.

Socioeconomic information about individuals and households are organized by place of residence, and from the dataset it is also possible to link the home and workplace for each worker. Workers aged 16–65 (sample size = 112,616) were selected for the analysis. Next, a smaller database for only married couple households ($N = 58,846$) who lived together and worked outside the home was constructed from the population of workers. Next, the number of married couple sample households was reduced to only those using automobiles ($N = 40,424$). This was necessary because studies have reported that the use of public transit is associated with significantly longer travel times than auto commuting (McLafferty and Preston, 1997; Sultana, 2003, 2005). This step excluded a small number of married-couples, as only 3% are public transit users. Next, married-couple household records were categorized as dual-earner ($N = 32,205$) versus single-earner families ($N = 8,229$). In order to meet “dual-earner” criteria, only those

households were selected in which both spouses are of working age (16 to 64) and working outside the home either full-time or part-time.

Most studies that compared the average commute of dual- and single-earner families are based on travel distances, but work-trip length is available in the PUMS as travel time. Travel time is a better indicator for studying urban travel behavior than the distance between home and work because it is a better measure of the cost of commuting (Ewing et al., 2004; Texas Transportation Institute, 2002). Travel time, the focus of this study, is the actual number of minutes spent traveling from home to work as reported by the respondents. Average commuting times for dual-earner families were measured in this research as the aggregated commuting time of the partners divided by two (e.g., if one partner spent 30 minutes and another partner spent 50 minutes traveling from home to work, then the average commuting time of this dual-earner family is 40 minutes).

Commuting time differences between these single- and dual-earner households were compared using analysis of variance. A multivariate statistic, stepwise regression, was also used to identify multiple factors, along with household structure, that have an effect on metropolitan commuting.

ANALYSIS OF VARIANCE IN AVERAGE COMMUTING TIME

The difference in average commuting times between single- and dual-earner families was compared using analysis of variance (ANOVA). The hypothesis is that if the average commuting time for married-couple households with dual-earners (TTW_DEHH) exceeds that of married-couple single-earner households (TTW_SEHH), there should be a higher level of commuting time variation between these two groups, i.e., $TTW_DEHH > TTW_SEHH$, than the variation within each group. Since the sample size of one group is substantially larger than the other (32,205 vs. 8,229), the equality-of-variance assumption ($\sigma_{TTW_DEHH} = \sigma_{TTW_SEHH}$) was checked using the Levene test. One-way ANOVA was utilized when the Levene test was found to be insignificant, which means population variances for both groups are equal, one of the fundamental assumptions for ANOVA.

Mapping Differences by PUMAs

In this section, the household level data are aggregated at the PUMA level and the average commuting times for both types of families were calculated (Table 1). ANOVA was then used to test whether commuting times for families with dual-earners are significantly different from those with a single earner. Commuting differences by PUMA were also mapped (Fig. 2). The positive values represent longer average commutes for families with a single-earner, and negative values represent longer average commutes for families when both spouses worked. The dots on Figure 2 mark those PUMAs that have statistically significant average commuting time differences between these two groups.

Surprisingly, the majority of PUMAs show longer average work travel times for single-earner families than those with dual-earners, and statistically significant differences were found only in those areas in which the average commute of single-earner families exceeds that of dual-earner families. Those areas are suburban and exurban counties (e.g., Gwinnett, Barrow, Walton,

Carroll, Douglas, Coweta, Fayette, Spalding, and Cobb). Overall, the spatial variation in average commuting time differences between single- and dual-earner families by PUMAs implies that workers in dual-earner families do not necessarily commute longer than those in single-earner households. However, this visual method is based on large zones, and an analysis at the household level is essential obtaining detailed findings. ANOVAs were therefore carried out at the household level, using matched pairs to allow a direct comparison of commuting times between households with similar characteristics and locations.

TABLE 1. AVERAGE COMMUTING TIMES OF SINGLE-EARNER VS. DUAL-EARNER FAMILIES BY PUMAS (CAR USER ONLY)

	<i>Single-earner families</i>	<i>Dual-earner families</i>
<i>PUMA</i>	<i>Travel time (minutes)</i>	
700	35.52 (N = 494)	35.50 (N = 1916)
900	36.11 (N = 382)*	33.41 (N = 1502)*
1101	33.91 (N = 395)*	31.85 (N = 1101)*
1102	27.04 (N = 423)	27.29 (N = 1480)
1103	18.20 (N = 184)	18.79 (N = 589)
1104	23.90 (N = 51)	21.82 (N = 230)
1105	30.85 (N = 91)	28.41 (N = 368)
1106	30.77 (N = 66)	28.25 (N = 208)
1107	29.89 (N = 126)	30.08 (N = 598)
1201	24.56 (N = 109)	22.54 (N = 679)
1202	27.52 (N = 225)**	24.08 (N = 760)**
1203	25.31 (N = 167)	28.17 (N = 765)
1204	32.82 (N = 124)	31.54 (N = 518)
1205	33.73 (N = 121)	34.27 (N = 764)
1206	36.78 (N = 138)	37.97 (N = 850)
1301	33.69 (N = 201)*	30.71 (N = 832)*
1302	33.57 (N = 359)	33.28 (N = 1278)
1303	28.28 (N = 218)	27.45 (N = 680)
1304	34.78 (N = 218)	32.33 (N = 865)
1305	37.98 (N = 443)	36.69 (N = 1829)
1401	29.62 (N = 199)	28.85 (N = 697)
1402	32.14 (N = 235)	31.41 (N = 1031)
1501	34.17 (N = 251)	31.88 (N = 999)
1502	37.66 (N = 385)	35.62 (N = 1382)
1503	39.29 (N = 247)**	34.52 (N = 1410)**
1504	32.95 (N = 235)*	30.51 (N = 1062)*
1505	30.46 (N = 286)	29.39 (N = 1057)
1600	31.55 (N = 326)	29.89 (N = 1152)
1700	35.90 (N = 302)*	33.00 (N = 1267)*
1800	33.56 (N = 509)*	31.65 (N = 1841)*
2000	33.68 (N = 723)**	30.01 (N = 2549)**
Total	32.83 (N = 8229)***	31.39 (N = 32205)***

***Significant at $p \leq .01$. **Significant at $p \leq .05$. *Significant at $p \leq .10$.

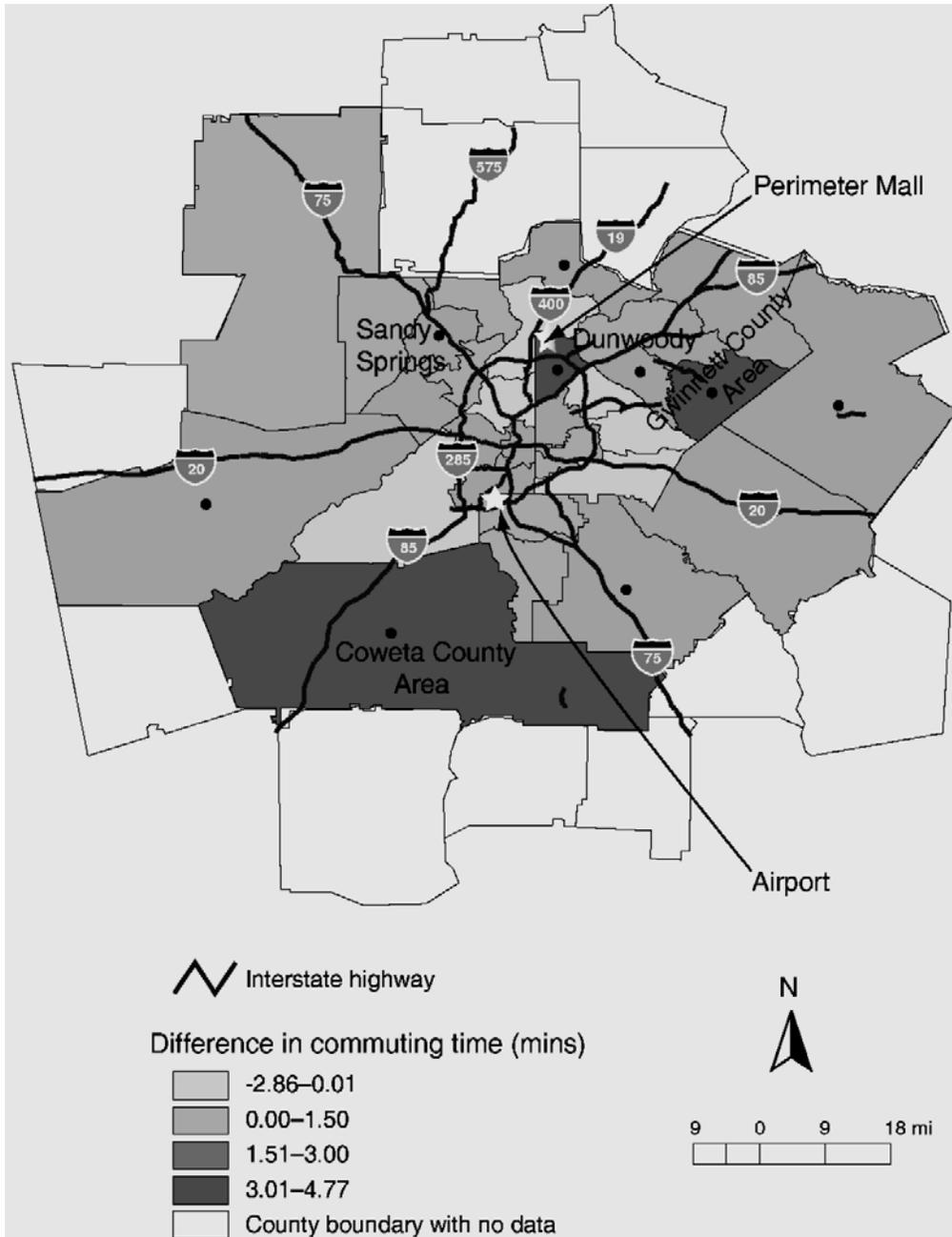


Fig. 2. Average commuting time differences between single- and dual-earner households in the metropolitan Atlanta area. *Source:* PUMA, 2000.

Average Commuting Time by Household Types when Controlling for Matched Household Characteristics

The average commuting times for single- and dual-earner families were calculated before and after considering domestic responsibilities, such as the presence of young children (Table 2), as these may complicate commuting patterns for the families. Again, the differences in average commuting times between single- and dual-earner families are statistically significant, except for households with children aged less than 6 years old (Table 2). Results clearly show that when none of the other household responsibilities are controlled for in the analysis, average commuting times of single-earner families slightly exceed those of dual-earner families. The average commute time for single-earner families without children is more than a minute longer, and this difference expands to two minutes when households have school age children or when households have both school age and younger children present.

TABLE 2. AVERAGE COMMUTING TIMES BY FAMILY TYPES (CAR USER ONLY)

<i>Family types</i>	<i>Travel times (minutes)</i>
Single-earner families	32.83*** (N = 8,229)
Dual-earner families	31.39*** (N = 32,205)
Single-earner families without children	31.98** (N = 3,304)
Dual-earner families without children	30.83** (N = 14,633)
Single-earner families with children age <6 years	33.26 (N = 1,598)
Dual-earner families with children age <6 years	32.99 (N = 4,166)
Single-earner families with children age 6–17 years old	33.00*** (N = 2,120)
Dual-earner families with children age 6–17 years old	31.11*** (N = 10,314)
Single-earner families with children with age <6 and 6–17 years old	34.30* (N = 1,207)
Dual-earner families with children with age <6 and 6–17 years old	32.76* (N = 3,092)

***Significant at $p \leq .01$. **Significant at $p \leq .05$. *Significant at $p \leq .10$.

Again, comparisons of commuting times between matched pairs of single- and dual-earner families do not favor the hypothesis that households with both partners employed have longer average commuting times, which is consistent with Rouwendal and Rietveld's (1994) study of Dutch families. Instead, these results reveal that households with a single-earner are at a slight disadvantage in minimizing their commuting in metropolitan Atlanta, whether or not they have child responsibilities.

Average Commuting Time by Residential and Work Place Locations

The analysis was repeated after controlling for the effects of residential and workplace locations (central-city vs. suburban areas) on commuting time for single- and dual-earner families, because previous research suggested that locations of homes and workplaces may influence commuting time (Crane, 2000; Johnston-Anumonwo, 2000; Sultana, 2005). In general, average commuting times for both types of families are substantially shorter in the central city areas than in the suburban ring (Table 3). The average time spent commuting by single-earner families is significantly longer than that of dual-earner households, regardless of central city or suburban

residential location. When households are grouped by workplace locations, single-earner families again have significantly longer commutes.

TABLE 3. AVERAGE COMMUTING TIMES OF SINGLE-EARNER AND DUAL-EARNER FAMILIES: CONTROLLING FOR LOCATIONS OF RESIDENCE AND WORKPLACE*

	Commute time by place of residence		Commute time by place of work	
Household Types	Central-city areas	Suburban areas	Central-city areas	Suburban areas
Single-earner families	25.98 (<i>N</i> = 1050)	33.83 (<i>N</i> = 7179)	35.91 (<i>N</i> = 3736)	28.95 (<i>N</i> = 4136)
Dual-earner families	25.55 (<i>N</i> = 4152)	32.25 (<i>N</i> = 28053)	35.15 (<i>N</i> = 14384)	27.55 (<i>N</i> = 16,195)

*All are statistically significant at $p \leq .5$.

Average Commuting Time by Occupational Status and by Work Hours

It is anticipated that labor force characteristics are important for understanding individual residential and workplace locations and associated travel behavior decisions. Locationally constrained careers may complicate dual-earner families' commuting patterns, and in certain circumstances they may not be able to maximize the benefits of spatially balancing residential and workplace locations as single-earner families in the same profession can do. Average commuting times between families with single- and dual-earners when both exhibit similar occupational status were therefore compared. Households were classified according to seven occupational groups using standard census-defined categories—Managerial (Ma); Business and Financial operation (BF); Professional and related (PR); Services (Sr.); Sales and Office (SO); Construction, Extraction and Maintenance (CEM); and Production, Transportation and Material moving (PTM) (U.S. Department of Commerce, 2004).

It is anticipated that when both spouses of dual-earner households are working in more locationally constrained careers such as Ma, BF and PR occupations (Green, 1997) they may have longer average commuting times than a single-earner household linked to the same occupation type. However, the evidence in Table 4 does not support this expectation. Although the comparisons are not statistically significant, the average commutes of dual-earner couples with Ma and BF occupations are quite similar to those of families with a single-earner who was employed in the same job category. In contrast, families with a single-earner once again show longer average commutes compared to dual-earner families when both of these family types hold PR, Sr., and PTM positions (these differences are statistically significant). Single-earner families in these occupations average commutes up to three minutes longer.

Similarly, previous research has also indicated commutes will be longer for full-time workers (Wyly, 1998). It is therefore expected that when both partners in dual-earner households are working full-time, they will experience more constraints in their residential location choices

when attempting to minimize commuting time. Accordingly, dual-earner and single-earner families were matched based on their hours of work and their average commutes were compared (Table 5). The results, however, do not match expectations when the average commuting times are compared for households with either full- or part-time jobs. These results also clearly show that full-time jobs create greater constraints for families compared to families with part-time jobs, no matter whether they contain one or two earners, reflected by their longer average commutes. After controlling for occupational status and work hours, the evidence again does not support the idea that the average commute of dual-earner families will be longer than that of single-earner families. Rather, it shows that the residential choices of dual-earner households seem to be based on minimizing the commuting burden compared to families with a single-earner, which is consistent with Green's findings (1997).

TABLE 4. AVERAGE COMMUTING TIMES OF SINGLE-EARNER AND DUAL-EARNER FAMILIES: CONTROLLING FOR OCCUPATIONAL TYPES

Occupation types	Single-earner households	Dual-earner households
Ma: Managerial	32.69 (<i>N</i> = 1503)	33.04 (<i>N</i> = 4255)
BF: Business and financial operations	35.33 (<i>N</i> = 461)	35.36 (<i>N</i> = 2045)
Pr: Professional	32.55*** (<i>N</i> = 1528)	29.28*** (<i>N</i> = 7623)
Sr: Services	29.05* (<i>N</i> = 638)	27.52* (<i>N</i> = 2811)
SO: Sales and office	30.65 (<i>N</i> = 1660)	30.98 (<i>N</i> = 9134)
CEM: Construction, extraction and maintenance	37.69 (<i>N</i> = 1254)	37.49 (<i>N</i> = 2794)
PTM: Production, transportation, and material moving	32.42* (<i>N</i> = 1165)	30.85* (<i>N</i> = 3484)

***Significant at $p \leq .01$. **Significant at $p \leq .05$. *Significant at $p \leq .10$.

INFLUENCE OF WIVES ON DIFFERENCES IN COMMUTING TIME

Despite the consistency of the results in the previous section, an important question that remains unclear is whether the average commuting times for dual-earner households' are "hidden" because of wives' consistently shorter commutes, even though males in dual-earner households may have longer commutes than their counterparts in single-earner households (Madden, 1981; Johnston-Anumonwo, 1992). This section will examine this question by calculating commuting times for husbands and wives separately in both types of households. Based on past studies, it has been suggested that males and females spend approximately equivalent time commuting when couples share similar occupational status and hours of work.

TABLE 5. AVERAGE COMMUTING TIMES OF SINGLE-EARNER AND DUAL-EARNER FAMILIES: CONTROLLING FOR HOURS OF WORK*

Hours of work	Single-earner households	Dual-earner households
Full-time	33.23 ($N = 5572$)	32.42 ($N = 17680$)
Less than full-time	30.10($N = 1193$)	29.41($N = 2355$)
Householder full time, spouse did not work	33.74($N = 4100$)	n.a.
Householder full-time, spouse less than full-time	n.a.	29.69($N = 8509$)
Householder did not work, spouse worked full-time	31.79($N = 728$)	n.a.
Householder worked less than full-time, spouse worked full-time	n.a.	31.77($N = 2642$)

*All are statistically significant at $p = .0$.

The importance of the head of the household also needs to be examined. In this dataset, the householder is the family reference person in whose name the housing unit is owned or rented. Even though traditional family roles have changed in many respects in the United States, men are still more often the head of the household. The relationship of other individuals in the household is defined in terms of their relationship to the householder. From the traditional point of view, it is assumed that women can only be recognized as “householders” when they earn more than their husbands or have greater decision power in the family. Therefore, householder identification is taken as a proxy for women’s highest power in the decision-making process. Some 87% of husbands in dual-earner households are identified as householders in the sample, while 87% of wives are identified as spouse. In contrast, 97% of husbands in single-earner households are identified as householders. Therefore, in this analysis the householder’s commuting time is more strongly influenced by the husband’s commute time, while spousal commute time typically represents the wife’s work travel.

Table 6 presents the results of comparisons of commuting time based on gender and working hours for single- and dual-earner households. Without much effort, one can clearly see that regardless of working hours or who is designated as the reference person in the household, wives in both types of households have shorter commuting times than their husbands (Wyly, 1998; Clark et al., 2003). Whether husbands worked full-time or part-time, their average commuting times are always higher than those of their wives. This suggests that there is the possibility of having shorter average commutes by dual-earner families since the commuting times of wives in these households have been found to be significantly shorter.

TABLE 6. GENDER DIFFERENCES IN TRAVEL TIMES CONTROLLING FOR WORK HOURS^a

	Single-earner families		Dual-earner families	
	Husbands	Wives	Husbands	Wives
Work hours				
Full-time	33.94**(<i>N</i> = 4254)	29.85**(<i>N</i> = 574)	33.88**(<i>N</i> = 8903)	30.94**(<i>N</i> = 8777)
Less than full-time	32.07**(<i>N</i> = 687)	25.89**(<i>N</i> = 256)	31.35**(<i>N</i> = 1199)	27.39**(<i>N</i> = 1156)
Householder full time, spouse did not work	33.88**(<i>N</i> = 3980)	29.28**(<i>N</i> = 120)	n.a.	n.a.
Householder full-time, spouse less than full-time	n.a.	n.a.	33.58**(<i>N</i> = 4418)	25.49**(<i>N</i> = 4091)
Householder did not work, spouse worked full-time	34.76**(<i>N</i> = 274)	30.00**(<i>N</i> = 454)	n.a.	n.a.
Householder worked less than full-time, spouse worked full-time	n.a.	n.a.	32.71*(<i>N</i> = 1284)	30.88*(<i>N</i> = 1358)

^a97% (*N* = 6201) of husbands in single-earner households and 87% (*N* = 14,183) of husbands in dual-earner households are identified as householders. In contrast, 70% (*N* = 1195) of wives in single-earner households and 87% (*N* = 13735) of wives in dual-earner households are identified as spouses.

**Statistically significant at $p \leq .05$. *Statistically significant at $p \leq .10$.

However, comparison of commuting times between matched pairs of households based on gender and their working hours reveals some interesting results. In those households in which both partners were employed full-time, wives have slightly longer commutes compared to full-time working wives in single-earner households. The same relationship is found for those households in which both partners were employed part-time compared to wives employed part-time in single-earner families. Similarly, comparison is made when wives are identified as spouses and worked full-time in both types of households: wives in dual-earner households, where the householder (mostly husbands) worked part-time and the spouse (mostly wives) worked full-time, have slightly longer commuting times than the wives in single-earner households when the householder did not work. This table also reveals that wives' working hours reverse the situation: when wives are the only full-time earner and identified as householder in single-earner families, their average commute exceeds by almost four minutes that of wives in dual-earner households when the householders (mostly husbands) worked full-time and the spouses (mostly wives) worked part-time.

It should also be noted that the comparable commuting times of husbands for both dual-earner and single-earner households are inconsistent with past findings (e.g., Madden, 1981; Johnston-Anumonwo, 1992). Even though husbands in dual-earner households commute longer than their wives, their commute is shorter (by about one to two minutes) than husbands in single-earner households. These results clearly suggest that the While valuable, ANOVA does not

simultaneously consider the effects of other independent variables. Stepwise multiple regression is therefore needed to identify other factors that affect commuting in single- and dual-earner households, and to what extent commuter flow volumes are increasingly result from dual-earner households. The stepwise selection procedure is used to add and remove variables in the models to ensure that all models are free from multicollinearity. The regression models⁴ are specified for one-way travel time to work (TTW) for all married-couple households (Model 1), single-earner households (Model 2), and dual-earner households (Model 3) in order to determine the individual influence of each independent variable on commuting time while controlling for the influence of other independent variables.

The variables chosen were based on the existing literature. A large body of theoretical and empirical research suggests a number of determinants for measuring work-trip length (e.g., Wily, 1998; Dieleman et al., 2002) and travel behavior (Weber and Kwan, 2003), and these independent variables are displayed in Table 7. Additional variables that are not yet widely used for measuring commuting length were also added. Many studies have suggested that a larger Black population alters the average travel pattern of a region (Johnston-Anumonwo, 1997, 2000; McLafferty and Preston, 1997; Sultana, 2000) and predicts that because of residential segregation a wider separation between home and workplace is found among Black commuters. Married-couple households were therefore also classified as White or Black and are represented as dummy variables. Congestion can also be expected to be a factor in lengthening commuting time. Annual congestion costs per driver range from \$125 in Boulder, Colorado, to \$1,290 in Washington, DC, per year (Employment Policy Foundation, 2000), and time lost to congestion by peak-hour travelers in the three most congested cities were, respectively, 136 hours for Los Angeles, 92 hours for San Francisco, and 84 hours for Washington, DC (Texas Transportation Institute, 2002). With rush-hour commuting an issue for workers both in terms of money and lost time, two dummy variables were created to represent the effects of peak-hour commuting; one represents workers who leave home before the rush hour (called LHBRHR), and the other for workers who leave home after rush hour (called LHARHR). CARPOOL was created as a final dummy variable because past studies suggest that carpooling adds extra commuting time compared to that of individual drivers.

TABLE 7. VARIABLE NAMES, DESCRIPTIONS, AND DEFINITIONS

Variable name	Definition and description
<i>Demographic</i>	
AGE	Age of workers from 16 to 65
EDU_LHS (dummy)	Less than high school = 1; bachelor's degree = 0
EDU_HS	High school = 1; bachelor's degree = 0
EDU_SCAS (dummy)	Some college or associate's degree = 1; bachelors degree = 0
EDU_MSM (dummy)	Master's degree = 1; bachelor's degree = 0
SEX (dummy)	Sex of workers; male = 0 and female = 1
RACE_BW(dummy)	Race of workers; White = 0 and Black = 1
PRESCHLD (dummy)	Presence of children; presence = 1, no presence = 0
CHLDU6 (dummy)	Children ages under 6 = 1; no children = 0
CHLD6_17 (dummy)	Children ages 6 to 17 = 1; no children = 0
CHLDU6_617 (dummy)	Children ages under 6 and 6 to 17 = 1; no children = 0

MCPS_DE (dummy)	Married couple households; single-earner = 1 and dual-earner = 0
DE_FTHHPTS (dummy)	Dual-earner households: householder worked full time and spouse worked part time = 1; both worked full time = 0
DE_FTSPTHH (dummy)	Dual-earner households: spouse worked full time and householder worked part time = 1; both worked full time = 0
DE_BWPT (dummy)	Dual-earner households: both worked part time = 1; both worked full time = 0
SE_PTHH (dummy)	Single-earner households: householder worked part time = 1; householder worked full time = 0
SE_FTS (dummy)	Single-earner households: spouse worked full time = 1; householder worked full time = 0
SE_PTS (dummy)	Single-earner households: spouse worked part time = 1; householder worked full time = 0
<i>Labor market characteristics</i>	
BF (dummy)	Business and finance = 1; managerial = 0
PR (dummy)	Professional and related occupation = 1; managerial = 0
Sr (dummy)	Services = 1; managerial = 0
SO (dummy)	Sales and office occupation = 1; managerial = 0
CEM (dummy)	Construction, extraction and maintenance = 1; managerial = 0
PTM (dummy)	Production, transportation and material moving = 1; managerial = 0
PTE	Personal total earnings
RHHINC	Median household income
Variable name	Definition and description
<i>Characteristics of residence and workplace</i>	
POR (dummy)	Place of residence if outside central city = 1 and if inside central city = 0
POW (dummy)	Place of work if outside central city = 1 and if inside central city = 0
HVLMHV (dummy)	Less than median housing value = 1; median housing value (\$150K to 175K) = 0
HV175_250K (dummy)	Housing value between \$175K to \$250K = 1; median housing (\$150K to 175K) = 0
HV250_500K (dummy)	Housing value between \$250K to \$500K = 1; median housing value (\$150 to 175K) = 0
HV500K_1M (dummy)	Housing value from \$500K to \$1 million = 1; median housing value (\$150,000 to 175,000) = 0
HVM1M (dummy)	Housing value more than 1 million = 1; median housing value (\$150,000 to 175,000) = 0
<i>Transportation</i>	
LHBRHR (dummy)	Leaving home before rush hours (6 a.m.) = 1; rush hours (6 to 8:30 a.m.) = 0
LHARHR (dummy)	Leaving home after rush hours (8:30 a.m. to 2 p.m.) = 1; rush hours (6 to 8:30 a.m.) = 0
CPOOL2 (dummy)	2 person carpool = 1; solo driver = 0
CPOOLM2 (dummy)	2 or more person carpool = 1; solo driver = 0
TTW	Travel time to work (one way)

Determinants of Commuting Time for Married Couple Households

Model 1 shows that household structure does not have any effect on commuting times when other variables are controlled in the analysis, which is indicated by the failure of the dual-earner or a single-earner dummy variable to enter into the model (Table 8). This model, however, clearly implies that the presence of wives in the labor market has an important effect on metropolitan Atlanta's commuting time. Predicted commuting times for wives are shorter than those for husbands when other variables are controlled in the model. Thus, the greater the magnitude of wives' presence in the labor market, the less the average commute time for the metropolitan area, an indirect indication of the minor effect on commuting time by dual-earner households.

This model also shows some unexpected results that are inconsistent with standard urban economic theory. This theory predicts that high income and high status professionals, such as those in managerial (Ma) occupations, will commute longer than workers in other professions because they prefer to live in neighborhoods in peripheral suburbs. However, this model shows that households holding Ma occupations commute shorter times than households engaged in BF occupations when controlling for all other variables. All other professional families, except those in CEM occupations, have shorter commutes than Ma-occupation families, as predicted by many earlier studies. The place of work for construction and maintenance workers (CEM) varies throughout the year and they may end up with longer commutes longer as a result. Similarly, families with master's or doctoral degrees have shorter commutes than families with only bachelor's degrees.

The observed relationship between housing price and commuting time reconfirms the established connection between housing value and work-trip length, although total household income does not show any relationship to commuting time. Families who own housing more expensive than the median price range (\$150,000–\$175,000) tend to have shorter commutes, though this effect is most visible for extremely expensive housing above the \$1 million level. These findings are consistent with studies of the Atlanta MSA that show the wealthy prefer to live within the central city in order to be in proximity to their workplaces (Hartshorn and Ihlanfeldt, 2000), while the middle income population accepts the burden of longer commuting in order to afford spacious housing in suburban neighborhoods (Sultana, 2002). Given their greater income potential, these results suggest why families with dual-earners tend to have shorter commutes than single-earner households.

An extensive literature documents longer commutes among workers at their peak age (Hanson and Pratt, 1995), and so does this research. Age has a negative effect on commuting time, though the coefficient is small, suggesting that older families commute less compared to younger couples. This model predicts that the presence of both school-age and younger children adds extra commuting time for those families compared to families without children (Wyly, 1998), whereas the presence of only school age children decreases the commuting time for the families (Preston and McLafferty, 1993). This model also predicts that a larger Black population has slightly longer commutes than White married couples, which is consistent with recent studies on

Atlanta (Sultana, 2000) as well as many other U.S. metropolitan areas in the U.S (Johnston-Anumonwo, 2001).

TABLE 8. DETERMINANTS OF COMMUTING TIME^a

Variable ^b	Model 1	Model 2	Model 3
Constant	37.15	36.46	37.06
AGE	-0.11	-.11	-0.08
EDU_MSM	-1.73	-2.97	-1.59
SEX (dummy)	-3.35	-3.26	-3.17
RACE_BW (dummy)	1.14	n.e. ^c	0.80
DE_FTHHPTS (dummy)	n.a.	n.a.	-1.87
DE_BWPT (dummy)	n.a.	n.a.	-1.81
SE_PTHH (dummy)	n.a.	-2.39	n.a.
BF (dummy)	2.42	n.e.	2.45
PR (dummy)	-1.80	2.17	-2.44
Sr (dummy)	-3.34	n.e.	-4.14
CEM (dummy)	2.24	3.82	2.13
PTM (dummy)	-2.84	n.e.	-3.56
POW (dummy)	-10.25	-10.21	-10.52
POR (dummy)	9.45	10.29	9.59
CHLDU6 (dummy)	n.e.	2.37	1.54
CHLD6_17 (dummy)	-.62	n.e.	n.e.
CHLDU6_617 (dummy)	1.01	n.e.	1.87
RHHINC	n.e.	-0.02	n.e.
HV175K_250K(dummy)	-1.21	n.e.	-1.24
HV251K_500K(dummy)	-3.51	n.e.	-3.59
HV501K_1M(dummy)	-5.92	n.e.	-6.26
HVM1M (dummy)	-7.07	n.e.	-6.37
LHBRHR (dummy)	2.91	4.41	2.44
LHARHR (dummy)	-6.27	-5.54	-6.23
CPOOL2 (dummy)	n.e.	n.e.	2.66
CPOOLM2	2.54	n.e.	n.e.
<i>F</i> -statistics	143.87	33.24	115.18
<i>R</i> -square	0.10	0.09	0.10
Total observations (<i>N</i>)	40,439	8,229	32,205

^aModel 1 = Entire sample of married couple households. Model 2 = Single-earner households. Model 3 = Dual-earner households.

^bStatistically significant at $p \leq .05$. n.a. = not applicable; n.e. = not entered.

Not surprisingly, the location of workplace and residence also has an important effect on explaining lengthening commuting time for Atlanta. The predicted average travel time for jobs located outside the central city is 10 minutes shorter than that of central city job locations when

controlling for the other variables. This is consistent with past studies that argued that the dispersion of employment centers, especially those located in the suburbs, tends to be related to shorter commutes (Cervero and Wu, 1997; Sultana, 2000). Consistent with past findings (Ewing et al., 2004; Sultana, 2005), this model predicts that the suburbanization of residential areas lengthens commuting by about nine and a half minutes for families compared to married-couple families who live in the central city.

As was found in a study by the Texas Transportation Institute (2002), this model predicts that rush hour commuters spend six minutes more on commuting compared to workers who leave home for work after the rush hour. The model also predicts that people who leave home before the rush hour commute about three minutes longer than people who leave during rush hours. This is because people who leave home before 6 am probably live farther away from their work, requiring an earlier departure.

Determinants of Commuting for Single- and Dual-earner Households

Models 2 and 3 (Table 8) were run separately for single- and dual-earner families to compare the influences of the independent variables in explaining commuting times between these households. Age, education, gender, place of work, and place of residence have the same effect for both types of households, as shown in Model 1. The gender gap in commuting remains the same in both types of households. Even though higher education (master's degree and higher) helps to reduce commuting time in both types of households, the effect is greater for single-earner households. The predicted commute times for single-earner families' with master's degrees is almost three minutes less than single-earner families that contain only bachelor's degrees.

Consistent with education, single-earner families have shorter commutes as their household income increases even though the coefficient is small; however, household income is not associated with dual-earners' commuting time. Unlike single-earner households, housing value is associated with dual-earner households' commuting times: the higher the housing prices, the lower the commuting time. Race also plays a significant role in explaining the greater commuting time for dual-earner families, but not for single-earner households. Carpooling increases commuting time for dual-earner households, but has no effect on single-earner families.

This research also addresses some of the complexities regarding the commuting behaviors of dual-earner households, such as whether a household with one spouse working full-time and the other working part-time will have shorter commutes compared to households in which both spouses work full-time. Model 3 demonstrates that hours of work have an important effect on commuting times of dual-earner households. Commuting times are shorter for the dual-earner families when spouses (in this case possibly wives) are working part-time rather than full-time. This result is consistent with many past studies (Hanson and Pratt, 1995; Johnston-Anumonwo, 1997; Wylie, 1998), which implies that dual-earner households' commuting times are minimized in response to reduced wives' earnings and part-time work.

SUMMARY AND CONCLUSION

The idea of creating a balance between jobs and housing within different commuting catchment areas of a metropolis has been a prominent approach to reducing traffic congestion, air pollution, and commuting times. Dual-earner households have been identified as an obstacle to the job-housing balance concept because of their limited ability to choose a residential location near both workplaces. However, this has not yet been conclusively tested. Despite the assumptions and ambiguities concerning the role of dual-earner households on lengthening commutes in a metropolitan area, researchers have not paid much attention to understanding the extent of commuting time differences between these households and how they affect on overall commuting time. This paper has attempted to highlight the extent to which the future growth of dual-earner households may shape commuting patterns in and around American cities. Drawing on the 2000 5% PUMS dataset for metropolitan Atlanta, this article examined the commuting behavior of these households relative to single-earner households. The results challenge the assumption that the average commutes of married couple dual-earner households are necessarily longer than those of single-earner households.

This study indicated that dual-earner households are more prone to reduce their commuting time compared to single-earner households, despite facing more problems in balancing home and work locations. As was seen, the results of testing for commuting differences between these types of households, after controlling for a range of factors, are remarkably consistent. In all cases, either there were no significant differences or the average commutes of single-earner households actually turned out to be longer. Consequently, as critics of the job-housing balance idea have argued, the relationship between commuting time and household characteristics is more complicated than some earlier research has suggested (Dieleman et al., 2002). However, arguments that the growth of dual earner households will prevent the successful implementation of the jobs-housing balance are not supported here. The shorter average commuting times of dual-earner households are not only the result of wives' shorter commutes and fewer hours of work, but also from their husbands' shorter commutes. Thus, when controlling for family structure, occupation, and location, husbands in dual-earner households commute fewer minutes than husbands in single-earner households, a conclusion that differs from previous findings (Madden, 1981; Johnston-Anumonwo, 1992). Although this research does not address households that have more than two earners, these findings are not likely to change if children and/or relatives are also wage earners in a household.

Although this research did not directly model the residential location choices of dual-earner or single-earner households, they were indirectly evaluated in the context of commuting behaviors of both types of households. This research does not deny that the location decisions of dual-earner households are similar to those of single-earner households, as Madden (1981) argued, especially when both spouses have part-time jobs. Wives working part-time find jobs closer to their residential location, either because their earnings do not justify long commutes or because it gives them time to take on household responsibilities. However, location decisions for economically compatible dual-earner households are slightly different, as wives' commutes are significantly greater; hence, it suggests that when husbands and wives both work full-time they are constrained in minimizing their commuting time, which is consistent with Green's (1997) findings. Nonetheless, however, the average commute time for dual-earner families does not exceed that of single-earner households. Shorter commuting times of dual-earner households

reflect the fact that accessibility to both work and home might emerge as crucial factors in locational decision-making among dual-earner households (Green, 1997). Since dual-earner families face more time constraints, their residential location might be based on proximity to work to free up enough time for the family.

Finally, this research suggests that housing value, an indirect measure of income, is more important for explaining commuting time than is household structure. Families are not able to economize on commuting times when housing prices do not match their affordability levels, an essential requirement for the job-housing balance concept. As reflected by the observed relationships between commuting time and housing value, dual-earner families are actually the most privileged to trade off their housing cost with their commuting burden, because they have a wider array of alternative housing choices. Typically, families can reduce much of their commuting time if they can afford to live in housing priced well above the median value for metropolitan Atlanta. This is consistent with a report in the *Atlanta Journal-Constitution* (Cauley, 1998) which found that wealthier families preferred to live in the northern sector of the region, in affluent areas such as Sandy Springs, Dunwoody, or North Fulton County. These suburbs are close to Atlanta as well as to the Perimeter Center and Cumberland-Galleria edge cities, and offer many amenities as well as good schools (both public and private; Cauley, 1998). But, many middle-income workers cannot afford to live in those suburbs because of their extremely high housing values. As a result, more single-earner households may tend to choose residential locations in more distant suburbs, such as those in Gwinnett County or Coweta County, which are less expensive but also contain good schools (Sultana, 2002). In recent years, this has produced a substantial increase in reverse commuting from the southern suburbs through and around Atlanta to the northern suburbs (in where 60% of the regional jobs are now located. Cartographic evidence (Fig. 2) also suggests the longest commutes for single-earner households are found in these suburban locations. Thus the transportation costs are simply overshadowed in importance by the need for affordable housing, which is consistent with the jobs-housing balance concept. Affordability must therefore be a major consideration in locational and mobility decisions for single-earner families, because this study found a negative relationship between commuting time and household income for such families.

These research findings are consistent with earlier studies that argued that the imbalance between the cost of housing and workers' housing affordability is one of the most important factors in shaping the residential location choices of families in a city (Cervero, 1989; Sultana, 2002). Therefore, it is a lack of affordable housing near job locations, not the presence of dual-earner households, that should be blamed for lengthening commuting time and impeding the implementation of job-housing balances in metropolitan areas.

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