Unpacking Household Budgeting Strategies through a Transportation Lens

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Abstract

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Plain Language Summary

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1 Introduction

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

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

2 Literature Review

The literature relating to this study has be classified into four groups: (1) Family Choices and Activity Patterns, (2) Family Transportation Choices, (3) Family Spending and Budgets, and (4) Family Transportation Budgets. The following sections describe the relevant findings from literature in each of these groups.

2.1 Family Choices and Activity Patterns

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

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

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

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

2.2 Family Transportation Choices

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

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

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

Another study interested in car ownership was done by @bilgin_investigating_2025. They analyzed car ownership across multiple years using the United Kingdom Household Longitudinal Study dataset to see if ridesourcing availability affects car ownership. They used two fixed effects logit models: one to model the effect of ridesourcing on the decision to increase the number of cars in the household and the other to model the effect of ridesourcing on the decision to decrease the number of cars in the household. Their results suggested that households with more than one car are more likely to get rid of a car and less likely to add a car compared to households with one car. Even with this tendency, their models did not show a strong connection between the presence of ride sourcing and changes in car ownership. They concluded that changes in household composition have a stronger impact on the change in number of cars of a household.

2.3 Family Spending and Budgets

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

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

Other studies with similar analyses have had similar findings. @hastings_parental_2022 used the CEX to compare expenditures between different racial and ethnic groups. When controlling for both family characteristics and income, he found that there was not a significant difference in total expenditures on children among racial and ethnic groups. This suggests that income and family characteristics play a larger role in family budgeting than race and ethnicity. Duncan et al. (2023) performed a study in Canada using the country's Survey of Household Spending (SHS) to analyze family expenditures. They found similar results as previously mentioned studies. Different income groups had different amounts allocated to children, but housing was always the highest expenditure with food, child care/education, and transportation being the next highest expenditures.

2.4 Family Transportation Expenses and Budgets

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

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

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

Mattson (2020) Mattson & Peterson (2019) - single family homes spend more on transportation, higher income is correlated with higher transportation costs. - denser areas are more likely to use transit to commute. People in single-family homes tend to spend more money on transportation

Molloy et al. (2024) - "Captive Riders" have less spending allocated to transportation than captive drivers.

Bureau of Transportation Statistics (2024) - Lots of summaries

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