An economy, at its core, consists of people doing things. People work and play, eat and drink, create and think, and all the while perform activities both measured and unmeasured that nonetheless provide value to themselves, their families, and society at large. Within this structure, the most fundamental unit of our modern economy is the household, which consists of at least one consumer who spends time consuming some positive amount of net resources. This consumer may also spend time supplying labor or investing in new ideas or various speculative enterprises so that he can afford his desired consumption level. Even if he does not work or invest, he still must consume in order to ensure his sustenance and continued living. Thus, while the consumer comprises the core unit of the modern economy, it is consumption itself which is the economy's most central activity. In the United States, consumption amounts to almost 70% of all output. To better understand the many important factors that drive broad aggregate economic outcomes, it behooves us to study the behavior of individual consumers themselves.

A goal of mine as a researcher is to continue working to expand the frontier of knowledge pertaining to the motivations and outcomes of household behaviors. And while this thesis does not reflect all of my economic research projects currently underway, it does fully reflect the variegated flavors of the questions and puzzles I consider. Here, I focus on two particular frontiers in household economic research. In Chapters 1 and 2, along with co-authors, I consider how the allocation of off-market time directly affects consumption, savings, the labor supply, and aggregate growth. In Chapters 3 and 4, along with co-authors, I apply theories from behavioral economics, like mental accounting and the non-fungibility of various forms of liquidity, to explore the high-frequency spending and savings patterns of individual consumers. While the first two chapters consider how mechanisms behind household decisions drive macroeconomic outcomes, the latter chapters deal with granular, microeconomic behavior. This thesis thus represents the breadth of my many research interests spanning both macro- and microeconomics.

Since Becker (1965) economists focusing on household decisions have grappled with the classic consumption/leisure tradeoff in various applications. However, rich decision structures, like Becker's original theoretical model featuring multiple off-market time utilization decisions, have been only minimally explored. Data limitations may be to blame: in the United States quality time use data has only been available since 2003, while other developed countries lack a comprehensive time use survey of households. Still though, we can gain further insight into many well-established economic puzzles, like the reason for the rise in the U.S. services share I explore in Chapter 1, or the decline in long-run U.S. GDP growth I explore in Chapter 2, among others, by examining these phenomena in model environments where households face rich, previously unexplored time use decisions.

Chapter 1 features joint work with co-author William Bednar. We consider an application of a home production model toward United States structural change where households decide how much time to spend consuming various market purchases. In the context of our problem, structural change is the process by which the share of consumption devoted toward intangible services has risen while the share of
consumption devoted toward physical, manufactured goods has fallen. There is contentious debate in the literature as to whether supply-side factors or demand-side factors have driven the rise in the services share of aggregate output. Income effects from non-homothetic consumer preferences have been touted as a primary contributor. We test this implication in a model that accounts for consumers' joint consumption and off-market time allocation decisions. When accounting for time to consume in this manner, we show that homothetic utility functions can still generate non-linear expansion paths as wages increase. In the model, differences in the time intensities of different home production activities affect how consumers adjust their consumption allocation in response to relative price and real wage changes. Our findings suggest that the rise in the U.S. services share since 1948 is primarily due to relative price changes which dominate income effects from wage growth, contrasting with many findings in the literature.

In Chapter 2, I work with co-author Finn Kydland to address how population aging will impact aggregate GDP growth when accounting for the time working-age adults spend caring for their elders. As the population of the United States ages, the number of elderly people who require living assistance is increasing. To understand how this impacts aggregate output, we calibrate an overlapping generations model where growth endogenously depends on the care young agents choose to provide for their parents. Relative to an economy with a constant population distribution, we project that population aging will reduce GDP 17% by 2056 and 39% by 2096. Curing old-age diseases such as Alzheimer's and dementia can lead to 5.4% higher output relative to the baseline, while improving welfare for consumers of all ages.

The mental accounting theories of Richard Thaler have inspired a generation of behavioral scientists to reconsider how consumer behavior departs from predictions of classic economic models of rationality. Until recently, Thaler’s theories have been largely isolated to applications in experimental and other controlled settings. Further, there lacks broad consensus as to what types of behavior exactly correspond to mental accounting. In Chapters 3 and 4, along with co-authors Alan Montgomery and Christopher Y. Olivola, I apply Thaler’s various theories of mental accounting to transaction-level field data from consumers’ bank balance ledgers. Generally, we seek to understand the degree to which mental accounting behavior is actually observed in consumption spending data and also the degree to which including flexible, behavioral features like mental accounting can improve the fit and predictions of structural models of demand.

In Chapter 3 we construct a unifying theory of two stage budgeting and mental accounting in order to reconcile heterogeneity in consumer-level weekly spending and savings patterns. Mental accounting and rational inattention induce behavioral wedges between first stage expenditure budgets and second stage actual expenditure. Specifically, consumers engage in Gabaix (2014) sparse maximization, re-assessing only a subset of their spending budgets every period. Over or under spending affects future budgeting and expenditure decisions. With agent-level weekly expenditure data, we use latent Bayesian inference to structurally estimate the degree to which low-income consumers appear constrained by mental accounting frictions. We find that consumers optimally set only 25-50% of first stage budgets each period. A sparse max model with mental accounting fits the data best, compared to alternative models without one and/or the other. In a counterfactual experiment, relaxing rationality constraints leading to greater budget attentiveness is not necessarily welfare improving if consumers can easily adjust budgets on the fly to mitigate the disutility of over expenditure. We are the first to estimate the structural parameters and latent decisions of a two stage budgeting model with sparse maximization and mental accounting. In doing so, demand shifters in our estimation are endogenous, resulting from behavioral frictions.

In the final chapter I engage in a second application of mental accounting theory to explore empirical evidence that consumers use liquidity from debit cards and credit cards differently. Thaler (1999) describes one of the primary components of mental accounting as the budgeting of specific utility-providing activities which can depend on the resources used to fund those activities. The analysis presented in this chapter focusses on household expenditure of durable and non-durable goods and the liquidity sources used to fund these different expenditures. Specifically, we exploit a linked dataset of credit and debit card users to
examine consumer purchasing patterns of durable and non-durable consumption commodities under both methods of payment. Our findings suggest that on average durable purchases are more sensitive to increases in available credit than non-durable purchases, and most consumers are more likely to increase total consumption due to increases in available credit than increases in available checking account balances. We empirically show that the standard neo-classical consumption/savings model, the equilibrium conditions of which implicitly assume that the household's available resources (liquidity and investments) are perfectly fungible, fails to rationalize our data for the median/modal consumer in our sample. However, our results are rich because we also show that the behavioral distribution of consumers includes both households which treat liquidity as fungible and those that do not. Given the heterogeneity we find, future work should test whether these results would matter on aggregate.