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How consumers budget☆

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ABSTRACT

Although budgeting is widely considered a common method of managing household finances, surprisingly little is known about the budgeting process. Using a nationally-representative survey (N=3,826) of US adults, we examine budgeting behaviors and beliefs, including who budgets and why, how individuals categorize consumption, and how they adjust their behavior after over- or under-spending. We identify five facts that illuminate key features of budgeting and supplement findings with administrative data (N=194,678) from a large financial institution in Australia. Understanding systematic patterns in how individuals and households budget can serve a critical role in informing economic models of consumption-savings behavior.

1. Introduction

Many people engage in some form of budgeting to manage their everyday finances. They set spending limits for different categories of consumption, use budgeting tools to monitor their spending, and adjust these limits in response to exceeding or underspending their budgets. In traditional economic models, budgeting plays a limited role. However, theoretical work suggests that the *practice* of budgeting—the process by which people set and manage their budgets—can meaningfully affect consumption patterns (Thaler 1985, 1999; Galperti 2019; Kőszegi and Matějka 2020). Consequently, understanding systematic patterns in how individuals and households budget may serve a critical role in informing economic models of consumption-savings behavior. Yet, empirical evidence identifying these patterns is surprisingly limited.

In this paper, we present new descriptive evidence on budgeting behaviors and beliefs using data from a survey we administer to a nationally-representative panel of U.S. residents. We focus on features of budgeting behavior that may be

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particularly relevant for models of consumption-savings behavior and document five new facts that can inform future research on budgeting and consumption.

First, budgeting is highly prevalent across the income distribution, even when liquidity is relatively high. Across our full sample, roughly 65.6 percent of respondents report that they currently budget, either formally or informally. Of those who don't currently budget, over 42.2 percent report having budgeted at some point in the past. Low-income individuals are only slightly less likely to report that they currently budget than high-income individuals, even after accounting for several measures of liquidity. This empirical pattern challenges the notion that people are only motivated to budget when faced with financial strain and suggests that the reasons for budgeting extend beyond the present state of a household's balance sheet.

Second, the frequency at which individuals assess the state of their current spending relative to their intended budgets varies substantially and is highly correlated with financial wellbeing. While the propensity to budget is positively correlated with financial wellbeing, we find that, conditional on budgeting, the frequency at which respondents check their budgets is *negatively* correlated with financial wellbeing. In particular, the evidence we find suggests that negative financial information may discourage people from budgeting to begin with. However, conditional on choosing to budget, people appear to rationally attend to their finances. This finding is consistent with prior work demonstrating that individuals selectively pay attention to financial information (Karlsson et al. 2009; Olafsson and Pagel 2022).

Third, nearly all individuals who budget do so by tracking their spending within distinct categories of consumption. While the use of "budgetary categories" has long been recognized, the prevalence and nature of such categories is largely unknown.[1] We find that over 90 percent of individuals who budget report doing so using budgetary categories. Recent studies suggest that individuals fail to treat funds as fully fungible across such budgetary categories (Hastings and Shapiro 2013, 2018; Zhang and Sussman 2018). This non-fungibility in combination with the widespread use of budgetary categories that we document may have important implications for the way that aggregate demand responds to economic shocks (Lian 2022; Heath and Soll 1996).

Fourth, there is wide heterogeneity in the level of granularity at which individuals categorize. For instance, some simply distinguish necessities from discretionary spending, while others maintain separate categories for internet, water, and gas utilities. This heterogeneity is present regardless of whether survey respondents are asked to describe the current budget they keep or the budget that they think they should keep. This fact presents a key challenge to theoretical efforts to construct unifying models of budgeting behavior. Any such model must not only be general enough to capture the widespread use of budgetary categories but must also be flexible enough to allow for differences in how broadly or narrowly individuals categorize their spending.

Fifth, individuals respond asymmetrically when faced with too little versus too much slack in their budgets. While more than 85 percent of respondents would either adjust their spending or update their spending limits if they overspent within a budget category, less than 30 percent would make such changes if they underspent their limit. In other words, people appear to update their budgets conservatively. This asymmetry suggests that households budget in order to constrain (often category-specific) spending rather than simply as a means of tracking spending over time.

Together these findings illuminate several important features of budgeting behavior that are largely absent from traditional economic models but may meaningfully affect consumption decisions. In the last section of the paper, we supplement our survey results with further evidence from administrative data provided by a large financial institution in Australia. While we cannot directly link this administrative data with the intended budgets of the customers of the financial institution, the data allows us to examine the extent to which their financial behavior reflects the patterns we observe in the survey data. We focus our attention on the two facts for which we have the closest analogues within the administrative data. First, we directly examine the relationship between engagement with online and mobile-app account management features (as a proxy for attention to finances) and objective measures of financial wellbeing derived from customer bank records. Results from this exercise are consistent with our second fact that, conditional on engagement, attention to finances and financial wellbeing are negatively correlated. Second, we use this data to examine the extent to which customers segregate their spending across payment methods. Our evidence indicates substantial segregation of spending across payment methods, consistent with tracking spending within specific categories of consumption.

Our paper contributes to a small but growing empirical literature examining the characteristics and determinants of household budgeting behavior. Much of the existing empirical literature comes from fields outside of economics and has tended to either focus on specific budgeting practices in isolation, often within laboratory settings, (Heath and Soll 1996; Cheema and Soman 2006; Ulkümen et al. 2008; Soman and Cheema 2011; Choe and Kan 2021) or has drawn conclusions from in-depth interviews with relatively small, non-representative samples (Davis and Carr 1992; Muske and Winter 2001; Halpern-Meekin et al. 2015; Morduch and Schneider 2017). Within economics, the literature has focused more heavily on long-term financial planning, such as the role of retirement planning for wealth accumulation (Ameriks et al. 2003; Lusardi and Mitchell 2007; Binswanger and Carman 2012). By comparison, relatively little attention has been given to more short-term budgeting behavior. In recent years, several studies have taken advantage of data from online platforms and financial apps where direct short-term budgeting practices can be observed or inferred. Such practices include tracking and paying

[1] Early references describe households separating cash into different envelopes, pitchers, or tin cans (see, for example, Rainwater et al. 1959; Thaler 1985; Zelizer 2017).

down debt (Kuchler and Pagel 2021), saving for specific goals (Gargano and Rossi 2022), and tracking spending against self-designated limits for various budget categories (Lukas and Howard 2022).

Our paper differs critically from the prior empirical literature on budgeting in two important ways. First, we draw from a large and nationally-representative sample of individuals in the U.S. While our survey data has the limitation of relying on self-reported budgeting practices, the representativeness it affords allows us to examine key empirical patterns across a broad spectrum of individuals. This stands in contrast to existing work, which often focuses only on those who are relatively financially strained or have selected into using a particular financial app or online platform. Second, our paper examines a wide range of budgeting practices and beliefs rather than studying a specific practice in isolation. This broader focus allows to provide a more comprehensive view of who budgets, how they budget, and their reasons for doing so.

The current work also relates to the growing literature focused on deviations from benchmark models of consumption and savings behavior (see Beshears et al. 2018 for an overview). One key strand of this literature examines the potentially important role of mental accounting in explaining consumption behavior (Thaler 1985, 1999). Recent empirical work has provided evidence consistent with the use of category-specific "mental budgets" across which funds are treated nonfungibly (Heath and Soll 1996; Hastings and Shapiro 2013, 2018). Theoretical efforts in this area have attempted to model these mental budgets and the processes by which they are formed (Galperti 2019; Kőszegi and Matějka 2020). Our work adds to this literature by documenting features of budgeting behavior that can speak to and help distinguish between theoretical models of mental budgeting and consumption-savings behavior.

Finally, our paper also contributes to the important literature studying the role of (in)attention in explaining financial behavior (Karlsson et al. 2009; Gherzia et al. 2014; Sicherman et al. 2016; Dierick et al. 2019; Levi and Benartzi 2021; Olafsson and Pagel 2022). We add to this literature by documenting new facts about the degree to which people pay attention to their budgets and the relationship between this attention and various measures of financial wellbeing.

2. Survey description

To explore households' budgeting behaviors and beliefs, we recruited a nationally-representative sample of respondents from Lucid, an online platform used to carry out surveys and experiments (see Coppock and McClellan 2019). We informed respondents that we were interested in learning about how people budget and that they would be asked a series of questions about their budgeting process. Respondents who reported having experience with budgeting were asked to provide survey responses with their current (or most recent) budgeting process in mind while respondents who reported having never budgeted were asked to respond based on the budget they think they would keep if they were to start budgeting. We intentionally did not provide a specific definition of budgeting so that we could elicit responses based on what respondents believe budgeting to be. Instead, we asked people to provide additional details on their budgeting process in the survey itself. Our survey questions fall into three broad areas of inquiry.

- **Who Budgets.** We asked respondents whether they budget and their main reasons for budgeting or not budgeting. For those not currently budgeting, we also asked whether they believed they should be. We asked how unpleasant they considered budgeting to be and why they considered it unpleasant if they did. We also assessed financial wellbeing along several dimensions and whether respondents believe budgeting to help with being more financially prudent when spending.
- **Setting a Budget.** We asked all respondents if they budgeted (or would budget) formally or informally and about the tools and resources they use when creating a budget and when determining potential spending limits. We further asked whether respondents segregated their funds using different formal financial accounts, credit cards, or any other physical means of grouping funds separately. We also asked the time horizons over which they budget, their use of budgeting categories for tracking their spending, and the malleability of these categorizations.
- **Managing a Budget.** We asked respondents about how frequently they assess the current state of their budget, how often they update their budget and why, how much effort they believe they put in to staying within their budget, and how guilty they feel if they fail to do so. We also asked how they adjust their budgets in response to an unusual expense or to having too much (little) slack in their budgets.

In addition to questions within the three areas above, we collected demographic information for our survey respondents. We also measured respondents' tendency to treat money as non-fungible by collecting responses to variants of two classic tests of mental accounting behavior: the "lost ticket-cash problem" and the "calculator-jacket" problem (Tversky and Kahneman 1981). Details on the exact language used for our survey questions can be found in Appendix C.

We took several steps to ensure the validity of our survey responses. First, we included an attention check to filter out respondents who may be skipping mindlessly through the survey. Second, to filter out respondents who may be making up responses, we included the same demographic question—how many children are in your household—twice in the survey and excluded those who provide inconsistent responses. From this sample of 3893 respondents, we further excluded 38 respondents who provide inconsistent responses to the question of whether it would be a big deal if they were to go [5/50] dollars over their budget and 29 respondents who failed to respond to the question of whether they budget. We are left with a final analysis sample of 3826 survey respondents.

A natural concern is the representativeness of our sample given that it is collected from an online panel of respondents. Table 1 presents descriptive statistics on key demographic and economic characteristics for our sample. In Appendix Table

Table 1
Survey summary statistics.

	(1)	(2)	(3)	(4)
	Full Sample	Currently Budgets	Budgeted in Past	Never Budgeted
	Panel A. Demographic Characteristics			
Age Brackets				
18–24 yrs	10.2	9.4	9.4	13.5
25–34 yrs	20.9	23.6	18.2	14.0
35–44 yrs	19.8	21.1	20.3	15.0
45–54 yrs	17.7	16.8	20.3	19.0
55+ yrs	31.4	29.1	31.8	38.5
Female	53.5	52.6	56.3	54.5
Employment Status				
Student	4.2	3.7	3.4	6.4
Part-time	14.2	13.9	15.6	14.0
Full-time	42.1	46.6	37.4	30.6
Work at home w/o pay	5.7	5.7	5.9	5.6
Not currently employed	33.7	29.9	37.6	43.0
Education				
High-school degree or less	24.8	22.8	25.0	30.8
Some college	25.7	24.5	29.3	27.0
Associate's degree	12.6	13.6	11.5	10.4
Bachelor's degree or more	36.9	39.1	34.2	31.8
Lives with spouse/partner	57.1	58.3	58.5	52.2
Number of children	0.7	0.8	0.7	0.5
	(1.1)	(1.1)	(1.1)	(1.0)
	Panel B. Household Balance Sheet Information			
Household Income Brackets				
< 20K	17.7	16.9	17.1	20.9
20K - 30K	12.8	12.4	12.4	14.2
30K - 40K	11.4	10.5	15.3	11.3
40K - 50K	9.7	9.6	11.9	8.3
50K - 60K	10.5	11.4	9.2	8.4
60K - 70K	7.3	7.6	5.4	7.9
> 70K	30.7	31.5	28.8	29.1
Amount of Assets				
< $250	27.4	23.3	35.3	35.0
$250 - $499	5.8	6.0	6.5	4.9
$500 - $999	7.2	7.7	4.9	7.1
$1000 - $4999	13.9	15.4	11.5	10.8
$5000 - $9999	8.2	9.2	7.7	5.4
$10,000 - $49,999	12.1	12.9	10.1	11.0
$50,000 - $99,999	7.8	8.6	6.1	6.4
> $100K	17.5	16.8	18.0	19.2
Amount of Debt				
< $250	24.8	23.2	21.6	32.2
$250 - $499	3.0	3.5	2.0	2.1
$500 - $999	5.1	5.3	5.8	4.3
$1000 - $4999	14.4	14.7	16.0	12.3
$5000 - $9999	10.6	10.6	12.2	9.3
$10,000 - $49,999	19.8	19.9	18.3	20.5
$50,000 - $99,999	8.0	7.8	9.5	7.3
> $100K	12.9	13.6	13.1	10.8
Number of Participants	3,826	2,508	556	762

Note: This table presents descriptive statistics for the full sample of survey respondents (column (1)) as well as restricted samples of respondents who report currently budgeting (column (2)), having budgeted in the past (column (3)), and having never budgeted (column (4)). All table entries represent sample means or standard deviations (in parentheses). The count of respondents are listed in the final row.

A.1, we benchmark these characteristics against other external data sources, specifically the American Community Survey (ACS) and the Current Employment Statistics (CES) survey.[2] We find our sample to align fairly well with the broader U.S. population, though there are some differences. In particular, our survey appears to be slightly higher income, with relatively more individuals in the $20,000 to $50,000 income range and relatively fewer individuals with less than $20,000 in income.

[2] Our sample of survey participants was recruited in 2018. However, the most recent full-population decennial Census, as of the time of our survey, took place in 2010. For this reason, we include both the 2010 ACS and the 2018 ACS in Appendix Table A.1 for reference.

Consistent with this, our sample also appears to sample disproportionately more from higher-educated individuals. To the extent that we observe meaningful differences in budgeting behavior or beliefs by household income, we highlight those differences in the discussion of our findings.

3. Budgeting behaviors and beliefs

3.1. The propensity to budget

Informal financial advice often encourages households to budget, and an increasing number of financial products and offerings by financial institutions are designed to facilitate the budgeting process. We begin by determining how widespread the practice of budgeting is. As previously described in Section 2, we measure budgeting behavior by asking respondents to classify themselves into one of three types based on which description most closely aligns with their behavior: I currently keep a budget, I have previously kept a budget but do not currently budget, and I have never kept a budget.

We find that the practice of budgeting is quite prevalent. As Table 2 shows, roughly 65.6 percent of respondents report that they currently budget, and of those who don't currently budget, over 42.2 percent report having budgeted at some point in the past. Turning to the demographic characteristics of respondents, we find that the propensity to budget does not differ by gender but does vary with age, exhibiting a hump-shaped profile over the life-cycle. The propensity to budget is also greater for those with higher levels of education, who are currently employed, and who live with a spouse or partner.

We next examine how the propensity to budget varies by income and wealth. If households budget primarily in response to facing financial strain, we might expect those with limited financial resources to be more likely to budget. Instead, as Table 2 shows, budgeting remains highly prevalent across the income distribution, and in fact increases slightly with income. Moving from the lowest to highest income range is associated with a statistically significant 5 percentage point increase in the likelihood that a respondent reports currently budgeting. We see a similar increase in the likelihood of reporting budgeting when moving across the distribution of household assets, though there is some evidence of non-monotonicity at the highest asset levels. The prevalence of budgeting even among those with higher levels of income and wealth suggests that people's motives for budgeting extend beyond simply the present state of their balance sheet.

To explore these motives more directly, we asked respondents who currently budget to identify their main reasons for budgeting. They could select one of multiple reasons from the following list: 1) to save for long-term goals (e.g., retirement), 2) to save for short-term goals (e.g., a new computer), 3) to avoid debt from predictable overspending 4) to get myself out of debt (e.g., repaying credit card debt), 5) to avoid debt from unforeseen expenses (e.g., an unexpected hospital visit), 6) to make sure that I can provide for my family, and 7) to make sure I don't spend more than my income.[3] Fig. 1 presents the frequency of each of these reasons for the set of respondents who report that they currently budget, both in aggregate as well as disaggregated by household income.

Several interesting empirical patterns emerge from this figure.[4] First, the desire to avoid overspending one's income is by far the predominant reason why respondents budget. Nearly three-quarters of respondents who currently budget indicate that they budget for this reason. Second, this motivation for budgeting does not appear to vary substantially with income or wealth. In other words, concerns about overspending do not appear to reflect an individual's current financial state. One potential explanation for this finding is that these concerns are instead a reflection of an individual's "type." For example, evidence documented across several studies links budgeting to problems with self-control (Thaler 1999; Ameriks et al. 2003; Galperti 2019). Third, the likelihood that respondents identify saving for future goals as a motivation for budgeting increases in income and wealth, and this relationship is significantly starker for long-term goals than for short-term goals. Higher-income individuals are nearly 2.5 times more likely than low-income individuals to report saving for long-term goals as a motivation for budgeting in comparison to 1.7 times more likely for short-term goals. This finding is consistent with evidence that individuals who are more financially-constrained behave as if they are more present-focused (Shah et al. 2012; Haushofer and Fehr 2014; Carvalho et al. 2016).

While detailed empirical data on budgeting is relatively scarce, a handful of existing surveys measure engagement with budgeting. For example, roughly half of respondents report using a spending plan or budget across several surveys, including the University of Michigan's 2001 Surveys of Consumers (46 percent; Hilgert et al. 2003), the 2015 National Financial Capability Study (56 percent; Lin et al. 2016), and the 2014 Canadian Financial Capability Survey (46 percent; Financial Consumer Agency of Canada 2015). In comparison, we find a slightly higher prevalence of budgeting, which may reflect differences in how we identify who budgets. As noted in Section 2, we intentionally did not provide survey respondents with a specific definition of budgeting so that we could elicit responses based on what respondents believe budgeting to be. However, we did ask respondents who reported budgeting to indicate whether they do so formally (e.g., written down or on a website)

[3] In addition to these response options, respondents could also indicate that they don't believe budgeting to be important or provide their own reasoning ("other"). Of those who report budgeting, less than 0.5 percent indicated that they don't believe budgeting to be important and less than 2.5 percent chose to provide their own reasoning. Given the low prevalence of these responses, we exclude them from our analysis.

[4] Appendix Figure A.1 presents analogous results disaggregated by asset levels and shows similar patterns.

Table 2
Propensity to budget by sample characteristics.

	(1)	(2)	(3)
	Overall	Formally Budgets	Informally Budgets
Panel A. Demographic Characteristics			
Age Brackets			
18–24 yrs	60.3	34.6	25.6
25–34 yrs	74.0	46.8	27.2
35–44 yrs	70.0	43.0	27.0
45–54 yrs	62.0	37.8	24.2
55+ yrs	60.9	32.1	28.7
Gender			
Female	64.5	37.3	27.2
Male	66.8	40.2	26.7
Employment Status			
Student	57.5	28.8	28.8
Part-time	64.2	37.1	27.1
Full-time	72.6	48.3	24.3
Work at home w/o pay	65.1	35.3	29.8
Not currently employed	58.3	28.9	29.4
Education			
High-school degree or less	60.5	32.1	28.4
Some college	62.5	34.7	27.8
Associate's degree	70.4	42.0	28.4
Bachelor's degree or more	69.4	44.5	24.9
Lives with spouse/partner			
Yes	66.9	41.5	25.4
No	63.7	34.7	29.0
Panel B. Household Income and Wealth			
Household Income Brackets			
< 20K	62.5	29.5	32.9
20K - 30K	63.8	34.2	29.7
30K - 40K	60.7	33.6	27.1
40K - 50K	65.2	38.5	26.7
50K - 60K	71.2	44.8	26.5
60K - 70K	68.0	46.6	21.4
> 70K	67.4	43.6	23.9
Amount of Assets			
< $250	55.8	27.4	28.4
$250 - $499	67.3	37.7	29.6
$500 - $999	70.4	41.2	29.2
$1000 - $4999	72.6	45.6	27.0
$5000 - $9999	73.3	49.2	24.1
$10,000 - $49,999	69.8	44.7	25.1
$50,000 - $99,999	72.1	44.3	27.9
> $100K	63.2	38.2	25.0
Full Sample	65.6	38.6	26.9

Note: This table presents statistics on the percentage of survey respondents in the full sample who report currently budgeting by demographic characteristics (Panel A) and income and wealth (Panel B). Column (1) presents these statistics in aggregate while Columns (2) and (3) presents these statistics for those who report budgeting formally and informally, respectively. The overall percentage of survey respondents for the full sample is listed in the final row.

or informally (e.g., keep it in your head). Of the 65.6 percent of respondents who currently budget, only 58.9 percent (or 38.6 percent of all respondents) report doing so formally.[5]

Together, these findings demonstrate widespread use of budgeting across the wealth spectrum, lending nuance to the commonly held view that budgeting is predominantly a habit of those with relatively lower levels of income and wealth. Importantly, they also provide additional perspective on consumers' rationale for budgeting. While people across the wealth

[5] Respondents who report budgeting formally may be more serious and intentional in their efforts to budget. In Appendix B, we repeat our main analyses, restricting to just the sub-sample of respondents who report budgeting formally. We generally find very similar results when looking at this restricted sample.

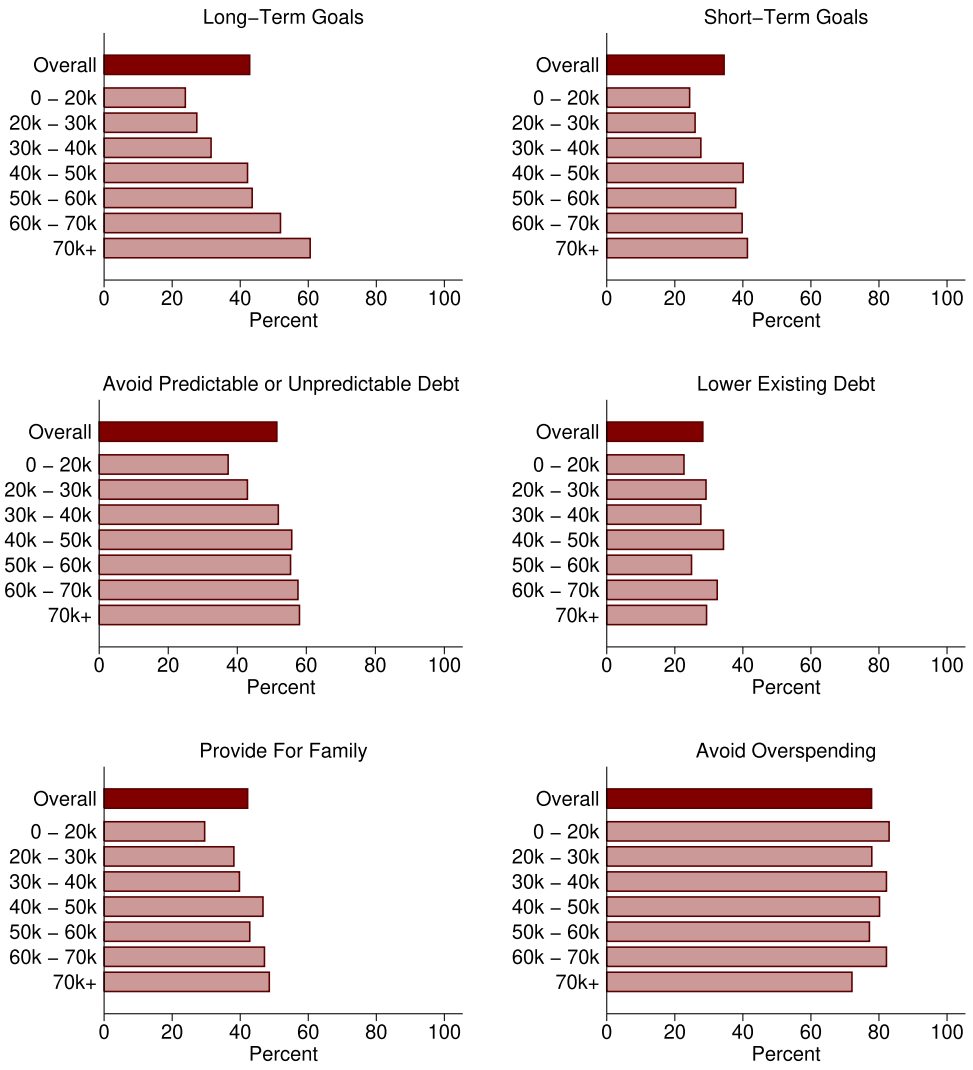


Fig. 1. Reasons for budgeting by household income ($). This figure plots, by level of household income within the sample of those currently budgeting, the share of respondents who indicate a particular motivation as a main reason for budgeting for each of the following set of potential motivations: savings for long-term goals, saving for short-term goals, to avoid debt from predictable overspending or from unforeseen expenses, to get out of debt, to provide for one's family, and to avoid overspending one's income. The overall share of respondents who indicate a particular motivation is shown in the dark red bar. The share of respondents disaggregated by level of household income is shown in pink. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

spectrum budget to help address (and potentially avoid) financial problems, our results suggest that those with lower wealth budget to account for short term needs while those with higher wealth budget to plan for the long-term.

3.2. Attention to finances and financial wellbeing

People exhibit limited attention, including when considering their finances. One explanation for this behavior is that people are "rationally inattentive." Those with sufficient financial slack may rationally choose to be inattentive to their finances because the cost to doing so is low (Shah et al. 2012; Morewedge et al. 2007). If this explanation is true, we should expect attention to be negatively correlated with financial wellbeing. On the other hand, a growing literature suggests that people selectively pay attention to their finances to avoid learning aversive negative financial information, in spite of potential benefits of increased attention (Karlsson et al. 2009; Olafsson and Pagel 2022). Dubbed the "ostrich effect," this avoidance behavior can explain why someone with mounting late payments might hide their bills in a drawer unopened. If this explanation is true, then we should expect attention to be positively correlated with financial wellbeing.

In this subsection, we examine the relationship between attention and financial wellbeing. We consider two margins of engagement along which people can pay attention to their finances when budgeting. First, we consider engagement on the extensive margin—the choice of whether to pay attention to your finances at all—and examine how the propensity to budget

varies with financial wellbeing. Second, we consider engagement on the intensive margin—the intensity with which you pay attention to your finances—and examine how the frequency of checking one's budget varies with financial wellbeing.[6]

We proxy for financial wellbeing using three different measures: asset holdings, confidence in the ability to come up with $500 if an unexpected need arose, and perceived wellbeing.[7] Confidence was measured using a four-point scale that ranged from "I am certain I cannot come up with [$500 if an unexpected need arose]" to "I am certain I could come up with [$500 if an unexpected need arose]" (Lusardi et al. 2011). To measure perceived wellbeing, we asked respondents four questions, with two designed to assess their perception of the current state of their finances and two designed to assess their expectations for their financial security in the future. Prior research has shown that perceptions of financial wellbeing are best captured by measures that address these two key dimensions (Netemeyer et al. 2018). For ease of comparison, we create a composite index of perceived wellbeing by combining the individual scores from these four questions.[8] We use this composite index as the third measure of financial wellbeing in our main analysis, though we also consider each of the four individual questions separately in the Appendix. The three proxy measures of financial wellbeing are moderately correlated with each other, with correlation coefficients between each pair ranging from 0.49 to 0.58.

Extensive Margin: Propensity to Budget

Fig. 2 shows that the propensity to budget is positively correlated with financial wellbeing across all three measures. For example, the propensity to budget increases significantly from 60.5 percent to 67.8 percent when moving from respondents with the lowest to highest self-reported confidence in their ability to come up with $500 if an unexpected need arose. Similarly, the propensity to budget increases significantly from 52.0 percent to 73.2 percent when moving from the lowest to highest quintile of perceived wellbeing. Consistent with these findings, the propensity to budget is also positively correlated with asset holdings, as first described in Section 3.1.[9]

While our survey findings do not allow us to infer the direction of causality underlying the positive correlation we observe, we do find suggestive evidence that this relationship is reflective of the ostrich effect. Specifically, we ask respondents who are not currently budgeting and report finding budgeting unpleasant why they find budgeting unpleasant. Table 3 presents the distribution of responses to this question by level of financial wellbeing for each of our three measures. While respondents with high financial wellbeing most commonly report that budgeting takes too much time, by far the most common response among respondents with low financial wellbeing is that budgeting makes them feel like they have less money than they thought. These findings suggest that the relatively lower propensity to budget among those with low financial wellbeing may be motivated by a desire to avoid these negative feelings.

Intensive Margin: Frequency of Budget Checking

On the intensive margin, we find the opposite relationship between attention to finances and financial wellbeing. As Fig. 2 shows, conditional on having a budget, the frequency at which respondents check their budgets is *negatively* correlated with financial wellbeing. In other words, conditional on budgeting, respondents with lower financial wellbeing pay more frequent attention to their budgets than respondents with higher financial wellbeing. For instance, 43.4 percent of those with the lowest confidence level in their ability to come up with $500 check their budget several times per week in comparison with only 34.8 percent of those with the highest confidence level. Similarly, 42.9 percent of respondents in the lowest quintile of the perceived wellbeing index check their budget several times per week in comparison with 34.1 percent of those in the highest quintile.[10] We find the same stark relationship between the frequency with which respondents check their budgets and asset holdings. Respondents with over $100,000 in assets are roughly half as likely to report checking in with their budget several times per week and nearly 1.5 times more likely to report checking monthly than respondents with less than $250 in assets.

Together the results from this section highlight interesting patterns in when and why people choose to pay attention to their finances. A number of potential mechanisms may explain the different relationships we find on the extensive and intensive margins. For example, it may be that financial engagement should be thought of as a two-step process, with motivated attention driving engagement on the extensive margin and rational inattention driving engagement on the intensive

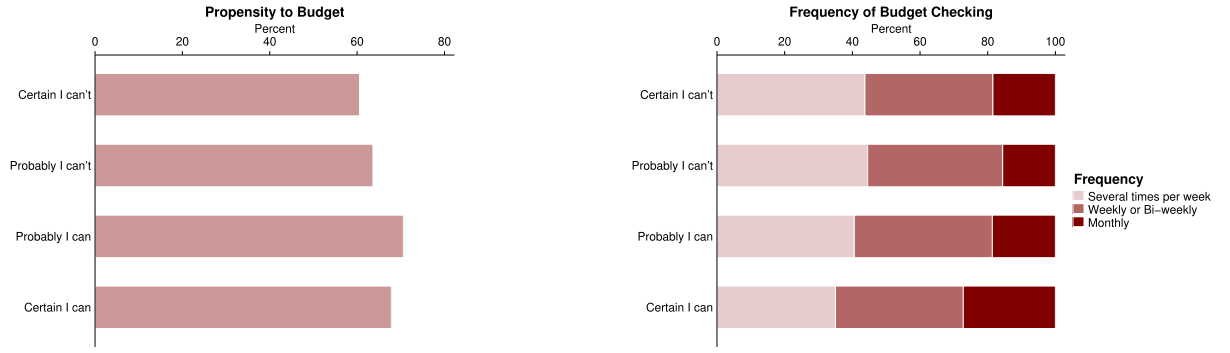
[6] While we focus on the frequency at which people check their budgets, a related question concerns the time horizon over which people define their budgeting periods. Appendix Table A.3. provides additional detail on this, identifying monthly budgeting periods as most common, with 60.7% of respondents budgeting on a monthly basis. The table also shows a correspondence between budgeting periods and pay frequency, with participants being more likely to budget over a period that matches their pay frequency (e.g., 52.7% of participants who are paid weekly budget on a weekly basis compared to 24.6% of the overall population surveyed).

[7] We include asset holdings rather than income as our third proxy for financial wellbeing. While both are limited in their ability to fully measure financial wellbeing, asset holdings provide a more comprehensive measure of the resources households have available to meet their needs.

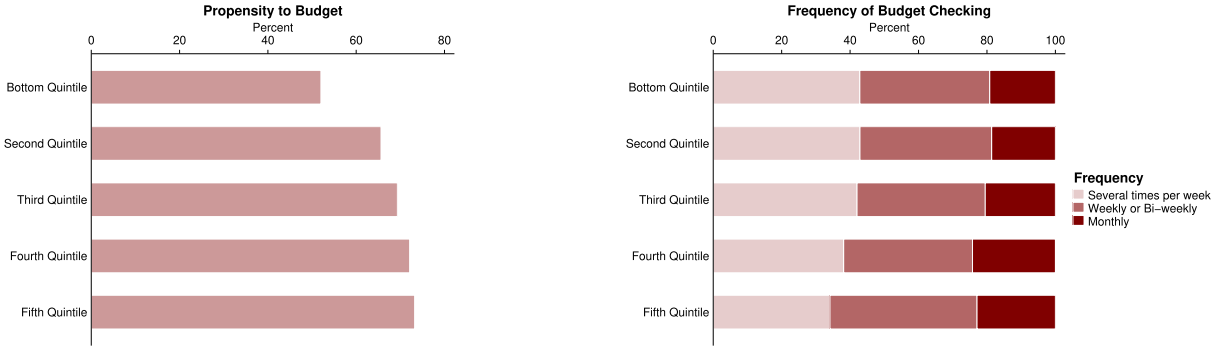
[8] Our composite index of perceived wellbeing ranges in value from -8 to 8, with higher values indicating higher perceived wellbeing. See Appendix Figure A.2 for additional detail on the four perceived wellbeing questions and how the composite index measure is constructed.

[9] As noted previously, there is some evidence of non-monotonicity at the highest asset levels. However, taken together with our other measures of financial wellbeing, and in particular our measure of perceived wellbeing, we interpret these findings as indicative of a positive association between financial wellbeing and the propensity to budget.

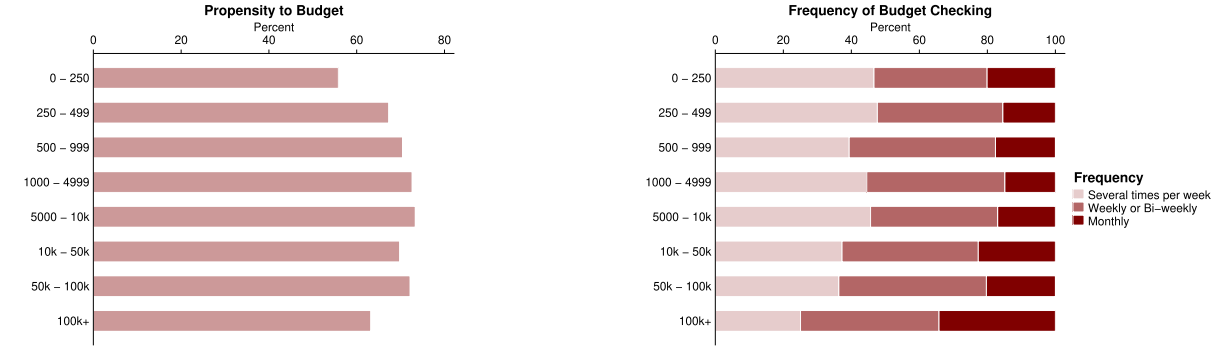
[10] As Appendix Figure A.2 shows, we observe consistent findings when separately examining the four individual components making up our overall index of perceived wellbeing.



(A) Confidence in Ability to Come up with $500



(B) Perceived Wellbeing Index



(C) Amount of Assets ($)

Fig. 2. Attention to finances by measures of financial wellbeing. This figure plots the share of respondents who currently budget (extensive margin) and, conditional on budgeting, the frequency at which respondents check their budgets (intensive margin) across three measures of financial wellbeing. Panel A shows this distribution using a respondent's confidence in their ability to come up with $500 if an unexpected need rose as a measure of financial wellbeing. Panel B shows this distribution using an index of respondents' perceived wellbeing as a measure of financial wellbeing. Panel C shows this distribution using asset levels as a measure of financial wellbeing.

margin. Alternatively, these findings are consistent with a model featuring two types of individuals, those who are rationally inattentive and those who suffer from the ostrich effect. While it is outside the scope of this paper to explore this further, one fruitful avenue for future research would be to distinguish between these alternative explanations. More generally, our findings also highlight the need for future work examining the causal effects of budgeting on financial wellbeing and the channels through which those effects may arise.

Table 3
Reasons keeping a budget is unpleasant by measures of financial wellbeing.

	(1)	(2)	(3)	(4)
	Takes Too Much Time	Hard to Follow Long-Term	Makes Me Feel Poor	Doesn't Help With Goals
	Panel A. Confidence in Ability to Come up with $500			
Certain I can't	32.1	42.0	49.0	16.0
Probably I can't	33.3	43.9	64.9	9.6
Probably I can	42.6	53.2	51.1	7.4
Certain I can	50.7	23.7	34.9	21.4
	Panel B. Perceived Wellbeing Index			
Bottom Quintile	28.3	44.4	54.5	18.2
Second Quintile	42.1	39.3	57.9	10.3
Third Quintile	41.2	40.3	54.6	7.6
Fourth Quintile	39.8	42.3	45.5	12.2
Fifth Quintile	53.1	21.5	23.8	26.2
	Panel C. Amount of Assets ($)			
0 - 250	30.9	43.6	50.4	14.0
250 - 499	30.8	53.8	50.0	0.0
500 - 999	44.7	44.7	55.3	7.9
1000 - 4999	49.3	28.2	57.7	14.1
5000 - 10k	39.6	45.8	47.9	16.7
10k - 50k	44.0	36.0	50.7	17.3
50k - 100k	46.2	28.2	56.4	17.9
100k+	47.3	29.0	29.8	21.4
Overall	39.8	38.0	47.4	15.5

Note: This table presents statistics on the share of respondents who indicate they find budgeting unpleasant because it takes too much time (column (1)), it's too hard to follow long-term (column (2)), it makes them feel like they have less money than they thought (column (3)), and it doesn't help them reach their financial goals (column(4)) within the sample of respondents who don't currently budget and who find budgeting unpleasant. Panel A presents these statistics by respondent's confidence in their ability to come up with $500 if an unexpected need arose. Panel B presents these statistics by quintiles of the composite perceived wellbeing index. Panel C presents these statistics by respondents' asset levels. The overall share of survey respondents in this sample who indicate a particular reason for finding budgeting unpleasant is listed in the last row.

3.3. The use of budget categories

Though budgeting practices may vary from household to household, a growing body of empirical evidence suggests that one commonly followed practice is to allocate and track spending within distinct budgetary categories (Henderson and Peterson 1992; Heath and Soll 1996; Antonides et al. 2011; Hastings and Shapiro 2013, 2018). For instance, a household might maintain a separate "entertainment budget" or "clothing budget." Furthermore, households appear to treat these categories as rigid, with funds not fully substitutable across categories (Hastings and Shapiro 2013, 2018).

The notion that people create such "mental budgets" and treat them as distinct when making consumption decisions is a key part of the theoretical framework underlying the important literature on mental accounting (Thaler 1985; 1999; see Zhang and Sussman 2018 for a review of the literature). However, relatively little is known about the prevalence or nature of the budgetary categories that households use. Most empirical studies make reasonable but ultimately ad hoc assumptions about the existence or usage of particular categories.[11]

In this subsection, we provide new evidence on budgetary categories. To better understand the extent to which individuals use budgetary categories, we asked respondents to list the five categories in their budget in which they spend the most money. Respondents were able to provide up to five open-ended responses and were also given the choice to indicate that they have spending limits but don't track categories in their spending.[12] We find that over 90 percent of individuals who budget, whether formally or informally, do so by tracking their spending within distinct budget categories. The use of budget categories is equally prevalent among those who do not currently budget but did so in the past.

[11] One important exception is Antonides et al. (2011) who survey a representative sample of the Dutch population and find that about one-third of respondents report reserving money for different expenses.

[12] Respondents were reminded to consider the most recent budget they've kept or the budget they think they would keep if they don't currently budget. They were also informed that they could list fewer than five categories if they do not have five categories that they track.

Appendix Table A.2 lists the twenty-five most common category descriptors that were provided by respondents who currently keep a budget.[13] Two patterns are worth noting. First, many of the budget categories that prior research has assumed to exist (e.g., food, clothing, gas, entertainment, etc.) appear in our list. Second, there is clear variation in the level of detail at which individuals categorize their spending. For instance, "bills" is a relatively broad category in comparison with the more narrow categories of "utilities" and "rent."

We directly examine this potential heterogeneity in the granularity of budget categories in our survey. Specifically, we ask respondents to identify the level of detail that most closely aligns with their actual budget from the following list (ordered from least detailed to most detailed):

- Necessities, Discretionary
- Housing & Transportation, Food, Discretionary, Other
- Housing & Transportation, Food, Entertainment, Clothing, Other
- Housing, Car, Groceries, Dining Out, Entertainment, Clothing, Other
- Rent, Utilities, Cell phone, Car, Groceries, Dining Out, Movies, Travel, Clothing, Other
- Rent, Utilities, Cell phone, Internet, Car, Groceries, Dining Out, Movies, Travel, Clothing, Exercise, Healthcare, Other.

Panel A of Fig. 3 presents the frequency of each of these levels of categorization for the set of respondents who report that they currently budget. Consistent with what we observe from the category descriptors in Appendix Table A.2, we find substantial cross-sectional heterogeneity in the level of detail at which individuals categorize their spending. For instance, while 12 percent of respondents who budget simply distinguish necessities from discretionary spending, roughly 23 percent maintain budget categories at the most detailed level of categorization.

We find similar heterogeneity when asking respondents to identify the level of detail that most closely aligns with the budget they think they should keep instead of their actual budget. Panel B of Fig. 3 is directly analogous to Panel A and plots the frequency of each level of categorization for respondents' desired budgets. While the distribution of responses shifts slightly towards more detailed budget categorization when comparing the budgets respondents think they should keep to their actual budgets, there remains wide variation in the granularity of budget categories.

These findings have important implications for our understanding of consumption patterns. If people do not treat funds as fully fungible across their mental budgeting categories, as prior studies suggest, then the way in which shocks (to prices, income, etc.) affect what people choose to consume will depend on the specific set of budgeting categories they form. For example, an individual with a gas-specific budget and a separate food-specific budget may significantly adjust their consumption of gas in response to an increase in gas prices but make relatively little change to their food consumption. In contrast, an individual who has a broader "necessities" budget that includes both gas and food may respond to the same increase in gas prices by significantly adjusting their consumption of both gas and food. Our finding that people exhibit heterogeneity in the budget categories they use therefore suggests potentially important heterogeneity in how people respond to such shocks.

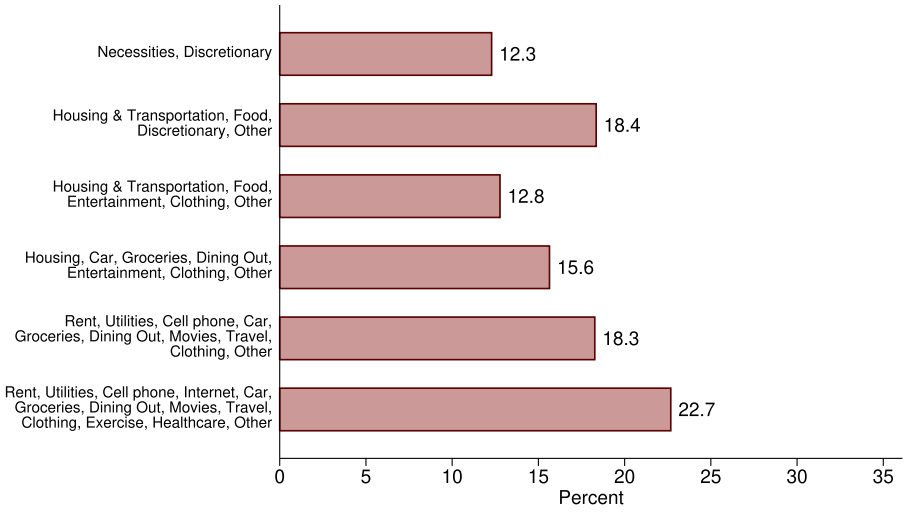
Our findings may hold significance for consumption in other ways as well. Prior research has shown that people often fail to fully consider opportunity costs (i.e., exhibit "opportunity cost neglect") when making consumption decisions (Frederick et al. 2009). This bias can arise because people, faced with limitations in their ability to process all available information, selectively focus on information that is salient at the time of decision-making. One implication of the prevalent use of explicit category-specific budgets is the potential for category-wise opportunity cost neglect (Persson and Tinghög 2020). When making consumption decisions within a particular budgeting category, people may underweight opportunity costs for consumption in other categories. The effect of this behavior on overall spending will depend on the granularity at which households budget, which we find to vary dramatically in our sample.

Finally, the patterns we observe are also informative for theoretical efforts to model mental accounting. While the existence of mental budgets is not strictly necessary to generate mental accounting behavior, our finding that nearly all who budget report tracking their spending using distinct budget categories suggests that models that allow for explicit mental budgets are likely to continue to be important going forward. In addition, our finding that people are heterogeneous in the granularity of their budgets suggest that efforts to model the endogenous formation of mental budgets, as in Kőszegi and Matějka (2020), are likely to offer a fruitful path for future work. Our results imply that any such model of mental budgeting must be flexible enough to allow for differences to arise in how broadly or narrowly individuals categorize their spending.

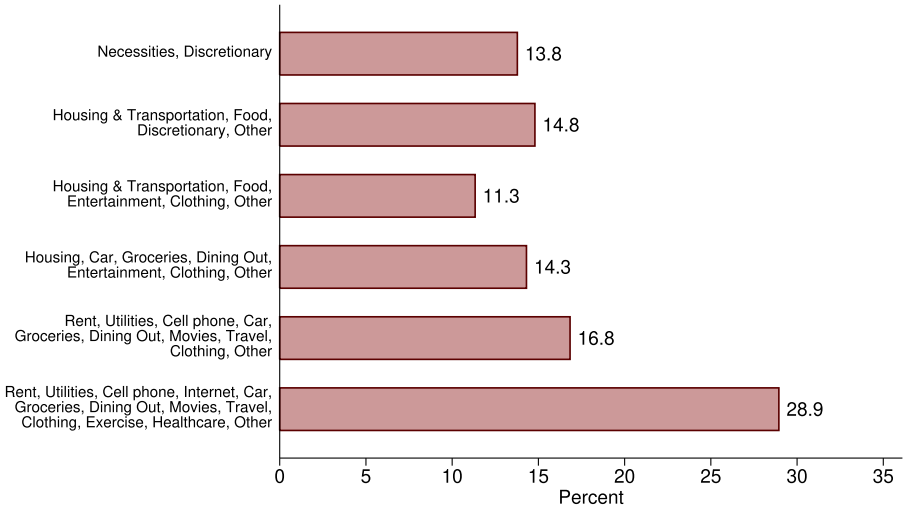
3.4. Responses to changes in budgetary slack

We have focused our discussion thus far on which individuals budget and how they set their budgets. In this subsection, we examine some of the ways individuals adjust their budgets or spending behavior in response to changes in their financial circumstances. We focus on changes in slack in respondents' budgets, for example due to overspending or underspending their budget. We define budgetary slack as the difference between the amount budgeted and the amount actually spent. Prior research has shown that a lack of financial slack can have serious economic and psychological consequences

[13] This table lists category descriptions as initially reported by respondents. We intentionally did not adjust categories (e.g., combining categories that appear to overlap) to avoid imposing our own notions of what categories belong together versus not.



(A) Actual Budget



(B) Desired Budget

Fig. 3. Level of categorization. This figure plots the distribution of responses given regarding the level of detail that most closely aligns with their budget for the subset of respondents who currently budget. Panel A shows this distribution for respondents' actual budgets. Panel B shows this distribution for the budget that respondents think they should keep. Response options were mutually exclusive to one another. Possible responses are shown on the y-axis in increasing levels of detail.

for household wellbeing (Zauberman and Lynch Jr 2005; Lusardi et al. 2011; Shafir and Mullainathan 2013). Using a series of hypothetical scenarios, we show that individuals respond asymmetrically when faced with more versus less slack in their budgets. Specifically, people appear to update their budgets conservatively, with a greater propensity to make adjustments when faced with a decrease in their budgetary slack in comparison to an increase in slack. We discuss each of these scenarios in turn below.

To understand how individuals would respond to a decrease in the slack in their budgets, we asked survey respondents who currently budget to consider their behavior under two different scenarios: 1) if they were to exceed the spending limit for one of their budget categories and 2) if they were unable to stay within their overall budget in a particular week or month. For each scenario, respondents were presented with several potential alternatives as well as an option to indicate "Other." As Panels A and B of Fig. 4 show, over 87 percent of respondents in the first scenario and roughly 90 percent of respondents in the second scenario would make adjustments, either by formally updating their category or overall budget spending limits or by informally adjusting their behavior to compensate (e.g., by decreasing their spending in another category or working more to have more money to spend).

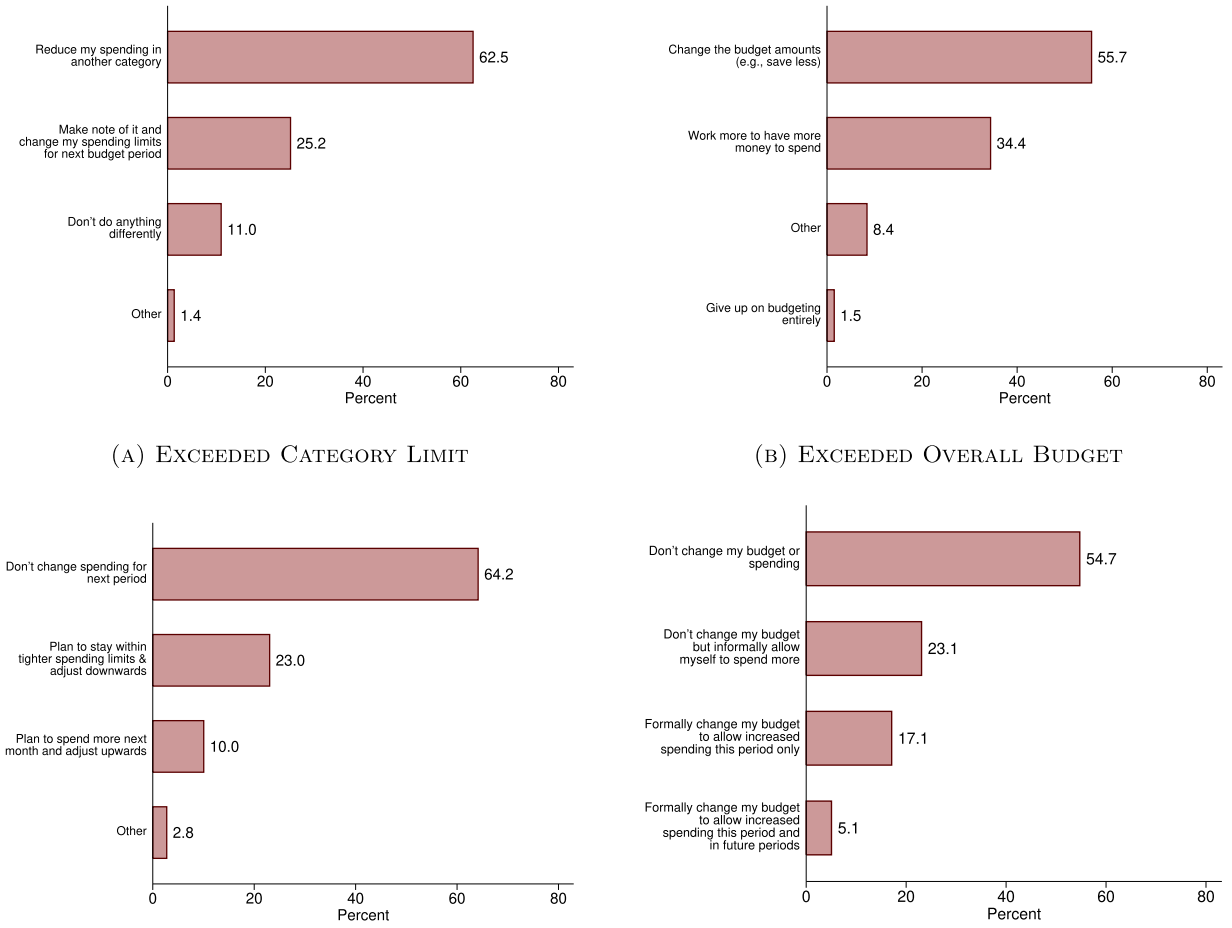


Fig. 4. Responses to changes in budgetary slack. This figure plots the distribution of responses given in response to four hypothetical scenarios in which respondents face changes to their budgetary slack. Panel A shows the distribution of responses to exceeding the spending limit for one of their budget categories. Panel B shoes the distribution of responses to failing to stick to their budget in a particular week or month. Panel C shows the distribution of responses to under-spending their budget in the current period. Panel D shows the distribution of responses in a week or month where the respondent earned more money. For each hypothetical scenario, response options were mutually exclusive to one another. Possible responses are shown on the y-axis. All statistics in this figure are calculated for the sample of respondents who currently budget.

In contrast, we find little adjustment by the same respondents when faced with an increase in the slack in their budgets. To understand how individuals would respond to an increase in the slack in their budgets, we once again asked survey respondents who currently budget to consider their behavior under two different scenarios: 1) if they were to underspend their overall budget in the current period and 2) if they were to make more money in a particular week or month. As Panels C and D of Fig. 4 show, over 64 percent of respondents in the first scenario and nearly 55 percent of respondents in the second scenario indicated that they would make no changes to their spending behavior or overall budget. Twenty-three percent of respondents in the second scenario would make no formal changes but would informally allow themselves to spend more than they have listed in their budget.

Taken together, these findings suggest that people update their budgets conservatively. In particular, the asymmetry we observe in how people respond to changes in budgetary slack suggests that households budget in order to constrain (often category-specific) spending rather than simply as a means of tracking spending over time. Our findings on how budgeting responds to changes in slack relate to the rich empirical literature using quasi-experimental research designs to examine how consumption responds to income shocks (see Jappelli and Pistaferri 2010; Fuster et al. 2021 for excellent reviews). Much of this literature carefully considers how these responses are shaped, both in theory and in practice, by whether the income received is temporary versus permanent or expected versus unexpected, in addition to the role of individual circumstances and the surrounding environment in influencing responses. While the scenarios in our survey do not allow us to explore more nuanced changes in slack, one promising area for future research would be to similarly examine the

extent to which households adjust their budgets in response to temporary versus permanent changes or expected versus unexpected changes in budgetary slack.

4. Supplementary evidence from administrative bank data

In this section, we supplement our findings from the survey data using detailed administrative data from 2019 for nearly 200,000 customers of the Commonwealth Bank of Australia (CBA), the largest bank in Australia. These data allow us to examine the extent to which real-world financial behavior reflects the empirical patterns identified from the survey data in the previous section. Because we are not able to directly observe the intended budgets of CBA's customers, we focus our attention on the two findings for which we are most able to observe direct analogues within the administrative data: the negative correlation between attention and financial wellbeing, conditional on budgeting, and the tendency to segregate spending by category. We describe the CBA data we use below and then explore these two findings.

4.1. Sample restrictions and descriptive statistics

Starting with the full universe of CBA customers, we impose two key restrictions in the course of selecting our final sample for analysis. First, we include only those customers for whom CBA was likely to be their main financial institution during the sample period.[14] Second, we include only customers who are "digitally active," which we define as having interacted at least once with CBA's mobile application or web platform in each month of the sample period.

From the set of customers who satisfied these two restrictions, we drew two random samples. The first is a random sample of 100,000 customers, the "representative" sample. For the second sample, we further restrict the remaining customers to include only those who have at least two bank cards (credit or debit) with CBA and randomly select 100,000 customers from this pool. This sample, the "multiple cardholder" sample, allows us to examine how customers allocate spending across multiple bank cards. From these two samples, we drop any customers who held joint accounts during the sample period, resulting in a final sample of 98,267 customers in the representative sample and 96,411 customers in the multiple cardholder sample. For each customer, we observe demographic characteristics, product holdings, account balances, transactions, and digital interactions with the bank's mobile app and web platform.[15]

Appendix Table A.4 presents summary statistics for both the representative sample (column (1)) and multiple cardholder sample (column (2)). The median customer in our representative sample is 36 years old, has been with CBA for 18 years, and earns an estimated annual income of A$45,305.50.[16] The sample is evenly split across genders. While approximately one-quarter of customers in the representative sample do not have a debit or credit card, most customers hold at least one bank card, with median monthly transaction outflows of A$769.98 for debit cards and A$1,558.48 for credit cards. Customers in the multiple cardholder sample look quite similar to those in the representative sample.

4.2. Attention to finances and financial wellbeing

The evidence from our survey findings presented in Section 3.2 suggests that, conditional on budgeting, how frequently an individual checks their budget is negatively correlated with their perceived financial wellbeing. In this section, we examine whether there is a similar relationship within the administrative data from CBA.

As a proxy for a customer's attention to the current state of their finances, we construct a measure we refer to as "digital engagement." This measure is defined as the average number of days per month where a customer visited either an "Accounts View" or an "Account Details" page within the bank's mobile app or web platform. Accounts View pages provide an overview of the account balance and available funds for all accounts the customer holds, while Account Details pages provide detailed transactions information for a specific account.[17] Appendix Figure A.4 plots the distribution of digital engagement for customers in the representative sample along with its median, standard deviation, and interquartile range. As the figure shows, digital engagement varies significantly across customers, with an interquartile range of 8 to 21 days.

To proxy for a customer's financial wellbeing, we use an internal financial wellbeing score derived from customers' financial records.[18] The CBA financial wellbeing score ranges from 0 to 100 (with a higher score reflecting higher financial wellbeing) and is comprised of five underlying component measures:

[14] This assessment is based on an internal model that predicts the likelihood that CBA is the main financial institution for a given customer using observable characteristics, such as a customer's account inflows and their frequency of transactions.

[15] Product holdings include transaction accounts, savings accounts, investment accounts, debit cards, credit cards, personal loans, and home loans.

[16] For customers who are paid into their CBA account, income is estimated by annualising salary transactions and other identified income streams from the previous six months.

[17] See Appendix Figure A.3 for examples of an Accounts View page and an Account Details page.

[18] The financial wellbeing score we use is the CBA-MI Observed Financial Wellbeing Scale. While we cannot make a direct comparison between this objective measure of financial wellbeing and the subjective measure from our survey, we believe that they are likely to be reasonably correlated. To benchmark the CBA-MI scale, Haisken-DeNew et al. (2019) gathered survey data on individuals' subjective perceptions and experiences of financial wellbeing. The questions they used were quite similar to those from our survey and correlated highly (ρ=0.46) with the CBA-MI scale. See Haisken-DeNew et al. (2019) for additional details on the CBA-MI scale and how it is constructed from customers' financial records.

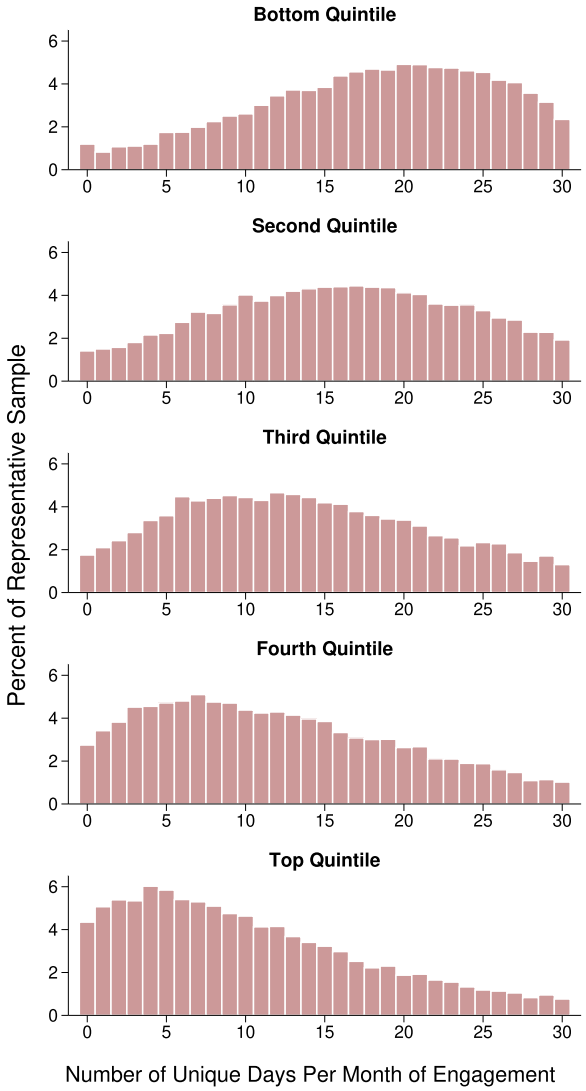


Fig. 5. Distribution of digital engagement by financial wellbeing score quintiles. This figure plots the distribution of digital engagement for CBA customers in the representative sample by quintiles of customer financial wellbeing scores. Digital engagement is defined as the average number of days per month where they visited either the Accounts View or Account Details page within the bank's mobile app or web platform. Financial wellbeing scores are derived internally from customers' financial records and are comprised of five underlying component measures that capture a customer's savings and liquidity, spending, and any experiences of payment problems (Haisken-DeNew et al. 2019).

1. Payment Problems: a measure of the extent to which a customer experienced difficulty making payment (e.g., insufficient funds or over-limit fees, late fees, payday loan usage, etc.) in the past year
2. Low Balance: the number of days in the past year with liquid balances below average weekly expenses
3. Net Spend: the number of months in the past year with spending exceeding 80 percent of inflows
4. Expenses Covered: the number of days in the past year where the customer had the ability to raise several months' expenses from savings or available credit
5. Relative Savings: a measure of a customer's savings balance relative to others their own age

By considering customers' savings and liquidity, spending, and any experiences of payment problems, the CBA financial wellbeing score provides a holistic overview of a customer's financial standing. Appendix Figure A.5 plots the distribution on financial wellbeing scores for customers in the representative sample along with its median, standard deviation, and interquartile range.

Consistent with our findings in the survey data, we find that engagement is negatively correlated with financial wellbeing ($r = -0.34$). Fig. 5 illustrates this relationship by plotting the distribution of digital engagement by quintiles of the CBA financial wellbeing score. As the figure shows, engagement decreases with financial wellbeing, with engagement falling

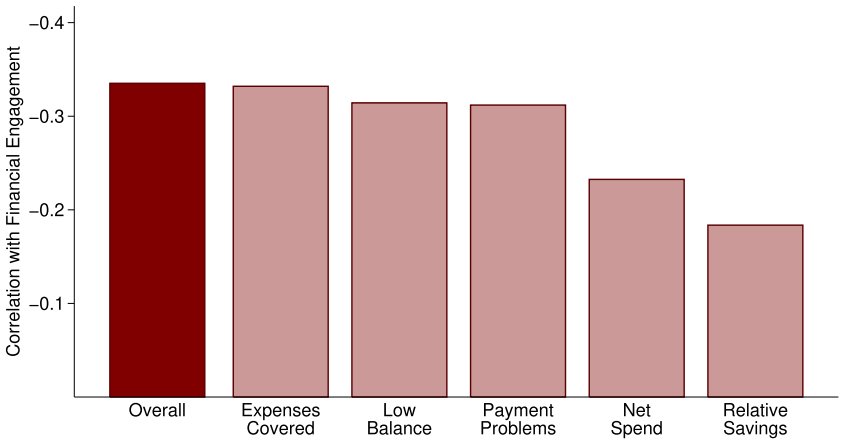


Fig. 6. Correlation between digital engagement and financial wellbeing score components. This figure reports the correlation between customer digital engagement and each of five component measures of the financial wellbeing score (Haisken-DeNew et al. 2019): payment problems, low balance, net spend, expenses covered, and relative savings. The overall correlation between digital engagement and financial wellbeing scores is shown in the dark red bar. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

from 18.4 days to 11 days per month on average when moving from the lowest to the highest quintile of financial wellbeing scores.

We further explore the relationship between engagement and financial wellbeing by examining the relationship between digital engagement and each of the five component measures that combine to form the overall CBA financial wellbeing score. As Fig. 6 shows, while digital engagement is negatively correlated with each component measure, the relationship is strongest with the "Expenses Covered," "Low Balance," and "Payment Problems" measures. This finding suggests that the lack of a short-term liquidity buffer may be especially critical in driving engagement with one's finances.

4.3. Segregating spending by category

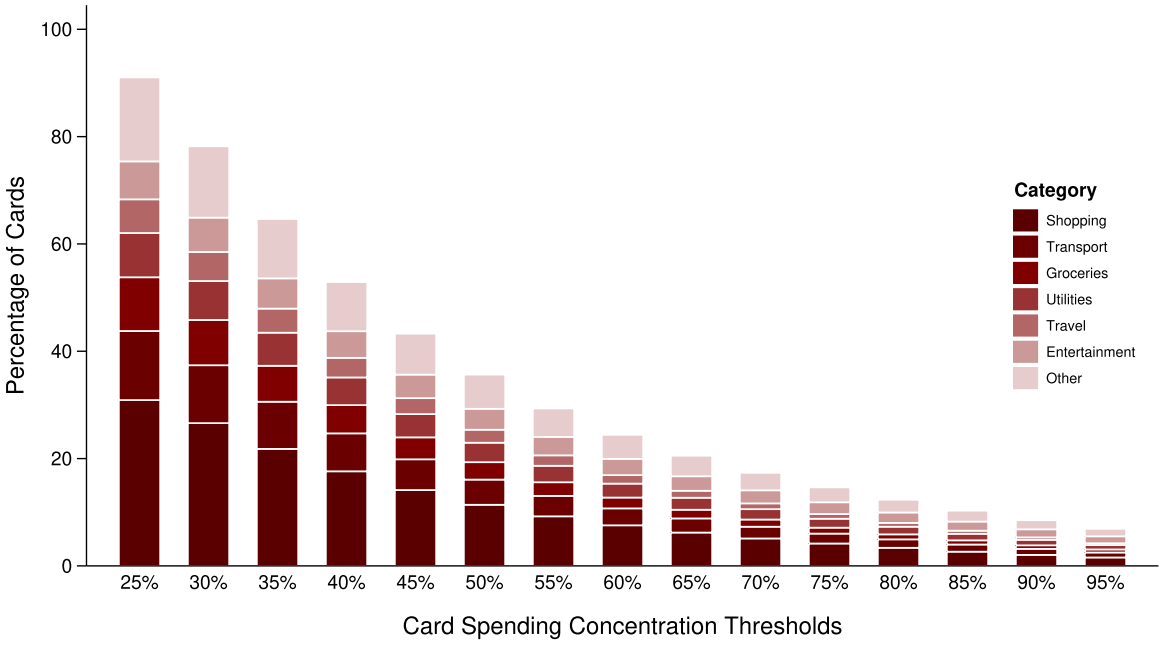
The evidence from our survey findings presented in Section 3.3 suggests that people allocate and track their spending within distinct budgetary categories. One important way in which the use of distinct budgetary categories may manifest in observed behavior is if people allocate their spending across financial accounts by category of expense (Shefrin and Nicols 2014). Among respondents in our survey who currently budget, nearly one in five report using different credit cards for different types of expenses. In this section, we explore whether CBA customers similarly segregate their spending across their bank cards by category of expense.

We focus on the spending behavior of customers in our multiple cardholder sample, who hold at least two bank cards. For each transaction on a customer's card, we observe both the dollar amount of spending and the associated spending category assigned by CBA. Since we cannot directly observe budgetary categories, which may be determined endogenously, we instead use the spending categories assigned by CBA as a proxy.[19] Many financial institutions automatically categorize transactions based on the type of transaction or associated merchant, often with the stated purpose of helping consumers to better track their spending. The median customer in our sample holds two bank cards and spends A$1,943.27 on average per month across their cards.

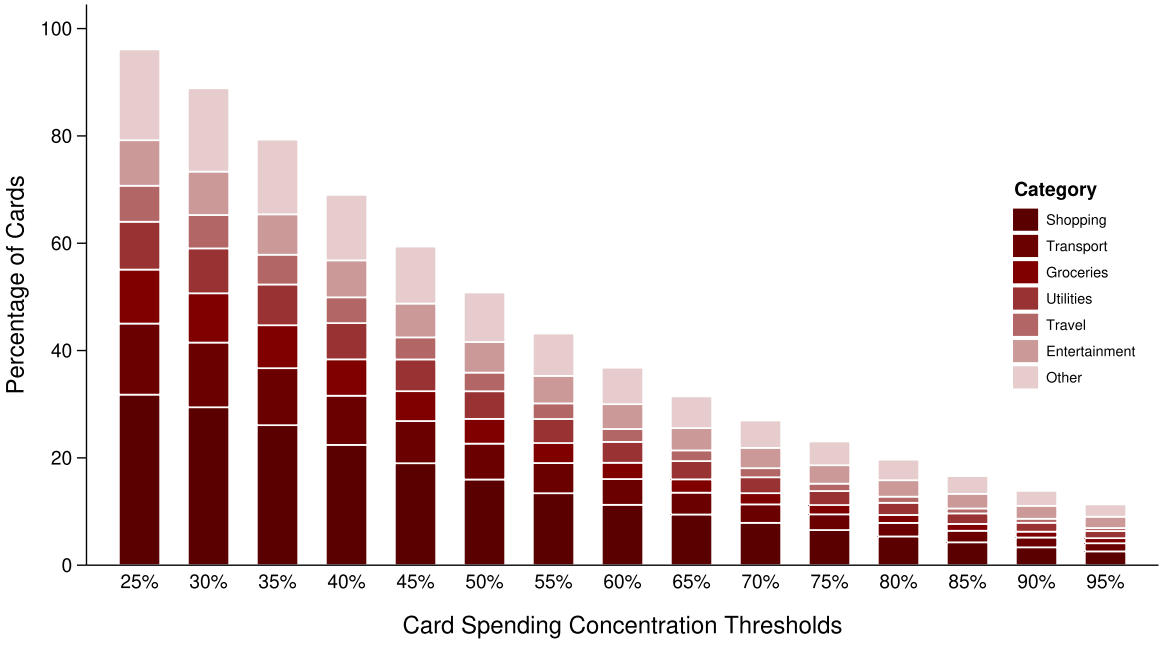
We define the "top spending category" for a customer's card as the category that accounts for the largest share of total spending on that card over the sample period. Appendix Table A.5 lists each spending category along with the share of overall individual spending accounted for by that category (column (1)), the fraction of cards for which that category is the top spending category (column (2)), and the share of overall card spending accounted for by that category for the set cards where the given category is the top spending category (column (3)). Shopping (e.g., department stores) is the top spending category for roughly one-third (34.0 percent) of cards held by customers in our sample, followed by Transport (13.8 percent) and Groceries (11.0 percent).

We next define the "concentration" of a card as the share of total spending that is accounted for by the top spending category. For example, if a person spends $1,000 on a given card, with $600 spent on groceries and $400 on all other categories combined, the associated concentration would be 60 percent. Panel A of Fig. 7 plots the cumulative distribution of the concentration metric for cards in the multiple cardholder sample. Panel B of Fig. 7 plots the cumulative distribution of the concentration metric at the individual-level using the card with the highest concentration for each customer. As the

[19] Specifically, we consider the following categories assigned by CBA: Cash, Donations, Eating Out, Education, Entertainment, Groceries, Health, Home, Shopping, Tax Paid, Travel, and Utilities. We exclude from our analysis one additional category, Money Transfers, since these transactions are not representative of spending behavior.



(A) Card-level



(B) Individual-level

Fig. 7. Cumulative distribution of card spending concentration in the multiple cardholder sample. This figure plots the cumulative distribution of the concentration metric for cards in the multiple cardholder sample at the card-level (panel A) and the individual-level (panel B). The concentration of a card is defined as the share of total spending that is accounted for by the top spending category. The top spending category for a card is the category that accounts for the largest share of total spending on that card over the sample period. The individual-level distribution in panel B is calculated based on the card with the highest card spending concentration for each customer in the multiple cardholder sample.

figure shows, we find that a sizable number of cards have a high concentration of spending within a single category. For roughly one in ten cards, at least 80 percent of total spending is concentrated within a single category.

We next compare how spending concentration differs for customers with multiple bank cards relative to the average cardholder in our representative sample. Appendix Figure A.6 plots the cumulative distribution of the concentration metric at the card-level (Panel A) and the individual-level (Panel B) using our representative sample of customers and is analogous to Appendix Figure A.6. Across all thresholds, we observe a consistent trend where the prevalence of concentrated card spending is higher in our multiple cardholder sample compared to our representative sample. While over half of customers in our multiple cardholder sample hold at least one card with a concentration of 50 percent or higher, less than one-third (30.9 percent) of customers in the representative sample meet the same 50 percent concentration threshold. Similarly, we find that about one in ten (11.2 percent) customers in our multiple cardholder sample meet the 95 percent concentration threshold—indicating that at least one of their cards is used almost exclusively for purchases of a single category—compared to only 4.8 percent of customers in the representative sample.

One potential concern is that some of the concentration in spending that we observe is driven by the use of credit cards with category-specific promotions (e.g., 2% cash back for spending at restaurants). We find similar results when we exclude rewards credit cards from the set of cards held by customers in our sample. We also observe no meaningful difference in our findings when we restrict the cards in our sample to only debit cards, which do not have category-specific promotions for spending.

Together these findings provide support for the evidence in our survey that a meaningful number of people use different cards for different categories of expenses, potentially as a way of organizing their spending. While the findings outlined above should not be taken as more than suggestive, they nonetheless indicate potential avenues for exploration in future research. For example, when we look at customers who have a card with at least 95 percent concentration, the two most common top spending categories are Shopping and Entertainment, which may reflect the use of a separate card for discretionary purchases. The next three most common categories are Transport, Utilities, and Groceries, which may instead reflect the use of a separate card for bill payments or everyday living expenses. Evidence from our survey findings suggests that there is significant heterogeneity in the granularity of budgetary categories. For individuals who use different cards for different types of expenses, there may be similar heterogeneity in the way they do so. One person may use one card for travel expenses and a second card for all other expenses, while another person may use one card for discretionary purchases and another card for necessities.

5. Concluding remarks

This paper provides new descriptive evidence on the drivers and correlates of household budgeting behavior. Our findings suggest two important theoretical considerations for future refinements of economic models of consumption and savings. First, the near ubiquitous use of distinct budgetary categories for tracking consumption that we find in combination with prior evidence from the literature on the non-fungibility of such categories highlights the need for future models to more explicitly account for this behavior. In addition, these models will need to be able to reconcile the apparent heterogeneity in the granularity of these categories across individuals. While there is some recent work attempting these refinements (see, for example, Kőszegi and Matějka 2020), further development of such models is a promising area of future research. Second, our findings underscore both the importance and challenges of incorporating more realistic assumptions about consumer inattention into consumption-savings models.[20] In particular, we find suggestive evidence of both motivated attention (Shah et al. 2012; Shah et al. 2018) and rational inattention (Sicherman et al. 2016; Reis 2006). Individuals with lower financial wellbeing have a lower propensity to budget; however, conditional on budgeting, individuals with lower financial wellbeing check their budgets more frequently. The potential complexity in how inattention affects financial engagement will need to be grappled with in future models.

Our findings also suggest a number of promising avenues of future empirical research, including: (1) investigating the formation and persistence of budgetary categories, (2) examining how budget categories affect consumption responses to both income and expense shocks, and (3) exploring further the relationship between attention and financial engagement. For instance, while we observe heterogeneity in the granularity of budget categories, the choice of categories is not arbitrary. The welfare effects of using budget categories at various levels of granularity are also unclear. If individuals create such categories to simplify the complexity of consumption-savings decisions, the use of budget categories may be welfare improving.

Our research is not without limitations. First, our findings are based on self-report and may therefore not accurately reflect our respondents' actual budgeting behaviors. We sought to allay these concerns by supplementing our findings with supporting evidence from the Commonwealth Bank of Australia. However, future work would benefit from more directly linking budgeting practices to observed behavior. Second, while we hope that the behavioral patterns and relationships that we document shed light on the budgeting process, we are necessarily limited in our ability to make causal claims. Further investigating budgeting behaviors by linking survey data to administrative data at the individual level in a way that allows for more direct causal inference remains a fruitful area for future research. For example, there is, to our knowledge,

[20] See Gabaix (2019) for a review of the large literature exploring how to model inattention.

no existing research identifying a causal effect of budgeting on financial outcomes. Our hope is that the findings we have reported in this paper will help to spark discussion and foster future research on budgeting.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jebo.2022.09.025.

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