

<sup>1</sup> **Unpacking Household Budgeting Strategies through a  
2 Transportation Lens**

<sup>3</sup> **Kamryn Mansfield<sup>1</sup>, Katie Asmussen<sup>2</sup>**

<sup>4</sup> <sup>1</sup>University of Tennessee,

<sup>5</sup> <sup>2</sup>University of Tennessee,

6      **Abstract**

7      This is where we will put our abstract.

8      **Plain Language Summary**

9      This is a plain language summary

10     **1 Introduction**

11    Households juggle how to allocate their budgets: whether to invest in a reliable car,  
 12    pay for quality childcare, secure housing in a good school district, or set money aside  
 13    for leisure. These everyday choices shape how families live and move, reflecting the  
 14    trade-offs they make to balance competing priorities. Transportation often sits at  
 15    the center of these decisions, not only because it can be a significant expense, but  
 16    also because choosing to buy and maintain a car versus relying on public transit  
 17    represents a long-term commitment and a broader lifestyle choice. Its relative weight  
 18    compared to housing, childcare, and other spending varies widely across families.  
 19    The relationship between household budgeting and mobility is shaped not only by  
 20    causal direction but also by how families prioritize and weight different needs. On  
 21    one hand, mobility resources such as car ownership can structure the household  
 22    budget: households with no or only one vehicle may spend far less on transportation,  
 23    freeing up income for other essential or discretionary categories. On the other hand,  
 24    underlying family structures and preferences can drive budget allocation choices  
 25    that, in turn, shape transportation behavior. Larger families may prioritize child-  
 26    care or invest in higher-quality housing in areas with better schools, limiting what  
 27    remains for transportation. Others may emphasize frugality across all categories or  
 28    deliberately substitute toward lower-cost transit options. Understanding both the  
 29    direction of influence and the weight assigned to different budget categories is critical  
 30    for transportation planning and policy, as these dynamics reveal how families navigate  
 31    competing priorities under varying demographic and mobility contexts.

32    The purpose of this research is to explore how household budgets are structured  
 33    around transportation decisions and how this impacts other spending categories.  
 34    Using the Consumer Expenditure Survey (CEX), we will perform a Latent Class  
 35    Analysis (LCA) to find groupings based on a household's transportation expenses.  
 36    These groupings can help us find groups of spenders with similar patterns to help us  
 37    predict transportation expenses based on the household's characteristics.

38     **2 Literature Review**

39    The literature relating to this study has been classified into four groups: (1) Family  
 40    Choices and Activity Patterns, (2) Family Transportation Choices, (3) Family Spend-  
 41    ing and Budgets, and (4) Family Transportation Budgets. The following sections  
 42    describe the relevant findings from literature in each of these groups.

43     **2.1 Family Choices and Activity Patterns**

44    There have been many studies done on the choices and activities of families (Rachel B.  
 45    Copperman & Bhat, 2007b; Leung et al., 2019; Sener et al., 2008; see Sener & Bhat,  
 46    2007). These studies often focus on the activities choices of households and children.

47    Paleti et al. (2011) performed a study where they wanted to characterize the activity  
 48    patterns of children after school. Their data were gathered from the Child Devel-  
 49    opment Supplement to the Panel Study of Income Dynamics which has household  
 50    demographics and time-use diaries for children. They looked at travel patterns  
 51    using combinations of three activity-travel scenarios: staying at school, going home  
 52    from school, and going somewhere else after school. They further identified specific  
 53    after-school activities (e.g. Organized activities at school, recreation at the home  
 54    of someone else, meals at restaurants, etc.) to use in a multiple discrete-continuous  
 55    extreme value (MDCEV) model. The MDCEV is a type of discrete choice model

56 that works when multiple options can be chosen, and was used to find predictors of  
 57 children's participation in the different after school activities. In their analysis, they  
 58 found that 57.7% of children in the survey participated in at least one out-of-home  
 59 activity after school. They also found that children's activities were connected to  
 60 household income, family dynamics, environment, and other things. For example,  
 61 children in households with higher income were more likely to participate in activities  
 62 after school. Children with no siblings along with children having a working primary  
 63 caregiver were more likely to stay at school or go somewhere besides home directly  
 64 after school. Children living close to a large city were less likely to go somewhere after  
 65 school, go home, and then go back out. The findings of this study show the variety of  
 66 factors that might affect a family's activity, and therefore transportation, patterns.

67 Another study on family choices was done by Bernardo et al. (2015). They used the  
 68 American Time Use Survey and a Multiple Discrete Continuous Nested Extreme  
 69 Value (MDCNEV) model to examine the activities of dual-earner households<sup>1</sup>. The  
 70 variables they used relate to household demographics, respondent demographics,  
 71 couple characteristics, and day of the week. Findings indicated that women are more  
 72 likely to participate in out-of-home maintenance, shopping, and social activities than  
 73 men. They also found that respondents with higher education and with children are  
 74 more likely to work from home. One key finding of this study is that couples with  
 75 children are much less likely to participate in out-of-home, non-work activities.

## 76 **2.2 Family Transportation Choices**

77 Among the studies on family choices is a group of studies that focus on family trans-  
 78 portation choices (Amirnazmiafshar & Diana, 2022; Rachel B. Copperman & Bhat,  
 79 2007a; Lu et al., 2022; Souche, 2010). These studies look at the connection between  
 80 family mobility and family decisions.

81 McCarthy et al. (2017) is a literature review with some good findings, but I don't  
 82 know if I should site the literature review or if I should find individual papers from  
 83 the review to talk about.

84 A unique study to understand the effects car ownership has on household decisions  
 85 was done by Nicholas Klein (2024). In order to understand how access to a car  
 86 can effect a family in the United States, he interviewed 30 people in Maryland and  
 87 Virginia who received a subsidized car. Two main findings of this study relate to  
 88 travel behavior changes and access to opportunities. The people interviewed generally  
 89 changed their travel behavior in similar ways after receiving a car. Before receiving  
 90 the car, they would rely on public transit and others for transportation, but after  
 91 receiving a car, they made many trips in their own cars, including some trips that  
 92 they had to forgo before having a car. Another general conclusion Klein makes is that  
 93 people had more access to opportunities after receiving a car. They had easier access  
 94 to more potential jobs, but some also mentioned the ability to get more hours at the  
 95 their current jobs. With less reliance on public transit, many respondents spent more  
 96 time with their families at the beginning and end of the day.

97 Another study interested in car ownership was done by @bilgin\_investigating\_2025.  
 98 They analyzed car ownership across multiple years using the United Kingdom  
 99 Household Longitudinal Study dataset to see if ridesourcing availability affects car  
 100 ownership. They used two fixed effects logit models: one to model the effect of  
 101 ridesourcing on the decision to increase the number of cars in the household and the  
 102 other to model the effect of ridesourcing on the decision to decrease the number of  
 103 cars in the household. Their results suggested that households with more than one car  
 104 are more likely to get rid of a car and less likely to add a car compared to households  
 105 with one car. Even with this tendency, their models did not show a strong connection

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<sup>1</sup> This is just me making sure I understand how to put a footnote here.

106 between the presence of ride sourcing and changes in car ownership. They concluded  
 107 that changes in household composition have a stronger impact on the change in  
 108 number of cars of a household.

### 109 **2.3 Family Spending and Budgets**

110 Another set of studies focuses on household budgets and household spending patterns  
 111 (Fontes & Fan, 2006; Nayga, 1998; Sabelhaus et al., 2013; Skinner, 1985). Many of  
 112 the studies reviewed had an emphasis on the budgets related to raising children.  
 113 Hargunani et al. (2024) analyzed family spending patterns in Mumbai and concluded  
 114 that many families focus their expenditures on the current and future wellbeing of  
 115 their children. This is evidenced by money spent on basic necessities and setting aside  
 116 money for the future.

117 The United States Department of Agriculture (USDA) has produced reports that use  
 118 the CEX to specifically analyze the costs of raising a child in the United States. The  
 119 most recent report (Lino et al., 2017) found the top expenditure for married-couple  
 120 families with two children to be housing. The rankings of other expenditures were  
 121 different depending on the age of children, but food, child care/education, and trans-  
 122 portation were always the next highest expenditures on children. Similar to the USDA  
 123 report on the cost of raising children, Osborne et al. (2021) modeled the cost of  
 124 raising children in Texas by following similar methodologies but using Texas-specific  
 125 data for housing and childcare costs. They looked not only at married-couple families,  
 126 but also at single-parent households and dual households where children spend time  
 127 with both parents in different locations. They found differing expenditures on children  
 128 among the different family make-ups and among different incomes.

129 Other studies with similar analyses have had similar findings. @hastings\_parental\_2022  
 130 used the CEX to compare expenditures between different racial and ethnic groups.  
 131 When controlling for both family characteristics and income, he found that there was  
 132 not a significant difference in total expenditures on children among racial and ethnic  
 133 groups. This suggests that income and family characteristics play a larger role in  
 134 family budgeting than race and ethnicity. Duncan et al. (2023) performed a study in  
 135 Canada using the country's Survey of Household Spending (SHS) to analyze family  
 136 expenditures. They found similar results as previously mentioned studies. Different  
 137 income groups had different amounts allocated to children, but housing was always  
 138 the highest expenditure with food, child care/education, and transportation being the  
 139 next highest expenditures.

### 140 **2.4 Family Transportation Expenses and Budgets**

141 There have been many studies on family budgets and transportation expenses (Blu-  
 142 menberg, 2003; Choo et al., 2007; Ferdous et al., 2010; Haas et al., 2008; Hong et al.,  
 143 2005; Morris & Wigan, 1979; Thakuriah (Vonu) & Liao, 2006).

144 One study focused on transportation budgets was done by Thakuriah & Liao (2005).  
 145 Using CEX data, they made multiple models to analyze the expenditures related  
 146 to vehicle ownership of households in the United States. In each model, they used  
 147 a variety of variables (income, household demographics, spatial factors, economic  
 148 factors, and family condition factors) to predict the amount of money a household  
 149 spends on vehicles. Their model results indicate 18 percent of additional household  
 150 expenditures is a vehicle expense. They results also indicate many factors influence  
 151 household vehicle expenses. The models showed that homeowners spend more on  
 152 vehicle expenses. They also showed that vehicle expenses are connected with the sex  
 153 of the head of household and the number of people in the household.

154 Deka (2015) - More housing costs = more transportation costs, people who take transit  
 155 spend less on transportation

156 Mattson (2020) Mattson & Peterson (2019) - single family homes spend more on  
 157 transportation, higher income is correlated with higher transportation costs. - denser

158 areas are more likely to use transit to commute. People in single-family homes tend to  
 159 spend more money on transportation

160 Molloy et al. (2024) - “Captive Riders” have less spending allocated to transportation  
 161 than captive drivers.

162 Bureau of Transportation Statistics (2024) - Lots of summaries

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