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Working paper

What would you do with £500? (...in your own words)

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Abstract

A longstanding puzzle in macroeconomics is why individuals with similar levels of available liquidity can have very different marginal propensities to consume (MPCs). We use a new approach to better investigate differences in consumer behaviour in response to hypothetical, one-off gains and losses: using open-ended questions and text analysis to understand the motives underlying consumers' decisions. High-liquidity individuals with high MPCs often cite mental accounting motives. Apparently illiquid individuals report a range of coping mechanisms in response to a loss, including labour supply responses, relying on friends and family and selling possessions. This implies greater effective liquidity than narrow financial measures indicate.

Keywords: MPC, heterogeneity, open-ended questions, text analysis

JEL codes: C82, C83, D14, E21

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1 Introduction

Marginal propensities to consume (MPCs) are important for several reasons. The MPC measures how consumers would change their spending in response to transitory income changes, and so indicates how consumers would respond to short run income losses or to fiscal stimulus policies such as tax cuts or direct stimulus payments. It is also a key parameter in many macro models (Kaplan and Violante, 2022). Finally, sensitivity to transitory fluctuations in income is a marker of financial fragility: households with liquid resources should be able to smooth transitory fluctuations in income (Blundell, Pistaferri, and Preston, 2008). Thus, prevalence of high MPCs in an economy is often treated as being indicative of the prevalence of households tight financial circumstances.

As a result, a large literature attempts to measure MPCs. One way to do this is with survey questions that ask respondents how they would change their spending in response to hypothetical windfalls and losses. One virtue of this approach is that it recovers an MPC for each consumer, and so is informative about the full distribution of MPCs. The striking, yet puzzling, finding of this literature is the apparent heterogeneity in MPCs. Theory suggests that most consumers should have an MPC that is either close to zero or close to one (Jappelli and Pistaferri, 2010). For consumers with liquid financial resources, the spending response to transitory income change should be approximately the annuitised value of the increase in lifetime income. For consumers with a long time horizon, this value will be near zero. In contrast, consumers who temporarily have little liquid wealth, may have MPCs close to one (Kaplan and Violante, 2014). Households with a currently binding borrowing constraint will have a high MPC out of a transitory gain (or loss). Households that are not currently constrained but would be so in the face of a loss will have high MPCs out of a transitory loss. Similarly, among consumers that are both highly impatient and prudent, models of precautionary saving predict high MPCs when consumers have less than their target ‘buffer-stock’ of liquid savings (Carroll, 1997) and low MPCs otherwise.

While past research has documented that elicited MPCs are often close to zero or one (Fuster, Kaplan, and Zafar, 2021), and mildly correlated with measures of liquid assets (Jappelli and Pistaferri (2014), Ganong et al. (2020), Fagereng, Holm, and Natvik (2021)), the puzzle lies in the substantial heterogeneity *within* groups of consumers defined by levels of liquidity. Some consumers with significant liquid wealth nevertheless report spending most or all of a transitory increase in income. Conversely, some consumers with little or no liquid assets report responses to a transitory income loss close to zero. More broadly, attempts to correlate MPCs with variables commonly observed in surveys have been “largely fruitless” (Fuster, Kaplan, and Zafar, 2021). Similarly, the quasi-experimental literature on MPCs has found that high-liquidity consumers often respond to the receipt of predictable changes in their income as if they were credit constrained (the so-called

“liquid hand-to-mouth”, Ólafsson and Pagel (2018), Baugh et al. (2021), Graham and McDowall (2024)). Experimental studies have also found high MPCs among those with high levels of liquidity (Boehm, Fize, and Jaravel, 2025).

We take a new approach to understanding heterogeneity in measured MPCs. We conducted a survey of thirty-five hundred UK adults in May 2023. We began by posing standard survey questions designed to elicit MPCs (similar to those studied by Fuster, Kaplan, and Zafar (2021) and Crossley et al. (2021)). Our innovation is that we then asked a series of open-ended follow-up questions. Respondents that indicated a positive MPC out of a transitory income increase were asked to explain, in their own words, what they would spend that windfall on; those who indicated a positive MPC less than one were also asked how they would use the unspent funds. All were then asked *why* they would use the money in the way that they did. Similarly, respondents were asked, through a series of open-ended questions, to explain their reaction to a transitory income loss.

This approach, which combines established quantitative survey questions, open-ended follow-ups, and textual analysis, has several advantages. It allows respondents to cite considerations that survey designers might not have thought to ask about *ex ante*, and it avoids priming respondents to give particular responses (Geer, 1991, Haaland et al., 2024). The puzzling heterogeneity in MPCs that the literature documents may reflect measurement problems (for example, respondents misunderstanding the question) and/or economic behaviour not captured by standard models (mental accounts being just one example). Our approach has the potential to reveal both.

We study the open-ended responses using a text analysis approach similar to that described in Ferrario and Stantcheva (2022). We group together lemmatized responses from “what” questions, and separately lemmatized responses from “why” questions. We then assign these responses to topics (capturing behaviours and motives) using frequently mentioned terms associated with particular spending responses or motives. For instance, we categorise those individuals who mentioned ‘rainy day’ in answers to the questions about why they would not increase their spending in response to a windfall gain under the topic ‘saving for precautionary reasons’. We then examine the frequency of different topics across groups defined by (i) scenario (gain or loss) (ii) consumer liquidity (high or low) and (iii) MPC (large or small).

Our key findings are as follows. Firstly, high-liquidity high MPC individuals are much more likely to mention topics that suggest that they view the payment in the gain scenario as a bonus or opportunity to treat themselves to something they would not typically buy. At the same, high-liquidity individuals who say they would cut spending in the loss scenario often report a desire to maintain their savings to recoup the loss. These responses are consistent with the behavioural life-cycle model of Shefrin and Thaler (1988), which emphasizes mental accounting. Specifically,

money is not fungible.¹ Mental accounting consumers have a high MPC out of current income, and particularly so when additions to current income are viewed as a windfall or bonus. We refer to this as *windfall mental accounting*. The behavioural life-cycle models also posits that mental accounters are unwilling to spend out of their designated savings. This implies a *high* MPC (that is, spending reductions) out of small losses, as such consumers are unwilling to use savings to smooth consumption. We refer to this as *saving mental accounting*.²

The mental accounting motives revealed in respondents' answers help account for a substantial share of high liquidity individuals with high MPCs. Excluding those expressing mental accounting motives reduces the fraction of high-liquidity high MPC consumers in the gain scenario by 36%, and in the fraction of high MPC consumers in the loss scenario by more than half. In contrast to high-liquidity respondents, low-liquidity respondents with a high MPCs are more likely to mention topics suggesting that gains relaxed a financial constraint.

Related to the above findings, we find that high-liquidity individuals who report a high MPC report that they would adjust their spending on luxuries (spending more in response to a gain and cutting back in response to a loss). In contrast, low-liquidity respondents with a high MPC would adjust essentials.

We also find that low-liquidity consumers were more likely to bring up paying down debts when describing how they would use their payments, which is consistent with the explanation advanced in Koşar et al. (2023) for low MPCs among the hand-to-mouth. High interest rates associated with low income or high levels of debt incentivise saving (by paying down debt). Consistent with this, those with higher debts also tend to exhibit larger MPCs in response to losses than they report for gains. Households with high debt face a strong incentive to save out of a gain, but may not be able to smooth a loss.

A further finding is that individuals responded in a variety of ways to the loss scenario, with non-trivial fractions of respondents reporting they would sell belongings, borrow from friends or family, or work extra shifts or overtime to compensate for the losses. This implies that they may have greater effective liquidity than is captured by a measure of liquid financial assets. These sorts of responses are less studied in papers eliciting MPCs, which tend to focus entirely on individuals' spending, debt and saving responses.³

¹As an example of the non-fungibility of money, Boehm, Fize, and Jaravel (2025) find that short-run MPCs were significantly higher for consumers randomly assigned a prepaid debit card with an expiry date or negative interest rate than for consumers given debit cards with no restrictions, despite the fact in both cases the value of consumers baseline expenditure was almost always greater than the amount on the cards. Rational consumers would use the prepaid debit cards subject to time restrictions or negative interest rates first, before switching to their normal debit or credit cards, but would have no additional reason to adjust the timing of their *total* expenditure relative to those who could spend using their prepaid debit card at any time. The fact consumers with time-limited cards did so is therefore evidence of money from different cards being viewed as non-fungible in some way.

²The third mental account mentioned in Shefrin and Thaler (1988) is the 'future' income account, from which consumers are predicted to have a low MPC.

³Crossley et al. (2021) and Crossley et al. (2023) also ask about whether individuals would adjust their transfers from or to other households in response to a windfall gain.

Our final finding relates to the potential role of measurement errors arising from the use of MPCs that are directly elicited from survey data. Respondents sometimes interpreted the classification of spending and saving differently to the standard economic conception. For instance, some low-liquidity individuals report debt repayments as an item of spending when listing what they would spend more on. Thus, high measured MPCs for these consumers partly reflect debt repayment (that is, saving). At the same time, some individuals report certain spending activities when asked what they would do with unspent funds. Importantly, however, such outlay classification problems, which lead to mismeasurement of individual MPCs, are limited, and do not seem to be a major source of the puzzling MPC heterogeneity within groups defined by liquidity.

In sum, we find that some of the heterogeneity in reported MPCs is explained by measurement problems, but the main measurement issue seems to be the classification of high and low-liquidity individuals, rather than mismeasurement of individual MPCs. Our findings point to behaviours and motives that are typically absent in standard models as more important explanations, particularly mental accounting and a strong debt repayment motive (perhaps because of heterogeneity in the interest rates households face). Thus, our analysis offers lessons both for the design of future surveys and the modelling of consumer behaviour. We return to these points in our concluding section. Our findings highlight the advantages of open-ended questions, which can reveal the importance of behaviours and motives that might otherwise not have occurred to data collectors.

We contribute to the literature that elicits MPCs using hypothetical scenarios. Such studies are now common and have been used to study variation in MPCs across countries (Drescher, Fessler, and Lindner (2020)), across gains and losses (Bunn et al., 2018, Christelis et al., 2019), in response to payments of different sizes (Andreolli and Surico, 2021) and across wealth and income shocks (Christelis et al., 2021). In a contemporaneous and complementary paper, Colarieti, Mei, and Stantcheva (2024) examine the motives of individuals' saving and spending decisions in response to hypothetical windfalls and losses with detailed closed format questions that also cover their general spending and saving strategies. Our use of open-ended questions complements this paper by allowing us to see which motives individuals raise unprompted, and by shedding light on how respondents interpret and understand what they are being asked.

A second literature we contribute to concerns potential behavioural explanations for high MPCs among consumers with significant liquidity. Graham and McDowall (2024) propose a model of mental accounting in which consumers are averse to dissaving, and show how this can account for the the large short-term consumption response of high liquidity consumers to anticipated tax rebates. Lian (2023) shows how mistakes in future consumption plans (potentially driven by a wide set of different possible departures from rationality) can generate high MPCs even amongst consumers with high liquidity. Ilut and Valchev (2022) outline a model in which it is costly for consumers to adjust their target wealth, which similarly predicts high MPCs amongst

the unconstrained. Boutros (2022) puts forward a model of rational inattention in which consumers endogenously choose their planning horizon over how to spend a windfall depending the utility costs of potential errors, leading to excessive impatience relative to the rational benchmark. The open-ended survey responses we study complement these efforts by revealing the self-described motives behind consumers’ decisions, which can be used to discriminate between potential explanations.

Finally, we contribute to a growing body of research using text analysis to study economic behaviour. Text analysis in macroeconomics has largely focussed on the words of policymakers (Hansen, McMahon, and Tong, 2019) or the media (Baker, Bloom, and Davis, 2016). Here we focus on the words of consumers, and in particular self-reported explanations of their own circumstances and decision-making. Open-ended questions of the kind we use have been used elsewhere to assess attitudes and understanding of particular fiscal and redistributive policies (Stantcheva, 2020).

The remainder of this paper is structured as follows. In Section 2 we describe our survey, the open-ended questions and our analysis sample. Section 3 describes how MPCs vary across treatments and gain and loss scenarios and their distribution across consumers in our data. Section 4 describes the methods and results of our text analysis. Section 5 uses the results of Section 4 to provide an accounting for the heterogeneity documented in Section 3. Finally, Section 6 discusses lessons both for the design of future surveys and for future modelling of consumer behaviour.

2 Data

2.1 Survey Overview

Our survey was put together using Qualtrics software, and fielded online with participants recruited from the UK by a large survey company from 11th-14th May 2023. Individuals who completed the survey received a small payment as compensation for their time. We reproduce the survey in Appendix G.

Because open-ended questions have not been used to study marginal propensities to spend in this way before, we conducted two pilots to test our questions and assess the quality of the open-ended answers before running the main survey. The first pilot ran from 23rd-27th February 2023 and had 240 complete responses. The second pilot ran from 5th-6th April and had 91 respondents. In both cases we collected respondent feedback at the end of the survey. Responses from the pilot waves are not included in the results below.

Before accessing the survey, respondents were shown a preamble that explained the nature of the survey and told that it was for academic research to “understand how individuals respond to unexpected changes in their income.” They were also told there were no right answers to the questions posed, and invited to share their own thoughts as accurately as possible.

Those choosing to continue were then asked questions about their demographics and financial situation, including whether they saved each month and how much, whether they had debts and the extent to which those debts were a burden for their household, and their available liquidity (how long they would be able to cover their living expenses if they lost their main source of income without borrowing or asking for help from friend or family).⁴ They were also asked questions about how often they were unable to afford essential goods such as food, clothing and heating. They were then invited to explain how they would respond to hypothetical windfalls and hypothetical losses, using open-ended text fields to describe what they would do and their reasons for doing so. Responses to these questions had to be a minimum of 12 characters, and individuals were prompted to give as much detail as they could (“The more detail you provide, the better we will be able to understand your circumstances and decisions”).

At the end of the survey, individuals were asked how clear they found the survey questions and to provide us with any feedback they had in another open text field. We found that this feedback field was particularly useful in redesigning the survey following the initial pilot waves. An example of this was the framing of questions on financial losses. Feedback from the pilot suggested this was difficult to answer for those with low levels of liquidity, particularly when asking about a one-off loss of £2,500, as several respondents pointed out that the loss exceeded their available funds. In light of this feedback, we added further detail to the question, explaining that the loss could be “a one-off reduction in the value of your savings, an increase in your debts or a one-time reduction in your income.”

2.2 Eliciting MPCs and open-ended follow-up questions

The questions on gains and losses were adapted from Fuster, Kaplan, and Zafar (2021). All respondents were asked about their responses to both hypothetical windfalls and losses. The order in which the two scenarios were presented was randomised across respondents to allow for possible question order effects. Respondents were also randomly assigned the size (either £500 or £2,500) of their gains and losses, with the same amount being used in both scenarios. Thus, we have a within-subject design for gain versus loss treatments but a between-subject design for size effects.

In the gain treatment, individuals were first asked if they would spend more, the same or less over the next three months in response to receiving a hypothetical unexpected payment. If they responded they would spend more or less, they were asked how much (allowing us to calculate their MPC). They were then invited to list - in their own words - what they would spend this money on if spending more, and what they would buy less of if they said they were spending less. Individuals who said they would not spend the entire payment were then asked how they would use the unspent funds. All respondents were then asked to give reasons why they would use the

⁴This question was taken from the Financial Conduct Authority’s *Financial Lives* survey (Financial Conduct Authority, 2023).

money in the ways they had stated. Those who said they would increase their spending by more than the payment were also asked specifically why they would do this in particular.

In the loss treatment, individuals were asked about “a hypothetical situation in which you unexpectedly find yourself (£500/£2,500) worse off today. This could be a one-off reduction in the value of your savings, an increase in your debts or a one-time reduction in your income. Note that this does not in any way affect your income going forward. You have simply found yourself suddenly to be (£500/£2,500) worse off than you were before.” They were again asked if they would spend more, less or the same over the next three months in response. If they responded by saying they would spend less, there were asked to describe what they would cut back on. Those not cutting back their spending by the full amount of the loss were then asked how they would cover the remaining deficit. As in the gain question, they were then asked to explain why they would respond in the way they did.

Table A1 in Appendix A shows results of tests for question order effects in reported MPCs, based on whether individuals were presented with the loss question first, or the gain question. Individuals were around 4 ppt more likely to report they would spend more in response to a windfall, or to report they would spend less in response to a loss, if this was the first question they were asked (a difference that is statistically significant). A possible explanation for this order effect is question fatigue. As we randomized the order across individuals, this should not unduly affect our results.

2.3 Data Collection and Analysis Sample

In the main survey, we used quota sampling with quotas of 872 each for men aged 18-44, women aged 18-44, men aged 45 and over and women aged 45 and over. We also allowed up to 12 individuals identifying as being non-binary. In the end, this yielded a sample of 3,505 respondents.⁵

We found the vast majority of respondents provided good quality and coherent responses to the open-ended questions - but not all. We took several steps to screen out low quality responses from our sample, making use of paradata collected by the survey software. In particular, we drop i) 45 individuals who reported (to our feedback section) that the survey questions were ‘very unclear’ ii) those whose time spent reading and responding to the open-ended questions put them in the bottom 5% of the distribution (175 individuals whose responses also tended to be of low quality) iii) 68 respondents who completed the survey on a phone and who spent less than 30 seconds reading and responding to the open-ended questions and were recorded making more than five clicks on the page (and so appeared to answer the questions using predictive text) iv) 8 individuals reporting implied MPCs to either gains or losses greater than 10. After these selections,

⁵Our sample is not a probability sample, so the well-established mathematics of population inferences do not apply. The goal of our quota sampling instead was to have a sufficiently large and diverse sample of respondents to capture the full range of behaviours in the population. All inferences refer to this sample.

we are left with an analysis sample of 3,213 respondents (92% of the obtained sample).

Table A2 in the Appendix A displays summary statistics for the analysis sample. The average respondent spent 12 minutes completing the survey. The sample remains roughly balanced by age and sex after our sample selection (52% are female and 52% are 45 and over). Table A2 also includes sample characteristics taken from the 2022-23 wave of UK Household Longitudinal Study (UKHLS, (Institute for Social and Economic Research, NatCen Social Research, and Kantar Public, 2025)), weighted to be representative of the population. Our sample is younger, more likely to be white, less likely to be living as a couple and more likely to be in employment than the implied population values from UKHLS.

2.4 Liquidity Groups

High-liquidity individuals are defined as those who say that they would be able to cover at least three months of their living expenses if they lost their main source of income. Table 1 displays summary statistics for some aspects of the personal finances of the two liquidity groups. The measure of liquidity correlates well with other measures of wealth and financial security. Those with high liquidity are more likely to own their homes outright, to not have debts, and to have saved in the most recent month. They were also much less likely to report difficulties eating adequately, paying for goods and services related to health and hygiene, or paying bills to maintain and heat their homes. We also considered an alternative measure of individuals' liquidity, simultaneously drawing on various questions of the survey and using latent class analysis to divide the sample into two liquidity groups. This measure turns out to have a high degree of overlap with the simpler classification (see Appendix B).

3 Heterogeneity in MPCs

The previous literature has largely achieved consensus on two facts with regard to individuals' MPCs (Fuster, Kaplan, and Zafar, 2021). The first is that MPCs are larger in loss scenarios than gain scenarios (Bunn et al., 2018, Christelis et al., 2019); the second is our motivating puzzle: while average MPCs differ according to measures of liquidity, much of the variation in MPCs is not explained by observables, i.e. the R-squared of regressions of MPCs on observable demographics and cash on hand is low (Fagereng, Holm, and Natvik, 2021, Ganong et al., 2020, Lewis, Melcangi, and Pilossoph, 2024). In this section, we document that each of these facts are reproduced in our data.

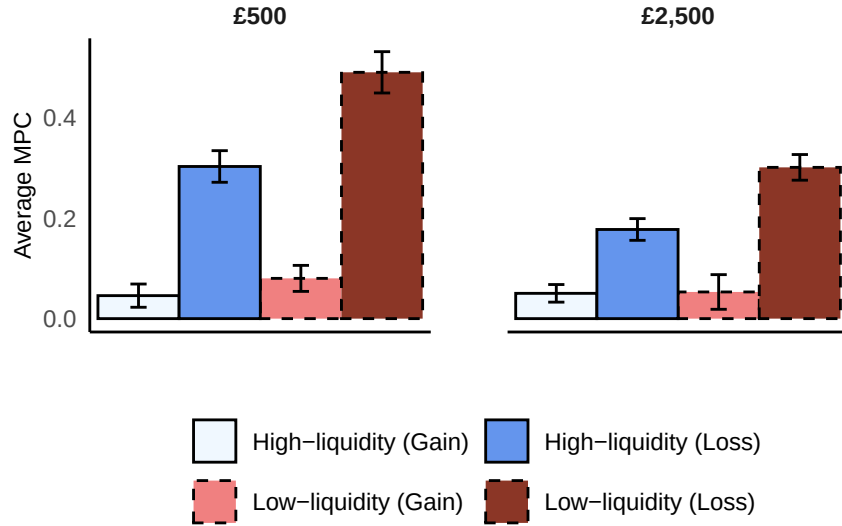
Figure 1 shows average MPCs by liquidity group, across the gain and loss scenarios, and according to the size of the gains and losses that respondents were asked about. Average MPCs are similar to those reported in previous studies using similar questions (Fuster, Kaplan, and Zafar,

Table 1: Personal finances by liquidity

	High Liquidity		Low Liquidity	
	Mean	SD	Mean	SD
<u>Home ownership</u>				
Own home outright	0.50	0.50	0.14	0.35
Own w/mortgage	0.28	0.45	0.30	0.46
Rent home	0.18	0.39	0.48	0.50
Shared ownership	0.01	0.09	0.02	0.15
Live rent free	0.03	0.16	0.04	0.19
<u>Personal finances</u>				
No loans	0.62	0.49	0.41	0.49
Loans: not a burden	0.23	0.42	0.10	0.30
Loans: somewhat burden	0.13	0.34	0.31	0.46
Loans: heavy burden	0.02	0.14	0.19	0.39
Save any income	0.80	0.40	0.49	0.50
Savings amount (>0)	472.70	772.09	368.17	1,057.17
<u>Ever had problems affording...</u>				
Count food items	1.41	2.19	4.20	2.88
Count health items	0.63	1.31	1.87	1.83
Count home items	1.00	1.47	2.54	1.78
Count any item	3.04	4.46	8.61	5.73
Observations	1473		1740	

Note: High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. The remaining two percent of responses regarding home ownership for individuals with low liquidity correspond to *Other* types of ownership.

Figure 1: Average MPCs by liquidity group and gain/loss treatments



Note: Figure shows average implied MPCs across liquidity groups, gain and loss scenarios, and treatments specifying different amounts for the gains and losses (£500 and £2,500). Whiskers represent 95% confidence intervals. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income.

2021, Crossley et al., 2021).⁶ For both individuals with high and low levels of liquidity, MPCs are greater in the loss treatment than in the gain treatment. The asymmetry across gains and losses is greater for low-liquidity individuals. As Fuster, Kaplan, and Zafar (2021) illustrate, this is consistent with a life-cycle model with precautionary saving. However, this asymmetry is apparently smaller for MPCs in the £2,500 treatment, which is not consistent with a concave consumption policy function - a point we return to in our conclusion. Average MPCs are also smaller for both gains and losses when individuals were asked about amounts of £2,500 than when they are asked about amounts of £500. Larger amount sizes are associated with more respondents reporting positive MPCs, but conditional on changing their spending, their implied MPCs are smaller.⁷ Tables A3 and A4 in Appendix A present formal statistical tests of these differences.

Figure 2 shows the distribution of MPCs across liquidity groups, across gain and loss treatments, and across treatments with different amounts of money. In all cases, the modal response MPC was zero. Much of the difference in average MPCs shown in Figure 1 is on the extensive margin: individuals with three months or more of available liquidity were more likely to report an MPC of zero than those with less liquidity. Differences in the extensive margin also account for

⁶The level of MPCs and its relationship with liquidity can be strongly influenced by the way questions are posed (see Crossley et al. (2025)).

⁷Fuster, Kaplan, and Zafar (2021) also find that larger cash gains are associated with an increase in the proportion of respondents reporting positive MPCs, but that average MPCs conditional on spending more are lower than for smaller payments. However, in their case the former effect outweighs the latter, meaning that higher cash amounts are associated with larger MPCs on average (they do not consider the effect of different amount sizes in the loss domain). Boutros (2022) model of endogenous planning horizons aims to explain this negative association between MPCs conditional on spending and windfall sizes. In this model, it is costly for consumers to adopt longer planning horizons (greater consumption smoothing), and this cost is more likely to be justified for larger windfalls.

much of the difference in the spending response across gain and loss scenarios, with many more reporting positive MPCs in the loss scenario than in the gain scenario.

Figure 2 also highlights that there is considerable heterogeneity within groups defined by liquidity. While on average those with less liquidity have higher MPCs, many low-liquidity individuals have an MPC of zero. At the same time, 2% of those with high liquidity report an MPC of 100% or more in the £2,500 gain treatment, and 4% report an MPC of 100% or more in the £500 gain treatment. The equivalent numbers in the loss treatment for high-liquidity individuals were even higher: at 6% for the £2,500 treatment and 16% for the £500 treatment.

Very little of this heterogeneity is explained by other observable characteristics. Table 2 reports regression results of MPCs on demographic characteristics, employment status and controls for individuals' financial situation. The R^2 s in these regressions are low, even when looking within high and low-liquidity groups. The R^2 is noticeably higher, though still small, in the loss scenario compared to the gain scenario. R^2 s for regressions of MPCs in the gain scenario are always under 1%, and in the loss scenario they are always under 6%. When the dependent variable is an indicator for having a positive MPC, the R^2 is always under 12% for the loss scenario and under 2% for the gain scenario.

In what follows, we seek to understand heterogeneity in MPCs through analysis of choices and motives mentioned in individuals' responses to open-ended questions.

4 Text analysis

4.1 Pre-processing

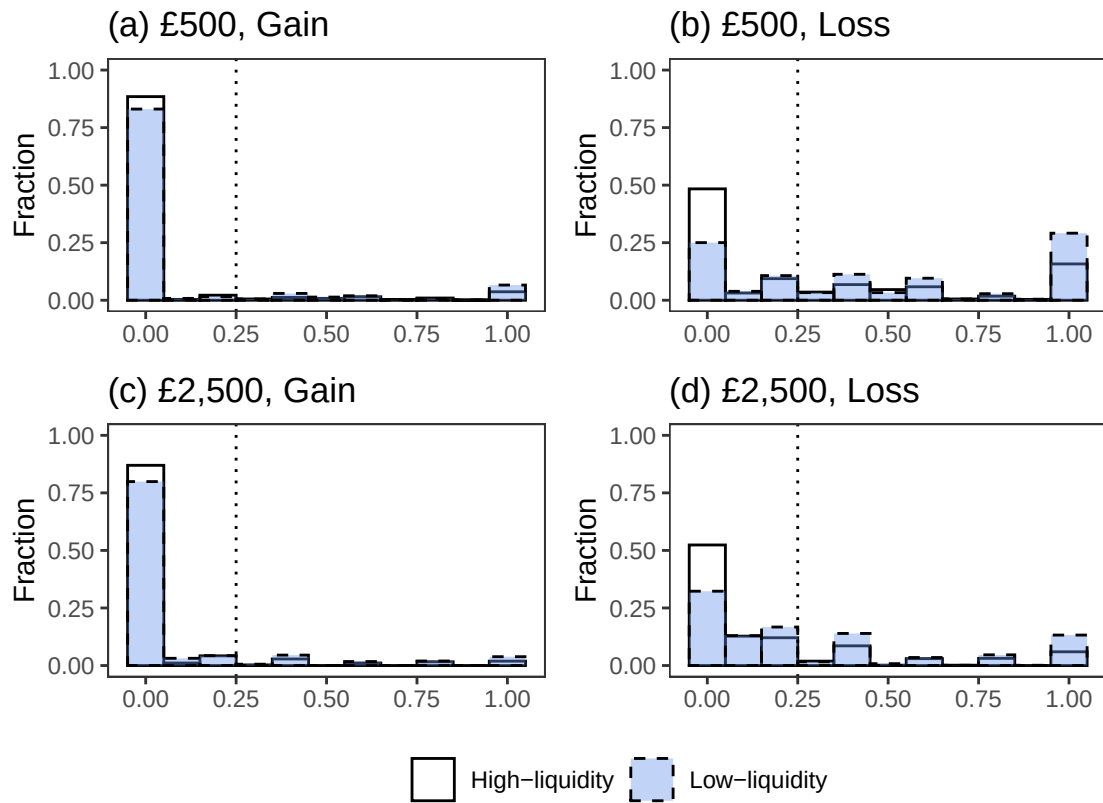
Our analysis sample contains over 3,000 responses to a range of questions covering both how individuals would use an unexpected windfall gain and how they would cover an unexpected loss.

We prepared the responses to the open-ended questions for text analysis using an approach similar to that described in Ferrario and Stantcheva (2022). We first remove punctuation, numbers, excess spaces and special characters as well as commonly used stop-words such as 'I', 'the', 'and' etc. We then lemmatize the remaining words (remove inflections, such that for example 'savings', 'saving', and 'saves' are replaced with 'save'). Thus, "*Treat myself to a few days down the pub, and nice food*" becomes "*treat day pub nice food*".

We then processed the lemmatized answers which described *what* individuals would do with the gain or to cover the loss, and then separately processed answers that explain *why* they behaved in the way they did.⁸ In the gain treatment, the 'what' responses were what they would

⁸We appended lemmatized answers to sets of questions, separating the answers to different questions with special characters. The special characters ensure ngrams used to assign respondents to topics did not span across answers to different questions.

Figure 2: Distributions of MPCs by liquidity group



Note: Figure shows the distribution of implied MPCs across liquidity groups, gain and loss scenarios, and treatments specifying different amounts for the gains and losses (£500 and £2,500). We trim MPCs so that they are between zero and one. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. The dashed lines indicate our cut-off for 'high' MPCs (0.25).

Table 2: Regressions of MPCs on observable characteristics

	Gain		Loss	
	MPC	Pr(MPC>0)	MPC	Pr(MPC>0)
<u>Panel A. Full sample</u>				
Low liquidity	0.01 (0.02)	0.04*** (0.02)	0.09*** (0.02)	0.15*** (0.02)
High debt	0.04** (0.02)	0.05*** (0.02)	0.08*** (0.02)	0.11*** (0.02)
Employed full-time	-0.02 (0.02)	-0.03* (0.01)	0.04** (0.02)	0.01 (0.02)
Own home outright	-0.01 (0.01)	-0.02 (0.02)	-0.06*** (0.02)	-0.11*** (0.02)
Observations	3058	3058	3058	3058
R ²	0.004	0.017	0.048	0.113
<u>Panel B. High liquidity</u>				
High debt	0.06** (0.03)	0.09*** (0.03)	0.13*** (0.03)	0.22*** (0.03)
Employed full-time	-0.01 (0.02)	-0.02 (0.02)	0.06*** (0.02)	0.03 (0.03)
Own home outright	-0.01 (0.02)	-0.02 (0.02)	-0.04* (0.02)	-0.10*** (0.03)
Observations	1421	1421	1421	1421
R ²	0.008	0.018	0.056	0.093
<u>Panel C. Low liquidity</u>				
High debt	0.02 (0.02)	0.04* (0.02)	0.06** (0.03)	0.06*** (0.02)
Employed full-time	-0.02 (0.03)	-0.03 (0.02)	0.02 (0.02)	-0.01 (0.02)
Own home outright	-0.01 (0.02)	-0.00 (0.03)	-0.06 (0.04)	-0.06* (0.03)
Observations	1637	1637	1637	1637
R ²	0.004	0.004	0.008	0.024

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. High debt individuals are those that declare that their debts are *somewhat of a burden* or *a heavy burden*. All regressions control for gender, being above 45 years old, being married, and having any child living in the household.

do if they spent more, what they would do with funds they did not spend, and what they would use the funds for if they said they would spend the same. The ‘why’ responses were responses to questions on why they would spend more, why they would spend the same, and why they would use unspent resources in the way they stated. In the loss treatment, the ‘what’ responses were responses to questions asking what they would spend less on following the loss, and what they would do to cover losses not covered by spending reductions. The ‘why’ responses to the loss questions were then combined with responses to questions asking why they would spend less and why they would spend the same following the unexpected loss. When assessing motives, we combine both ‘what’ and ‘why’ responses, as individuals often mentioned motives when describing what they would do (for example, by responding “I would save it for future emergencies” when asked what they would do with unspent funds from the windfall).

To analyse the text responses, we identified topics mentioned in both the what and why responses using keywords or ngrams (groups of words). Since the answers were in general short (at most a few sentences), we selected the keywords and ngrams ourselves, using frequently mentioned words and combinations of words and their synonyms. More specifically, we started by assigning the most commonly used ngrams to topics, then verified that the mapping of ngrams to topics was appropriate by reading individual answers to assess the precise manner in which they had been used. We then selected additional ngrams that would help us classify answers that had not yet been assigned to a topic, verifying the use of these and so on.

Recording the keywords and ngrams associated with each topic has the advantage of making our classification transparent: the list of keywords and ngrams associated with each topic is described in Appendix C. An alternative to manually defining topics would be to use supervised or unsupervised machine learning techniques (see for example the suggestions for topic modelling in Gentzkow, Kelly, and Taddy (2019)). We found this was not necessary given the typical length of the responses we received, which made it feasible to read many answers. We also found that the meaning of different terms tended to be highly sensitive to context and so important to check manually. Another alternative is the use of large language models, which can read full non-lemmatized responses and thus account for the full context in which individual words might be used. To compare this approach with keyword classification, we used the ChatGPT API to classify responses to what individuals would do with a windfall gain. The results are reported in Appendix D. The exercise gave qualitatively similar results to our main approach, but there were some differences. In general we found the LLM tended to miss spending topics (in particular when respondents listed what they would buy without explicitly mentioning words like ‘buy’ or ‘spend’). We also found the LLM could misclassify some responses relative to economists definitions (for example categorising placing money in a savings account as ‘investment’, or ‘pay off debt’ as spending on essentials). In other words, the LLM can be affected by the same differences

Figure 4: Bigrams mentioned in response to loss

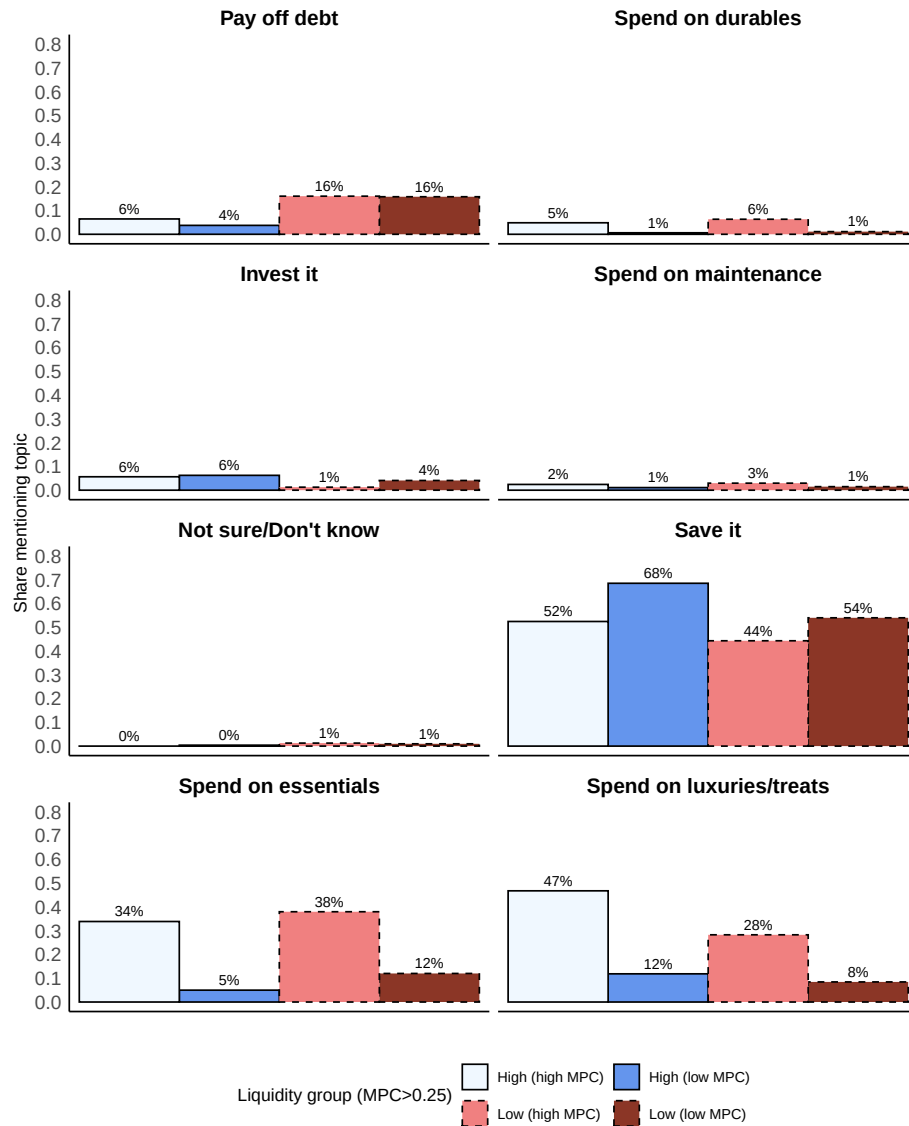
4.3 Topic analysis: how a gain would be used

"I would spend the money on future activities and events. I would book short holidays, including hotels, transport and events as appropriate. I am [age], and would take this course of action as although I have three adult children, they are all self sufficient and require no financial support. My eldest brother worked and saved for his retirement only to fall victim to Alzheimer's Disease. He died prematurely at just 64. This is a significant influence on how I conduct myself." – **£2,500 treatment, high-liquidity, high MPC**

In this section, we use the open-ended responses to better understand differences in MPCs across and within liquidity groups. We start by considering responses to an unexpected gain. Figure 5 shows the shares of individuals in different liquidity groups describing topics when answering what they would do with payments. We pool responses across £500 and £2,500 treatments but separate respondents according to whether they reported a high MPC (greater than 0.25) or a low one (0.25 or below). Appendix F shows how responses differ according to the size of the payment amount (and pools responses across individuals with different MPCs).

half of high-liquidity individuals with larger MPCs. Low-liquidity individuals are less likely to report that they would save more than high-liquidity individuals regardless of whether they had high or low MPCs.

Figure 5: Share mentioning topics on how they would respond to a windfall, by liquidity group and MPC



Note: The figure shows the proportion of individuals, in groups defined by liquidity and their MPCs, who mentioned given topics when answering what they would do with a windfall gain. We pool responses across £500 and £2,500 treatments. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. This combines answers to what individuals would do if they spent more in response to the gain, and what they would do with any unspent funds. Topics are defined by keywords and phrases selected by the authors. See Appendix C for keywords defining each topic. Answers can contain multiple topics. We exclude responses of those saying they would spend less. N=2,992 (1,282 with low liquidity and low MPC, 124 with low liquidity and high MPC, 1,349 with high liquidity and low MPC, 237 with high liquidity and high MPC).

Of those that report a high MPC, low-liquidity individuals were slightly more likely to mention essentials such as food, clothing and heating. 38% of respondents mention this topic in the low-liquidity group compared to 34% in the high-liquidity group. However, high-liquidity individuals

are much more likely to mention spending more on relative luxuries such as entertainment and holidays. 47% of individuals who had both high-liquidity and a high MPC mention this topic compared to just 28% of low-liquidity individuals with high MPCs.

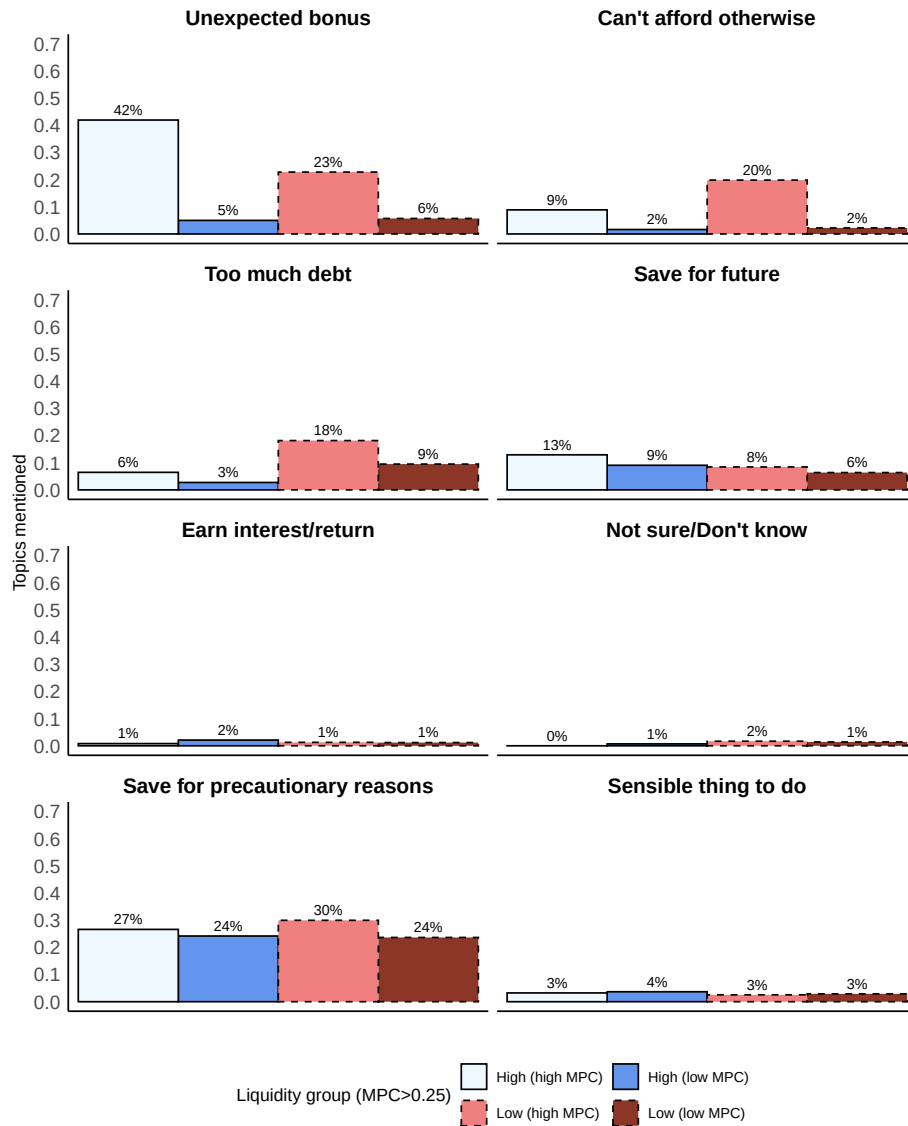
Only a small proportion of respondents in both liquidity groups mentioned purchases of 'big-ticket' durables such as cars or appliances (and in addition this does not vary much by payment size - see Figure F2). This is noteworthy as one explanation for high MPCs among consumers with high liquidity is that additional income might trigger large but 'lumpy' expenditures amongst some fraction of consumers (Fuster, Kaplan, and Zafar, 2021). Respondents do not appear to commonly mention such purchases unprompted.

Low-liquidity individuals are more likely to report using the windfall to pay off debt. This was true both for those reporting low MPCs, and for those reporting high MPCs. Partly, this is because some of those reporting they would spend more say they would spend the extra funds on credit card or other debts rather than consumption (see for example the third sample answer at the beginning of this section). These individuals are misclassifying saving (debt repayment) as spending, and their true MPC is lower than implied by their response. We discuss the implications of this for understanding heterogeneity in MPCs in Section 5.

Figure 6 shows the share of individuals in different liquidity and MPC groups who mention different topics corresponding to motives or explanations of their actions. This makes clear that the motives of high-liquidity spenders are quite different to low-liquidity spenders. High-liquidity spenders are much more likely to mention words related to the windfall being an "unexpected bonus", such as 'treat', 'windfall', 'bonus' and 'indulge' than low-liquidity spenders. By contrast, those with low liquidity are more likely to mention words or phrases implying that they would not be able to afford their purchases without the payment (such as 'unaffordable', 'couldn't afford' or 'afford otherwise'). This suggests that for low-liquidity spenders, the payments were more likely to relieve a financial constraint, while high-liquidity spenders saw receipt of the payment as an opportunity to treat themselves to something they would not typically buy. This latter motive - reflected in the first two sample responses to the gain question - is consistent with mental accounting models of consumer spending behaviour (Thaler and Shefrin, 1981, Milkman and Beshears, 2009).

Many respondents mention topics related to precautionary motives for saving (one of the most commonly mentioned bigrams was 'rainy day'). However, the importance of this motive does not appear to vary greatly across liquidity, or by the size of reported MPCs.

Figure 6: Share mentioning different motives/explanations in response to windfall, by liquidity group and MPC



Note: The figure shows the proportion of individuals, in groups defined by liquidity and their MPCs, mentioning given motives or explanations when answering why they would respond in the way they did to a windfall gain. We pool responses across £500 and £2,500 treatments. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. This combines answers to what individuals would do if they spent more in response to the gain, and what they would do with any unspent funds as well as answers on why they would behave in this way (as respondents often mentioned motives when describing what they would do with the windfall). Topics are defined by keywords and phrases selected by the authors. See Appendix C for keywords defining each topic. Answers can contain multiple topics. We exclude responses of those saying they would spend less. N=2,992 (1,282 with low liquidity and low MPC, 124 with low liquidity and high MPC, 1,349 with high liquidity and low MPC, 237 with high liquidity and high MPC).

Perhaps unsurprisingly, low-liquidity individuals are also much more likely to mention existing debts in explanations of their motives than those with more liquidity. Among low-liquidity individuals, 18% with high MPCs and 9% with low MPCs mentioned words related to debt and borrowing in their answers. As before, the high proportion of low-liquidity individuals with high MPCs mentioning debt in their explanations partly reflects the misclassification of debt repay-

ments as spending. Were it not for this misclassification, many of the individuals mentioning debt as a motive would report lower MPCs.

4.4 Topic analysis: how a loss would be covered

"The loss is heavy. £500 is just under half my monthly wage. Amenities, food, rent, TV, phones etc. would all be affected. Food would have to be cut. No extras. Less use of electricity and gas (heating) less use on car (fuel) direct debits for the tops [sic] bills would have to go out or we would be homeless. " – **£500 treatment, low-liquidity, high MPC**

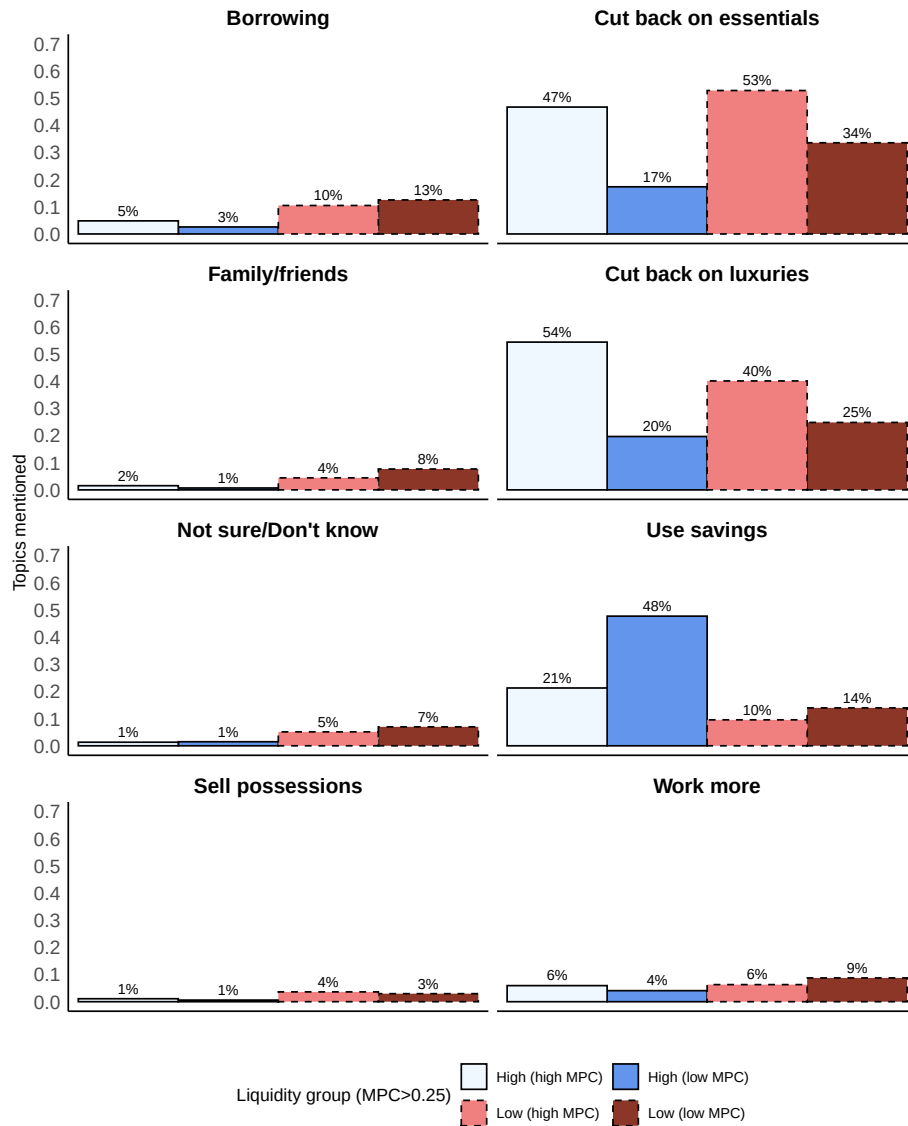
" ... I would still have plenty of emergency savings left to cover the 3 months. I also live with 2 other adults who also have income and savings, and we all chip in together to make sure all the essentials are paid off leaving us all with extra money to save, so I wouldn't feel like I would need to change the way I spend." – **£2,500 treatment, high-liquidity, low MPC**

We now turn to considering differences across individuals in terms of their responses to a loss in their available resources. Figure 7 shows the share of individuals mentioning given topics when asked how they would cope with a given loss, again separated across groups defined by available liquidity and MPCs.

As we saw in Figure 1, spending responses to the loss were much larger than responses to equivalently sized gains. Figure 7 shows the areas of spending where respondents would cut spending. As one might expect, low-liquidity individuals who cut back their spending are more likely than high-liquidity individuals to report they would cut back on essentials such as food and fuel. Among high MPC responses, that is individuals who reduce their spending by more than 25% of the amount of the loss, 53% of low-liquidity individuals mention cutting back on essentials compared to 47% of high-liquidity individuals. On the other hand, high-liquidity individuals are more likely than low-liquidity individuals to report they would reduce non-essential spending such as restaurant meals, streaming services and travel.

Figure 7 also shows that there is rich set of non-spending responses individuals mention when explaining how they would cope with a loss. Alongside cutting back spending and dipping into savings, non-trivial fractions of respondents report they would borrow from friends and family, sell possessions or work extra shifts to cover the loss. For these individuals, their *effective* liquidity might be greater than narrow financial measures of liquidity might suggest. Labour supply responses are rarely mentioned in response to the gains scenario (besides a handful of individuals who mention it would help them to retire earlier). Between 10 and 13% of low-liquidity individuals also mention they would cover the loss with greater borrowing.

Figure 7: Share mentioning topics on how they would respond to a loss, by liquidity group and MPC



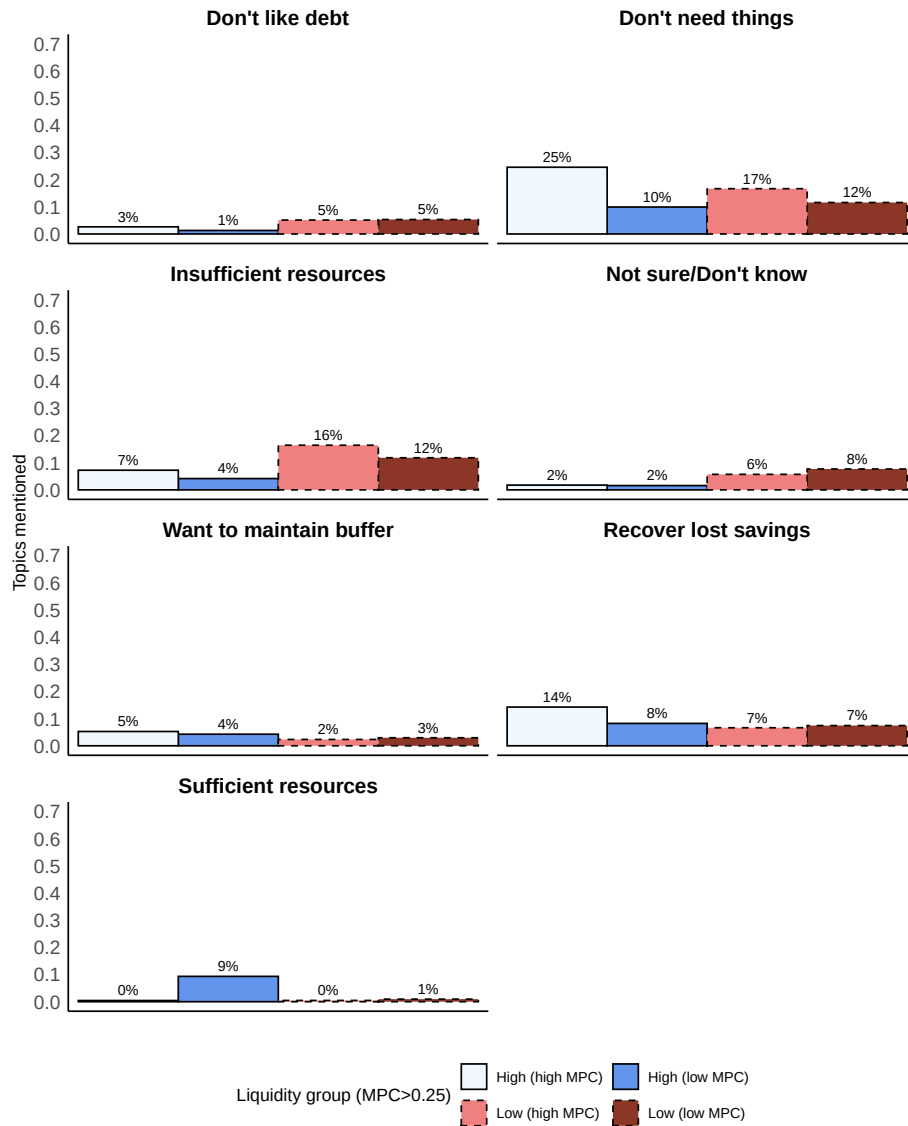
Note: The figure shows the proportion of individuals, in groups defined by liquidity and their MPCs, who mentioned given topics when answering what they would do in response to a loss. We pool responses across £500 and £2,500 treatments. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. This combines answers to what individuals would do if they spent less in response to the loss, how they would cover remaining losses, and what individuals would do if they spent the same after the loss. Topics are defined by keywords and phrases selected by the authors. See Appendix C for keywords defining each topic. Answers can contain multiple topics. We exclude responses of those saying they would spend more in response to the loss. N= 3,168 (1,008 with low liquidity and low MPC, 456 with low liquidity and high MPC, 846 with high liquidity and low MPC, 858 with high liquidity and high MPC).

Figure 8 shows motives that individuals mention when explaining why they would act in the way they described. High-liquidity individuals are more likely to mention that some of their spending was unnecessary than low-liquidity individuals. Among high-liquidity individuals with a high MPC out of a loss, 25% mention words such as “unnecessary”, or “non-essential” compared to 17% of low-liquidity/high MPC individuals. Low-liquidity individuals are much more likely to report difficulty being able to cover the loss because of insufficient resources, and this was still

more common among those low-liquidity individuals with high MPCs. High-liquidity individuals with low MPCs are essentially the only group to mention words or phrases that implied they had sufficient resources to absorb the loss (and thus that they did not need to cut back spending).

Compared to the gain scenario, more individuals report being unsure what they would do in response to a loss. This was particularly the case among those with low liquidity. Figure F5 in the Appendix shows that this was more common among those in treatment with the £2,500 loss, than in the treatment where the loss was £500. This likely reflects the fact that for some of these individuals, a loss of this magnitude made up a large fraction of their available resources, making the scenario - and how they would respond to it - difficult to envisage. This was mentioned in some of the answers and feedback we received. To give an example, when asked why they would spend the same as they would otherwise in response to a £500 loss, one low-liquidity individual responded 'I am already spending the bare minimum. I simply would not know how to cope'.

Figure 8: Share mentioning different motives/explanations in response to loss, by liquidity group and MPC



Note: The figure shows the proportion of individuals, in groups defined by liquidity and their MPCs, who mentioned given topics when answering what they would do in response to a loss. We pool responses across £500 and £2,500 treatments. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. This combines answers to why individuals would spend less in the event of a loss with what they would do if their spending was unchanged. Topics are defined by keywords and phrases selected by the authors. See Appendix C for keywords defining each topic. Answers can contain multiple topics. We exclude responses of those saying they would spend more in response to the loss. N= 3,168 (1,008 with low liquidity and low MPC, 456 with low liquidity and high MPC, 846 with high liquidity and low MPC, 858 with high liquidity and high MPC).

Those with high MPCs in response to a loss are also more likely to mention topics associated with recovering lost savings or maintaining their buffer of precautionary savings. This is consistent with *saving* mental accounting behaviour (particularly for those with initially high levels of liquidity). In the behavioural life-cycle theory set out in Shefrin and Thaler (1988), mental-accounters face a self-imposed cost to accessing funds in their 'current assets' account, preventing them from using their savings to cover temporary losses.

Since we observe consumers motives in both loss and gain domains, we are able to examine whether the same individuals mention topics consistent with both windfall mental accounting and saving mental accounting. Table cross-tabulates the proportions with those mentioning mental accounting motives in the gain domain (that payments would be bonuses that they would be inclined to spend) against the proportions mentioning these in the loss domain (a desire to maintaining their stocks of savings). Interestingly, the correlation in these motives across the two domains is low. Only 1% of respondents mentioned a mental accounting behaviour in both loss and gain scenarios. Overall, 8% mentioned a windfall mental accounting motive in the gain scenario, and 11% in the loss scenario, and in total 18% of respondents mention a topic consistent with a mental accounting motive.

Table 3: Cross-tab mental accounting motives

		Mental accouter (saving)	
		No	Yes
Mental accouter (windfall)	No	0.81	0.10
	Yes	0.07	0.01

Note: Table shows the proportions of respondents with non-negative MPCs in both loss and gain scenarios who mention keywords or bigrams associated payments being an “unexpected bonus” when explaining their response to a gain (mental accouter (windfall)) or keywords or bigrams related to ‘recover lost savings’ or ‘want to maintain buffer’ in the loss scenario (mental accouter (saving)).

5 Understanding MPC ‘puzzles’

In this section, we draw on our analysis of respondents’ open-ended responses to discuss possible explanations for the within-liquidity group heterogeneity in MPCs, and also to explore gain-loss asymmetries in MPCs.

5.1 Accounting for MPC Heterogeneity

Table 4 shows the proportion high-liquidity respondents with a high MPCs in the gain domain. Standard life-cycle consumption models predict that these individuals should instead smooth a windfall, consuming something like the annuitized value. The first row shows these proportion of such individuals in the complete analysis sample. In subsequent rows, we either reclassify individuals or exclude them according to their open-ended responses, to show how particular classification errors, misreporting or behaviours contribute to resolving this ‘liquidity puzzle’.

Table 4: *Understanding High-Liquidity - High Gain MPC Respondents*

	% high-liquidity with gain MPC >0.25	Share explained
Baseline	8.8%	
Reclassifying 'low-liquidity'	8.8%	0%
Excluding those over-reporting spending change	8.5%	4%
Excluding 'windfall mental accounters'	5.6%	36.6%

Note: In the first row, we show the share of high-liquidity respondents with high MPCs in the gain scenario. There are 1,406 high-liquidity respondents who gave valid responses to the loss question. In the second row, we show these proportions after reclassifying 136 individuals who specify non-financial coping mechanisms in response to loss questions, and who have low MPCs in the loss scenario, as high-liquidity. In the third row we exclude 6 individuals who misclassified non-spending (e.g paying down debts) as spending. In the final, row we exclude 124 individuals who reported mental accounting reasons for spending in their response to the gain scenario.

As a first step towards understanding the high MPCs among liquid consumers, we reclassify individuals whose open-ended answers implied their effective liquidity might differ from their *financial* liquidity. There are 136 low-liquidity individuals, who specify other coping mechanisms (working more, borrowing from friends and family or selling possessions) in the loss scenario, and who also have low MPCs in the loss scenario. Reclassifying these as high (effective) liquidity does not account for any of the puzzle. Comparing the first and second rows of Table 4, the proportion of those with high liquidity and high MPCs in the gain scenario remains at 8.8% of high-liquidity individuals when we do this.

As noted in Section 4, we observe some individuals who report debt repayments as spending in their responses to how they would use a windfall gain. This misclassification of saving as spending spuriously inflates the elicited MPC, but the number of such individuals is small, and the third row of Table 4 shows they explain very little of this puzzle. In total, correcting or removing these misclassification errors reduces the fraction of the sample classified as high-liquidity and high MPC from 8.8% to 8.5%. We therefore conclude that the puzzle of high gain MPCs among the liquid is not primarily a measurement problem. These MPCs appear to be genuine.⁹

Finally, we can examine how the distribution of MPCs among liquid respondents changes when we further exclude individuals who show evidence of mental accounting behaviour in the gain treatment (most of them with high MPCs). These are 124 individuals who mention that the windfall would be an unexpected bonus when discussing their motives for their behaviour. As shown in the final row of Table 4, this reduces the number of high-liquidity individuals with high MPCs to 5.6%, the largest adjustment that we find. Mental accounting motives appear to be an important explanation for high MPCs among the high-liquidity group. The cumulative effect of these adjustments is to reduce the share of individuals exhibiting puzzling behaviour by 36.6%.

⁹Some individuals reported spending activities when listing what they would do with funds they did not spend (and so likely unreported their MPCs). However, none of these individuals are left once we have made the sample changes in Table 4.

The second puzzling aspect of within-liquidity group heterogeneity in MPCs is the significant number of low-liquidity respondents with low MPCs in the loss domain. In principle, these individuals should struggle to smooth a loss, and being forced to cut spending, should have high MPCs in the loss domain. However, the first row of Table 5 shows that, in the full analysis sample, 49.6% of low-liquidity respondents report they would cut spending by less than 25% of a loss.

Table 5: *Understanding Low-Liquidity - Low Loss MPC Respondents*

	% low-liquidity with loss MPC <0.25	Share explained
Baseline	49.6%	
Reclassifying ‘low-liquidity’	44.6%	10.1%
Excluding those under-reporting spending change	44.6%	10.2%

Note: In the first row, we show share of low-liquidity consumers with low MPCs in the loss scenario. There are 1,704 low-liquidity respondents with valid responses in the loss scenario. In the second row, we show these proportions after reclassifying 154 individuals who specify non-financial coping mechanisms in response to loss questions, and who have low MPCs in the loss scenario, as high-liquidity. In the third row we exclude 2 individuals who misclassified spending as non-spending.

As noted above, some low-liquidity individuals with low loss-domain MPCs explicitly specify other coping mechanisms (working more, borrowing from friends and family or selling possessions). The second row of Table 5 shows that reclassifying these as high (effective) liquidity accounts for about 10% of this puzzle.

In the third row of Table 5 we exclude individuals, whose open text responses indicate that they under-reported their spending cut in the loss domain. For example, some individuals initially reported no change in spending, but in subsequent open-format probes revealed that they would cut spending. However, there are only a very small number of such individuals, and so these individuals explain a very small proportion of this second liquidity puzzle. Ultimately, for most of this low-liquidity/low loss MPC group, it remains uncertain how they would (as they claim) smooth a loss, or if indeed they would.¹⁰

A final group whose behaviour is puzzling are high-liquidity individuals who show excess sensitivity to a loss. Table 6 shows that 31.1% of individuals exhibited this behaviour in the full sample. When we exclude those reporting motives that relate to saving mental accounting, particularly a reluctance to access savings to smooth a loss, this falls to 14.8%, accounting for 52.4% of the puzzle in this case.

5.2 Gain-Loss Asymmetries in MPCs

As a final exercise, we exploit the within-subject gain-loss variation to study how gain-loss asymmetries differ across respondents. Standard life-cycle models of consumption are consistent with

¹⁰We identified these individuals as those who report they would not change their spending but who mentioned the key words or bigrams “cut down”, “cheap”, “buy less” or “cut luxury”. There were only 4 individuals who did this.

Table 6: *Understanding High-Liquidity - High Loss MPC Respondents*

	%high-liquidity with loss MPC > 0.25	Share explained
Baseline	31.1%	
Excluding 'saving mental accountants'	14.8%	52.4%

Note: In the first row, we show share of high-liquidity consumers with high MPCs in the loss scenario. There are 1,464 high-liquidity respondents with valid responses in the loss scenario. In the second row, we show these proportions after excluding 205 individuals who report mental accounting motives (a desire to maintain savings) in the loss scenario.

negative gain-loss asymmetries (that is, a low gain MPC paired with a higher loss MPC) among low-liquidity respondents. Such respondents do not have the resources to smooth a loss, and so are likely to have a high MPC in the loss domain. However, they will have a high MPC in the gain domain only if they are currently constrained in their current consumption, given current resources, preferences and expectations over future income streams. In a standard life-cycle model, desired current consumption will be greater where households are impatient, expect income growth, or face lower interest rates. Low-liquidity households are less likely to be constrained if they do not expect income growth, or face high interest rates. In particular, low-liquidity households holding debt effectively face the borrowing rate (rather than saving rate) and save by debt repayment. Moreover, they may face particularly high borrowing rates which give them a strong incentive to save through debt repayment, rather spend out a windfall, a point emphasized by Koşar et al. (2023). To summarize, we expect low-liquidity respondents to have negative gain-loss asymmetries, particularly if they hold debt.

Among high-liquidity individuals, mental accounting, or the non-fungibility of money can generate MPC asymmetries in multiple ways. As discussed above, windfall mental accounting generates a higher MPC in the gain dimension, while saving mental accounting leads to a higher MPC in the loss dimension (Mijakovic, 2023).

We test these ideas in Table 7, in which we regress MPCs in the gain scenario, MPCs loss scenario, and the within-individual difference between the two on a set of (overlapping) group indicators. These include: a dummy for whether consumers mention windfall mental accounting motives in the gain scenario, a dummy for whether consumers mention saving mental accounting motives in the loss scenario, a dummy for low-liquidity, a dummy for the being presented with the larger gain/loss size (£2500), an interaction between the amount size and whether they are low-liquidity, and an indicator for whether the respondents reported their debts as somewhat of a burden or a heavy burden.

Table 7 shows that those with lower liquidity, or higher debts, have greater MPCs in both the gain and loss scenarios. Because the impacts of low-liquidity and high debts on MPCs in the loss scenario are larger than for MPCs in the gain scenario, the impact on the gain-loss asymmetry are

indeed negative as predicted by a standard model in which those with higher debts face higher borrowing costs.

Mental accounting motives also appear to contribute to gain-loss asymmetries. We find that those who mention topics consistent with windfall mental accounting also have greater MPCs in the loss scenario, indicating that this behaviour carries over from one setting to the other. However, the increase in loss MPCs is smaller than the increase in mental accountant's gain MPCs - and so it contributes to the gain-loss asymmetry. By contrast, the impact of mentioning mental accounting motives in the loss scenario on gain MPCs is negligible.

Table 7: Regression analysis of MPC asymmetries

	<i>Dependent variable:</i>		
	Gain MPC	Loss MPC	Gain - Loss MPC
	(1)	(2)	(3)
Low-liquidity	0.049*** (0.015)	0.201*** (0.024)	-0.152*** (0.028)
High Debt	0.043*** (0.012)	0.109*** (0.019)	-0.066*** (0.022)
Mental Accounter (windfall)	0.251*** (0.019)	0.136*** (0.030)	0.115*** (0.034)
Mental Accounter (saving)	-0.021 (0.016)	0.016 (0.026)	-0.037 (0.029)
Amount = 2500	-0.007 (0.015)	-0.121*** (0.024)	0.114*** (0.027)
Low-liquidity x Amount = 2500	-0.016 (0.021)	-0.098*** (0.033)	0.082** (0.038)
Constant	0.049*** (0.011)	0.271*** (0.018)	-0.222*** (0.020)
Observations	2,830	2,830	2,830
R ²	0.074	0.096	0.049

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, ***. High-liquidity individuals are defined as those who would be able to cover their living expenses for at least three months if they lost their main source of income. High debt individuals are those that declare that their debts are *somewhat of a burden* or *a heavy burden*.

6 Discussion

The literature on elicited MPCs has found puzzling heterogeneity in MPCs within liquidity groups. Our analysis identified two measurement issues, and two behaviours, which may help resolve this puzzle.

Some high reported MPCs represent a misclassification of saving (particularly debt repayment) as spending. We also found that respondents cited a variety of ways in which they would finance a loss. This means that typical measures of liquidity (or “hand to mouth” status) are crude, and there is substantial variation in effective liquidity within groups defined by such measures. However, these misclassification problems appear too infrequent to explain the puzzle.

Turning to behaviour, we find a evidence of debt repayment motive, with high debt consumers unwilling to increase spending in the gain scenario and more likely to cut spending in the loss scenario.

The most important explanation for MPC heterogeneity that we find is significant evidence of mental accounting. High MPCs among high-liquidity individuals are associated with an opportunity to “treat oneself”, suggesting that individuals would treat a windfall differently than other income or wealth. Similarly, some individuals with high liquidity indicate a desire to cut down spending to avoid dipping into their assets. Browning and Crossley (2001) argue that failing to smooth irregular transitory windfalls and losses may have small welfare costs, and so timing luxurious expenditures to the arrival of a windfall, or treating savings as illiquid, may be reasonable heuristics.

What do these findings imply for the existing body of evidence on elicited MPCs? It seems that estimates of average MPCs may be slightly upward biased by the misclassification of debt repayment as spending. Still, most high MPCs appear to be genuine, and mental accounting seems to be an important source of higher MPCs. This is important because the heuristic may be abandoned for very large windfalls, or for payments that are expected to be repeated. Allowing for some mental accounting behaviour would also help models to fit the data, but such models should then be extrapolated to other situations with care.

Our findings also suggest that future modelling of consumption behaviour should consider debt repayment motives (as in Koşar et al. (2023)). In addition, while we find that MPCs are larger for losses than for gains, as standard consumer theory would predict, these asymmetries tend to be *smaller* for larger payment amounts and this size effect is greater for those with low liquidity. Alternative coping mechanisms that are triggered in the event of large losses, and a high marginal utility of consumption for essential spending, can help explain this behaviour, and are both consistent with the responses we received. However, this aspect of behavior remains puzzling and could be studied further in future work.

Finally, our results suggest that MPCs in the gain domain are a poor measure of financial fragility. A substantial fraction of high MPCs seem to represent "splurges" by financially secure consumers. At the same time some low MPCs in the gain domain are reported by financially constrained with a strong debt repayment motive. The implication is that if an aim is to document the prevalence of financial insecurity, it is important to ask about MPCs in the loss domain.

Turning to data collection, respondents' misclassification of debt-repayment as spending is a problem that might be remedied with careful wording of questions, help-screens or appropriate follow-up questions.

We also found that some respondents found it difficult to respond to questions about losses that were large relative to their available liquidity. For such cases, it might be advisable to provide respondents with a 'don't know' option so that these difficulties will at least be apparent in the survey results. Alternatively, loss (and gain) sizes might be proportional to the usual incomes of respondents, rather than fixed amounts.

Finally, we found question order effects to be significant, with individuals more likely to report positive MPCs in both gain and loss scenarios if these were the first questions to be asked. With within-subject designs, it is good practice to randomize the order in which scenarios are presented (as we did) in order to minimize the impact of question order effects.

Overall, our analysis demonstrates the value of combining open format questions with text analysis to understand both measurement issues and economic behaviour.

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Ethics

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