

Workers' Spending Response to the 2011 Payroll Tax Cuts

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ABSTRACT

This paper investigates workers' spending response to the 2011 payroll tax cuts. Respondents were surveyed at the beginning and end of 2011, which allows the comparison of ex ante and ex post reported use of the extra income. While workers on average intended to spend 14 percent of their tax cut income, they ex post reported spending 36 percent of the funds. This pattern of higher spending ex post is shared across all demographic groups. Differences across workers in this shift to greater ex post spending are largely unexplained by differences in either present bias or unanticipated shocks, so in the end the upward revision in spending remains a puzzle.

Key words: tax cuts; consumption; liquidity constraints; permanent-income hypothesis; present-bias.

JEL Codes: C83; D91; E21; E62; E65.

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On December 17, 2010, President Obama signed the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010. This legislation made major tax changes aimed at not removing economic stimulus given the weakness of the economic recovery. It extended the Bush-era tax cuts that were scheduled to expire on December 31, 2010 for two years. The act also reduced the payroll taxes for Social Security withheld from workers' paychecks from 6.2% to 4.2% for all of 2011 without any change in future benefits. This tax cut replaced the Making Work Pay credit of the American Recovery and Reinvestment Act of 2009, which expired at the end of 2010. The payroll tax cut affected nearly 155 million workers. It provided an aggregate tax cut of \$112 billion in 2011. For a household earning \$50,000 per year, it increased annual take-home pay by \$1,000. In December of 2011, amidst heated debate in Washington over the efficacy of these tax cuts, the tax cuts were extended for the first two months of 2012, and then on February 22, 2012, the tax cuts were extended for the rest of the 2012 calendar year.

Theoretically, the response to this kind of a temporary increase in income should be small: Under the life-cycle/permanent income hypothesis, individuals should increase their spending by at most the annuitized value of the stimulus. In fact, Ricardian equivalence implies no spending response, since individuals should anticipate higher future taxes to offset the tax cut. However, empirically, individuals may spend a non-trivial proportion of the extra income because of, for example, present-biased preferences or liquidity constraints (Browning and Lusardi, 1996). This paper presents survey evidence on workers' response to the 2011 payroll tax cuts.

For this purpose, we designed novel survey questions that directly elicit respondents' *ex ante* and *ex post* marginal propensity to consume and save the tax cut. These questions were included as part of an online survey, administered to the RAND Corporation's American Life Panel (ALP). Workers were surveyed at two points in time: in early-2011, just after the tax cut was first signed into law, and then in mid-December 2011, close to the expiration of the initial tax cuts. The first survey informed respondents of the tax cut and then asked respondents how they intended to spend the extra funds from the payroll tax cut in their paychecks; we refer to this as the *ex ante* use of funds. The second survey inquired about *ex post* usage of the funds.

When households are asked what they intended to do with their tax cut funds, we find that the average share assigned to spending – the *ex ante* marginal propensity to consume (MPC) – is 13.7 percent. Looking at the proportion of individuals for whom spending the funds is the modal response (opposed to saving them, or using them to pay off debt), we see that only 12 percent report intending to mostly spend the funds. However, data from the second survey reveal that the *ex post* MPC is 36 percent. While there is a positive correlation between *ex ante* and *ex post* uses, there is a high degree of inconsistency, with a systematic shift to greater spending *ex post*.

We consider two possible explanations for the systematic shift towards greater consumption. First, workers could have time-inconsistent preferences that they are not aware of (Thaler and Shefrin, 1981; Laibson, 1997; O'Donoghue and Rabin, 1999), which may lead them to consume more than intended. We test this hypothesis by using an individual-specific measure of whether the respondent is present-biased (obtained from an incentivized task), and by using financial literacy of the respondent as a proxy of her sophistication (that is, her awareness of the present-bias). Our analysis indicates that differences across workers in self-control problems do not explain differences in the systematic shift towards greater consumption. Another possibility for this systematic shift is a positive aggregate shock that affects the different demographic groups similarly, which would then cause them to spend more of the extra funds than they had intended to. By using unanticipated changes in individuals' year-ahead earnings, and exploiting state-level

variation in changes in macroeconomic conditions over the course of 2011 (relative to their trends during 2010) as proxies for individual-level shocks, we find some support for this hypothesis. However, our analysis suggests that our measures of individual-level shocks explain a small part of the cross-sectional differences in shift towards increased consumption. Therefore, the shift to greater ex post spending is largely unexplained, and remains a bit of a puzzle.

Our result of a large, unexplained gap between ex post and ax ante spending is particularly interesting since prior survey research where both planned and ex post usage have been elicited have found them to be quite similar (Shapiro and Slemrod, 2003a; Sahm, Shapiro, and Slemrod, 2010). These two studies, however, differ from ours in that they examine the impact of one-time lump-sum tax rebates, while we study a tax cut that is spread over time. One speculative explanation for the upward revision in spending is the mechanism of the tax cut (as a reduction in withholding rate, rather than a lump-sum rebate), which may have caused workers to use two different mental accounts for setting their intentions and deciding on the ex post use. Another possibility is an unmeasured increase in respondents' wealth or balance sheets during 2011, which would cause them to save less (and hence spend more) of the tax cut. While this explanation is unlikely given the economic climate prevalent during 2011, it cannot be ruled out entirely.

Turning to the level of ex post spending, the MPC of 36 percent is much larger than the small increase in spending predicted by the life-cycle/permanent income theory for an anticipated, temporary change in income. Thus, these estimates are inconsistent with the canonical life-cycle/permanent income theory. The estimated ex post MPC is at the higher end of the range found in studies that examine consumer response for nondurables to relatively recent tax rebates (which typically are in the 12-40% range).² This would then suggest that perhaps, as policy-makers had originally hypothesized when determining the design of the tax cut,³ the mechanism through which the tax cut was implemented – as a change in the withholding rate instead of a one-time lump-sum rebate – led consumers to spend a greater proportion of the extra income.

The most common use of the additional funds in our sample is paying down debt— 40 percent of the funds are, on average, used for debt servicing. This finding is consistent with survey approaches that examine consumers' response to recent tax rebates (Shapiro and Slemrod, 2003a, 2009). From the consumers' perspective, this may be optimal considering the large debt issues leading up to and during the financial crisis (Brown et al., 2013). Consumers may eventually spend the resulting increase in savings, and this may lead to a higher MPC over a longer horizon. But that is unlikely to boost aggregate demand in the short-term and is of little relevance in determining the efficacy of fiscal stimuli. Moreover, given the high indebtedness of U.S. households and a greater urgency to rebuild their balance sheets following tightening credit conditions and binding liquidity constraints (Chakrabarti et al., 2015; Mian, Sufi, and Rao, 2013), households are less likely to spend any future cash injections from tax cuts. The uniqueness of the economic climate in 2011 also suggests that policy-makers should be cautious in extrapolating the results from this study for future policies, and at the same time, be careful in using past studies to deduce the impact of current fiscal policies.

² The range of the estimated MPC goes up to 50-90 percent if durables are included in Johnson et al. (2006) and Parker et al. (2011). The impact on durable spending, however, is not precisely estimated.

³ Implementing the 2011 tax cuts by changing the withholding rate (as opposed to sending out rebate checks) was a conscious decision by the administration; according to Jason Furman, the deputy director of the National Economic Council, the administration believed that changing the withholdings was a more effective form of stimulus than sending out rebate checks (Cooper, 2010).

While the ex post MPC is higher than the ex ante MPC for each demographic sub-group, there is limited heterogeneity in the reported (ex ante and ex post) MPCs. Those who assign a higher likelihood to the tax cuts being extended are on average more likely to intend to spend the tax cut funds, and ex post weakly do so. However, low-income respondents, who are generally believed to be liquidity constrained, have an (ex ante and ex post) MPC that is similar to their higher-income counterparts. This group does not spend relatively more of the extra income, as is commonly claimed (Elmendorf and Furman, 2008). Likewise, there is no systematic difference in spending rates by age. Our finding of no differential response by income mirrors that of Shapiro and Slemrod (2011) and Sahm, Shapiro and Slemrod (2012); however, Johnson et al. (2006) and Parker et al. (2013) find a larger response for liquidity constrained households. We show that our finding is sensible since lower-income respondents are more heavily indebted than their counterparts, expect binding liquidity constraints in the future, and are more likely to face supply-side credit limitations since the financial crisis (Brown, Stein, and Zafar, 2013).

There is a large strand of research studying the response of consumption to changes in income (see the review article by Jappelli and Pistaferri, 2010). Our paper is related to the literature that investigates the effects of predictable changes in household income, particularly those caused by tax policy, on consumption (see Shapiro and Slemrod (2003a) and Parker et al. (2013) for reviews). From a methodological point, we design a new survey question that directly elicits the marginal propensity of tax cut usage from the respondent (as opposed to asking the respondent for their most likely usage, as has been done in most prior survey research; one exception is Jappelli and Pistaferri (2014), who like this study also directly elicit the MPC in an Italian survey of households for a hypothetical reimbursement). Our question may be more challenging for respondents to answer, but our resulting estimates are reasonable when compared with previous estimates. While more research is needed to conclude the relative merits of alternate questions wordings, our question does not require making assumptions to translate the most-likely uses to an estimate of the marginal propensity, the parameter of interest to policy-makers.

Besides the methodological innovation, we build on the related literature in a number of ways. First, this study is the first empirical examination of consumers' spending response to the 2011 payroll tax cuts. Second, we document a systematic shift towards greater consumption ex ante than planned, which is largely unexplained by unanticipated shocks or present-bias. This has implications for the survey literature that elicits MPCs for tax cuts/rebates, at least those that are spread over time. Third, our findings regarding the (lack of) heterogeneity in usage of the funds complements existing findings in the literature, and also brings rich data to the fore to understand such patterns.

This paper is structured as follows. Section 1 briefly reviews the related literature, and theories for why the design of tax cuts may matter. The data are described in Section 2, and the empirical results are presented in Section 3. Finally, Section 4 concludes.

1. Background

This section briefly reviews the related literature and possible theories for why the design of the tax cut may matter.

1.1. Related Literature

Here we briefly describe the findings from studies that examine spending responses to either tax rebates implemented in the last decade, or to tax rebates/cuts that have a design similar to that of the 2011 payroll tax cuts.

Micro-data based studies of consumer response to tax rebates have used two general approaches. The first uses micro data on consumption of households to infer their spending response to tax rebates indirectly. The second approach, which is methodologically closer to the one adopted in the current study, uses survey responses to directly estimate the consumption response to tax rebates. Examples of both are noted in Appendix Table A1 (studies using the Consumer Expenditure Survey (CE) fall in the first approach). All these studies find that stimulus boosts spending but, as mentioned above, reach different conclusions regarding demographic heterogeneity in use.

Following the first methodological approach, Johnson et al. (2006) and Parker et al. (2013) use the Consumer Expenditure Survey (CE) to estimate the MPC from the 2001 and 2008 tax rebates, respectively. Taking advantage of the random timing of the mailing of the rebates, these studies estimate an MPC on non-durables ranging from 12% to 40% in the 3 months during which the rebate checks were received. Parker et al. (2013) estimate that 50-90 percent of the rebate is spent.

The second methodological approach, pioneered by Matthew Shapiro and Joel Slemrod, directly asks respondents about what they did (or plan to do) with the extra funds from the tax rebates. For example, Shapiro and Slemrod (2003a), using questions added to the Michigan Survey of Consumers, find that only 22 percent of rebate recipients report that they will mostly spend the 2001 tax cuts; under certain assumptions, they calculate that this equals an MPC of about one-third, which is similar to the estimate obtained by Johnson et al. (2006) for the concurrent response to these tax rebates. For the 2008 rebates, Shapiro and Slemrod (2009) find that about 20 percent of recipients report they will spend the rebate, with nearly half saying they will use the stimulus payments to pay debt. This again translates into an MPC of about one-third, which makes the estimate in line with that obtained by Parker et al. (2013).

The tax cut that we investigate in this paper manifests itself as a change in the withholding rate. A few studies have investigated consumption responses to changes in withholding rates. Shapiro and Slemrod (1995), using a survey approach, find that 43 percent of consumers think they will mostly consume the extra cash from the change in the income tax withholding rate in 1992 (which increased after-tax income by about \$29 per month per worker for all of 1991). Parker (1999) estimates an MPC for nondurables of about 50 percent in a three-month contemporaneous period, when take-home pay increases in months after wage-earners hit the earnings ceiling for Social Security payroll taxes. Souleles (2002) investigates the consumption response to the Reagan Economic Recovery Tax Act, under which the withholding rate decreased by 5 percent in October 1981, 10 percent in July 1982, and a final 10 percent in July 1983. He estimates an MPC for nondurables of around 60-90 percent for the last two changes in the withholding rates, which were pre-announced; the standard errors on the estimates are fairly large though.

Two relatively recent studies that examine the spending response to changes in the withholding rate are Coronado, Lupton, and Sheiner (2005) and Sahm, Shapiro, and Slemrod (2012). Both elicit the use of the extra funds from the withholding rate change directly from consumers. The former investigate the spending response to the 2003 Jobs and Growth Reconciliation Act, and find that 20.7 percent of the respondents reported mostly spending the increase in pay resulting from the reduction in the withholding. The second study, Sahm et al.

(2012), examines the intended spending response to the 2009 Making Work Pay (MWP) tax credit and finds that only 13 percent of respondents reported that they would mostly spend the 2009 tax credit.⁴

It is also worth discussing whether survey questions that directly elicit the marginal propensity of tax funds accurately measure the behavior of households. The review of the literature above shows that direct survey methods yield contemporaneous marginal propensities of consumption similar to those obtained from the indirect approach of inferring them from self-reported consumption data (for the 2001 and 2008 tax rebates), indicating that the two types of survey data provide consistent and comparable information. In addition, Parker et al. (2013) added a Shapiro-Slemrod style question to the 2008 Consumer Expenditure Survey, and find that those who report mostly spending the 2008 stimulus payments in fact spent 75 cents more per dollar than those who said they mostly saved the payments. This suggests that survey responses do in fact contain useful information.

1.2. Does the design of the tax cut matter?

In a standard economic model with rational consumers, how the tax cut is implemented (for example, as a change in the withholding rate or a one-time transfer) is not relevant since different types of income are fungible. However, as Sahm et al. (2012) point out, it might matter outside the model if, for example, individuals use mental accounts, or if the delivery mechanism affects awareness of the tax cut which in turn affects their use.

Previous empirical studies, findings of which are briefly summarized in the prior section, paint a mixed picture with regards to changes in withholding leading to greater spending. The estimated MPCs in Parker (1999) and Souleles (2002) are quite high compared to other studies in the literature, varying between 50 and 90 percent. Over 1980-1991 (the period that overlaps with the Reagan tax cuts of changes in withholding), Souleles (1999) finds a much lower MPC – of between one-third and two-thirds – for the spring time federal income-tax refunds. On the other hand, Coronado et al. (2005) find that the proportion of respondents who report mostly spending the resulting income from the 2003 withholding change is similar to the corresponding proportion for the one-time child tax credit rebate. Quite notably, Sahm et al. (2012) find that the mostly spending rate (of 13 percent) reported by survey respondents for the 2009 withholding change is in fact lower than their mostly spending rates (of between 23 and 30 percent) for the 2008 tax rebates (distributed as a one-time payment), a hypothetical one-time payment in 2009, and the actual one-time payment to retirees in 2009. The authors' interpretation of these differences is that they are driven by the different delivery mechanisms of these payments, with changes in withholding rates leading to less spending.

There could be several reasons for these contrasting results. These tax cuts: (1) have been introduced in varying economic conditions; (2) have targeted different subpopulations; (3) have varied in amounts; and (4) have been accompanied with varying levels of awareness by consumers. Each of these factors may lead to differences in the propensity to consume. In particular, the last factor – awareness of the tax cut – is arguably quite important. The recent tax

⁴ Note that many of our respondents would have likely benefitted from the MWP tax credit during 2010. The MWP tax credit was equal to 6.2% of wages, up to a maximum credit of \$400 for single filers and \$800 for married filers. For working households, this was implemented as a reduction in income tax withholding. The 2011 payroll tax cut reduced the employee portion of the Social Security payroll tax by 2 percentage points of covered wages up to \$106,800 in 2011. Therefore, the payroll tax cut was larger than the MWP tax credit for individuals (households) with earnings of greater than \$20,000 (\$40,000).

changes implemented as changes in the withholding rates were not as well-publicized as the earlier ones; anecdotal evidence suggests that households did not notice the change in the payroll tax withholding that was implemented in 2009 (Cooper, 2010). In fact, only a third of our respondents were aware of a decrease in the 2011 FICA tax rate, when they were surveyed in early 2011; likewise, Sahm et al. (2011) find that most households were unaware of the change in their withholding rate due to the 2009 Making Work Pay tax credit. Whether and how the behavioral response to the tax cuts varies by being explicitly aware of the tax cut is far from clear.⁵ Unfortunately, policy-makers seem to have naïvely concluded that people would be more likely to spend income that they do not notice, when in fact their behavioral response depends on their optimal decision rule for spending each marginal dollar of income.

2. Data

The data used in this study were collected as part of the Household Inflation Expectations Project (HIEP) conducted by the Federal Reserve Bank of New York. The project is based on a panel survey that is conducted approximately every six weeks over the internet with RAND's American Life Panel (ALP). The sample for this panel survey consists of respondents who had participated in the Reuters/University of Michigan's Survey of Consumers between November 2006 and July 2010, and subsequently were recruited into the ALP.⁶ The data for the current study come from two survey modules that were added as part of the panel at the beginning and end of 2011.

2.1. Survey Design

The first module was administered as part of the survey fielded over the period February-March 2011, with the goal of understanding how workers intended to use the payroll tax cut funds; 92 percent of the respondents had completed the survey by the end of February. Respondents, who reported being employed, were first asked if they were aware of any changes in the payroll tax rate in their first paycheck that year.⁷ Only 35 percent of the respondents in the first survey reported being aware of the payroll tax cut.

Those unaware of the decrease in the withholding rate were then informed about the 2 percentage point cut in the payroll tax rate. Respondents who did not report seeing a decrease in their first paycheck of 2011 relative to the previous year were then asked “*What are you doing or planning to do with the extra income?*” More specifically, they were asked to report the share of

⁵ Thaler's mental accounting hypothesis (1990; 1992) would suggest that those aware of the 2011 payroll tax cuts should spend a large proportion of them. However, if respondents are unaware of those gains in the first place, the response to them would depend on how they would spend each marginal dollar of income in their paycheck (or, if instead of optimizing utility, the respondent uses a rule-of-thumb, it will depend on whether their rule-of-thumb behavior targets spending or saving- for those targeting spending (i.e., those with a specific target amount of how much to spend every month), the tax cut funds would be saved; on the other hand, the tax cuts would be largely spent by those who target saving.

⁶ The Michigan survey is a monthly telephone survey with 500 respondents, consisting of a representative list assisted random-digit-dial sample of 300, and 200 respondents who were re-interviewed from the random-digit-dial sample surveyed six months earlier. Prior survey evidence on consumers' response to tax rebates uses this Survey of Consumers.

⁷ The question was: “*In addition to possible federal income taxes, all workers in the United States pay social security and Medicare taxes (called FICA taxes) on their earnings. These taxes, also known as payroll taxes, are automatically withheld from a worker's paycheck. To your knowledge, were there any changes in the FICA tax rate applied to your earnings in your first paycheck this year (excluding regular federal income tax withholdings), and if so what type of change?*”

the extra income that they were using or planning to use to (1) spend, (2) save, and (3) pay down debt, with the requirement that the proportions add up to 100%. Consistent with the literature, we interpret this question as eliciting respondents' *ex ante* marginal propensities of tax cut usage. In particular, we interpret the proportion reported for spending as the *ex ante* marginal propensity to consume (MPC), the proportion allocated to saving as the *ex ante* marginal propensity to save (MPS), and the proportion allocated to paying down debt as the *ex ante* marginal propensity to pay down debt (MPPD). While paying down debt is a form of saving (and enters the same way in the budget constraint), consumers may think of paying down debt as distinct from saving. Therefore, we ask for it separately; prior survey research using the direct approach also makes this distinction.

Note that the elicited marginal propensities are from a group of individuals who were either a priori aware of the payroll tax, or were informed of its existence. How this affects their usage of the extra funds, and whether this differs from that of individuals in the broader population who are never aware of the tax cut is not clear. Our results should be interpreted with this caveat. It should, however, be pointed out that we find similar *ex ante* and *ex post* spending rates for the two groups of respondents.

To investigate how workers ended up using the 2011 payroll tax cut funds, we re-surveyed the same respondents in December 2011, close to the original planned expiration of the payroll tax cuts. Sample respondents who reported currently being employed were asked: *"In addition to possible federal income taxes, all workers in the United States pay social security and Medicare taxes (called FICA taxes) on their earnings. These taxes, also known as payroll taxes, are automatically withheld from a worker's paycheck. In January 2011, the FICA tax rate for employees was cut by 2%. What did you do with the extra income?"* As with the question that asked respondents for their planned usage of the funds, respondents were asked for the proportion of the extra income that they used for spending, saving, and paying down debt. We interpret these proportions as measuring the *ex post* marginal propensities.

Our survey wording differs from that employed in most prior survey research of consumer responses to tax rebates or changes in tax withholding (Shapiro and Slemrod, 1995, 2003a, 2009; Sahm et al., 2012), which instead asks respondents for what they plan to do with most of the funds. The question is generally phrased as follows: *"...will this income tax credit [tax rebate] lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?"*. To translate the mostly spend rates into an aggregate MPC, the parameter that is of interest from a policy perspective, one then has to rely on some distributional assumptions. We discuss the relative trade-offs of the two question wording in section 3.1.1.

2.2. Sample Characteristics

The initial survey was completed by 380 individuals. Of these, 209 reported to be employed and hence were eligible to answer the module on *ex ante* use of the payroll tax cuts. Of the 380 respondents, 362 were re-surveyed in late-2011. Of these, 196 reported to be employed at the time of the survey (of whom 177 were also employed in the first survey), and hence answered the relevant questions regarding payroll tax funds use. Table 1 reports demographic information on the 209 respondents in the first survey and 196 in the second. The characteristics of respondents are similar between surveys.

For the purposes of the analysis, we use the following sample selection criteria in the first survey. Of the 209 eligible respondents, 28 respondents (that is, ~13%) reported seeing a decrease in their FICA tax rate but did not see an increase in their take-home pay. These

respondents were then not asked about what they were going to do with the funds since they had no additional income. That leaves us with 181 respondents.

We further restrict the analysis to those respondents who participated in both surveys and who were working at the time of both surveys, leaving us with 156 respondents. This criterion was chosen so that we could compare ex post reported use of the tax cut funds with the ex ante use for the same respondents. Two more respondents are dropped because of missing data, leaving us with 154 respondents with complete data from both surveys. Note that conclusions based on the cross-sectional analysis of the first survey using the 181 respondents are qualitatively similar to those obtained using the more restrictive sample of 154 respondents.

Since our sample is older, and has higher household income and educational attainment than the US population overall (due to the original ALP sample design), in some of our analysis, we use post-stratification weights based on population frequencies derived from the Current Population Survey (CPS). Each respondent in our survey is assigned at most two post-stratification weights, one from each survey in which she participated. For those in our first survey, weights are assigned based on the February, 2011, CPS Monthly Basic survey, and for those in our second survey, weights are assigned based on the December, 2011, CPS Monthly Basic survey.⁸ Weights are used only when reporting sample or subsample statistics; regression analysis reported in the paper does not use weights.

2.3. Other Data Sources

Our analysis also uses an individual-specific measure of whether the respondent is present-biased. These data were collected in ALP module number 212 (see Barcellos and Carvalho, 2012), and we thank Leandro Carvalho for sharing these data with us. The individual-specific measure is derived from an incentivized intertemporal choice of allocating \$500 between 2 checks under different time frames and interest rates. Details of the incentivized procedure are given in Appendix A. We have these data for 152 of the 154 respondents. 35.5 percent of the respondents (54 of the 152 respondents) are found to have time-inconsistent preferences.

We also collect data to construct an individual-specific measure of financial literacy. For this purpose, we use four multiple-choice questions, adapted from Lusardi and Mitchell (2009). These four survey questions measure respondents' ability in four financial areas: numeracy, compound interest, inflation and time value of money. The questions are included in Appendix A. The distribution of responses for our sample is as follows: 4 respondents answer 0 questions correctly, 18 respondents answer 1 question correctly; 111 answer 2 correctly; 20 answer 3 correctly, and; 1 answer all 4 correctly.

3. Empirical Results

⁸ We construct the post-stratification weights in the following fashion: We count the number of respondents in each of 3 household annual income groups (<40K, 40K-75K, >75K), 2 education groups, 3 age groups, and 2 gender groups. The cutoff values for each of these were chosen to ensure no empty groups, and to evenly distribute our sample across all groups as best as possible. Thus, we are left with each respondent being assigned to one of 36 (3x2x3x2) groups based on his/her demographics. Then, we divide the group totals by the total sample size so that we have a proportion of the sample that each of the 36 groups accounts for. We do the exact same grouping, counting and dividing for the employed in the CPS Monthly Basic microdata for the two months mentioned above. To create the weights, we divide each group's CPS proportion by that group's proportion in our survey. The result is the post-stratification weight.

3.1. Use of Tax Cut Funds

3.1.1. Ex Ante Use

The first column of Table 2 reports the average ex ante marginal propensity of tax cut funds use, as reported by respondents in the first survey. On average, respondents intended to use nearly half of the funds (48.3 percent) for paying down debt, a third (37.4 percent) for saving, and only 14.3 percent for spending/consumption (i.e., an unweighted ex ante MPC of 14.3). The large standard deviation indicates that there is substantial heterogeneity in ex ante use of tax cut funds. The second column of Table 2 shows that applying the constructed post-stratification weights has little qualitative (or quantitative) impact on the point estimates.

Columns 3 and 4 of Table 2 report the proportion of respondents that report intending to mostly use the tax cut funds for one of the three categories. A respondent is characterized as intending to mostly use the funds for a certain purpose (consume; save; pay debt) if the marginal propensity reported for that category is the modal response. For example, if a respondent intends to use 30% for consuming, 30% for saving, and 40% for paying off debt, then she is categorized as intending to mostly pay off debt. In cases with ties (of which there are 16 instances), we randomly assign such respondents (whom we refer to as “split” respondents) to one of the two categories that received the highest proportion. The weighted statistics show that 12 percent of respondents report that they will mostly spend the funds, 35 percent report that they will mostly save the funds, and 53 percent report that they will mostly pay debt with the funds. That is, paying off debt is the most common plan for the tax funds.

In column (5), as a robustness check, we report the weighted mostly-use proportions by excluding from the sample those 16 “split” respondents; results are qualitatively similar to those in columns (4).

The large standard deviations in Table 2 underscore the heterogeneity in ex ante use. This is highlighted in Figure 1 which shows the distribution of ex ante marginal propensities. While there is substantial variation in responses, the bunching at 0, 50, and 100 is noticeable. In the case of ex ante MPC, 65 percent of respondents report zero, and 10 percent report 50. Furthermore, respondents tend to report values that are multiples of 5, suggestive of rounding in responses. This pattern has been documented in surveys of probabilistic expectations (Manski and Molinari, 2010). Jappelli and Pistaferri (2014) who also directly elicit MPC in an Italian survey of households document similar heaping in their data. It is unclear how this lumpy reporting should be interpreted.

While the quantitative approach does not require making distributional assumptions to arrive at an MPC estimate, and overcomes the problem of comparing responses across individuals who may interpret the qualitative question of “mostly spend/mostly save/mostly pay off debt” in different ways, the measurement error in responses – as reflected by the rounding and heaping at certain numbers – could be problematic. If this rounding is primarily due to respondents’ inability or unwillingness to give precise fractions, the quantitative approach would be of limited benefit. However, in Appendix Table C1, we show that the tendency to provide a focal response (50 percent; 0 or 100 percent) is not systematically correlated with demographic characteristics. In particular, it is not the case the less sophisticated respondents (as measured by their education or financial literacy) are more likely to report focal responses.

The question of whether the quantitative or the qualitative approach of eliciting responses to income changes is better (in the sense of reflecting the actual belief or action of individuals) is one that is beyond the scope of this paper, and is an important question for future research in this

area. In this paper, consistent with the approach of Jappelli and Pistaferri (2014), we take these responses at face value, and interpret responses to these questions as marginal propensities, both ex ante and ex post. Our results are robust to using a qualitative classification of respondents (which we describe below). The tables reported in the paper use the quantitative response, but corresponding tables using the qualitative measure are shown in the online appendix. Reassuringly for us, our conclusions are robust to both measures.

3.1.2. Ex post Use

Columns (6)-(10) of Table 2 show the ex post use of the tax cut funds, as reported in the second survey. Workers report spending, on average, 39 percent of the funds, a sharp increase from the average ex ante MPC of 14 percent. As a result, both the ex post marginal propensities of saving (MPS) and of paying debt (MPPD) are substantially lower than the ex ante marginal propensities. In fact, we reject the null hypothesis of the equality of the ex post and ex ante marginal propensities for each of the three categories at the 5% level or higher (adjusted t-test). Column (8) in Table 2 shows that 40 percent of individuals ex post report spending the majority of their tax-cut funds, compared with 12 percent of individuals who ex ante reported doing so (difference statistically significant at the 1% level using Chi-squared test).⁹ This proportion is at the higher end of the range of estimates found in most previous survey research analyzing response to tax cuts over the last decade.

As in the case of ex ante use, the ex post use is quite heterogeneous in the sample. Figure 2 reports the distribution of ex post marginal propensities. The distribution of ex post MPC is quite disperse, again with a substantial mass at zero, 50, and 100; 42 percent of respondents report an MPC of zero, 10 percent report an MPC of 50, and 23 report an MPC of 100.

Figure A1 compares individuals' *ex ante* use of the tax-cut funds with the *ex post* reported usage of the funds. Of those who planned to spend most of their tax-cut funds, 73 percent did in fact ex post spend the majority of it. A similarly high proportion of those who intended to use the majority of their funds to pay off debt report doing so ex post (63 percent). Notably, however, only 37 percent of those who planned to save most of their funds did so ex post. Two patterns are of note in the figure: (i) while there is a positive correlation between ex ante and ex post uses, there is a high degree of inconsistency; and (ii) there is a systematic shift toward ex post spending for those who did not use their funds in the way they intended to, that is, individuals ended up spending more of their tax-cut funds than they had intended.

3.2. Inconsistency between Ex Ante and Ex Post Use

We have seen that ex post marginal propensities differ significantly from ex ante plans; this pattern exists for each demographic group, something that we will return to later. The average gap between ex post and ex ante consumption is about 24.5 percentage points. There is substantial heterogeneity in the gap: the standard deviation of the difference between ex post and ex ante MPCs is 41.9 percentage points. This is highlighted in Figure 3, which shows the distribution of the shift in MPCs (that is, ex post minus ex ante MPC). While there is a large mass at zero (with nearly 42% of respondents reporting the same MPC ex ante and ex post), the distribution is right-skewed. Respondents are much more likely to report a higher ex post MPC (relative to the ex ante MPC) than a lower one. The shift toward greater ex post consumption is

⁹ Columns (8)-(10) are treated in the same fashion as columns (3)-(5). 20 respondents do not have a unique modal response; we break the ties randomly. Column (10) of the table reports the weighted proportions excluding these respondents, and we see that results are similar to those in column (9).

also evident when looking at the categorical “mostly” responses, with the proportion of respondents reporting mostly consuming the funds jumping threefold from 12 percent to 40 percent. Another notable feature of the data shown in Figure 3 is the mass at 100 percent, which is caused by a sizable portion of the sample (14 percent) reporting an ex ante MPC of 0 and an ex post MPC of 100.

The subjective data – like any survey data – has some measurement error, which will be exacerbated when taking differences. However, the systematic shift towards spending more of the funds than intended is hard to explain through classical measurement error.¹⁰ As another piece of evidence in support of measurement error being a minor concern in the data, it should be pointed out that in a subsequent survey (which included a subset of the respondents in the current study), conducted in early 2013 and which focused on workers’ response to the eventual expiration of the payroll tax cuts, we find retrospective marginal propensities that are remarkably similar to the ex post estimates we find in the current study (Zafar et al., 2013).

We next consider two plausible explanations for the systematic shift towards greater consumption: (1) individuals being naïve (or partially sophisticated) present-biased consumers; and (2) aggregate (unanticipated) shocks.

3.2.1. Present-Bias

With regards to the first explanation, consider a present-biased individual who is unaware of her time-inconsistent preferences (in the terminology of O’Donoghue and Rabin (1999), she is a naïve present-biased agent). She will report a low ex ante MPC, but because she is unaware of her present bias, she will end up over-consuming and report a higher ex post MPC (Thaler and Shefrin, 1981; Laibson, 1997). A similar anomaly in behavior would be observed for a partially sophisticated present-biased consumer who has access to commitment. She knows she has a present bias, so uses a commitment device, and reports a low ex ante MPC. However, since she is only partially sophisticated, she underestimates the extent of her present bias and does not use a strong enough commitment, and ends up over-consuming (O’Donoghue and Rabin, 1999).

To investigate this possibility, we use an individual-specific measure of present-bias that is derived from an incentivized intertemporal choice of allocating \$500 between 2 checks under different time frames and interest rates. Respondents are considered present-biased if they make at least one intertemporal choice reflecting present-biased preferences. Appendix A provides further details. We find that 35.5 percent of the respondents (54 of the 152 respondents) have time-inconsistent preferences. This experimental measure of present-bias has been shown to be predictive of actual behavior; for example, Giné et al. (2014) find that it is systematically related with individuals’ tendency to revise commitments in the future. Note that the incentivized task measures only the shape of the respondent’s discount function; it does not allow us to infer whether the respondent is aware of the bias (sophisticated) or not (naïve).

The first column of Table 3 regresses the hyperbolic dummy (which equals 1 if the respondent has time-inconsistent preferences) onto demographics. We see that high-income, college, and older respondents are less likely to be hyperbolic, though none of these estimates are statistically different from zero.

Columns (2)-(6) of Table 3 investigate correlates of switching to greater consumption. The dependent variable is (ex post MPC – ex ante MPC). Column (2) regresses this variable onto

¹⁰ Intentions and actual behavior may diverge simply because of the dependence of behavior on events not yet realized at the time of the survey that elicits intentions. Manski (1990) shows that intentions and behavior will diverge even if responses to intentions questions are the best predictions possible given the available information.

demographic variables. None of the variables are statistically different from zero, indicating that all demographic groups are over-consuming relative to their intentions. In column (3), we regress the difference onto a hyperbolic dummy: we see that the estimate is negative and indistinguishable from zero. However, given the size of the standard error for the coefficient on the hyperbolic dummy, we cannot reject that present bias has a positive effect on the difference between the ex post and ex ante MPC. For present-bias to be a factor in the shift toward greater consumption, what is required is that the respondent be present-biased, but also that she be unaware of her bias. Thus, the interpretation of the coefficient is ambiguous, and we return to it later below.

Since financial literacy has been shown to be correlated with better financial outcomes (Lusardi and Mitchell, 2009), column (4) investigates whether high financial literacy corresponds to a closer correspondence between ex ante and ex post behavior. We construct our measure of financial literacy from four multiple-choice basic financial literacy questions, adapted from Lusardi and Mitchell (2009), that were answered by our respondents (questions presented in Appendix A). We define a high financial literacy dummy that equals 1 if the respondent answers at least three of the four questions correctly, and zero otherwise (our results are robust to alternative definitions of high financial literacy). We see that financial literacy is not related to a closer correspondence between ex ante and ex post MPC—the coefficient while not statistically different from zero is in fact of the opposite sign that one would expect.

We now return to the interpretation of the result in column (3), that differences across workers in present bias are unrelated to differences in the shift toward greater consumption. This null result could either suggest that the discrepancy that we observe between ex ante and ex post consumption is not a consequence of present-biased preferences, or that respondents who we identify as being present-biased are sophisticated. While there is a large literature on the role of present-biased preferences in consumers’ decisions (see Dellavigna, 2009, for an overview), there is little empirical work that is able to measure whether the respondent is naïve or sophisticated (Kuchler, 2012). To distinguish between these two interpretations, we use the respondent’s financial literacy as a proxy for her sophistication. Column (5) of Table 3 estimates the regression:

$$\Delta MPC_i = \beta_0 + \beta_1 1_{i,Pres\ Biased} + \beta_2 1_{i,High\ Fin\ Lit.} + \beta_3 1_{i,Pres\ Biased} * 1_{i,High\ Fin\ Lit.} + \varepsilon_i,$$

where ΔMPC_i is the difference between ex post and ex ante MPC for individual i . The indicator function $1_{i,K}$ equals 1 if respondent i belongs to group K , and zero otherwise. In this specification, β_1 is the effect of present-bias for a naïve respondent on the consumption gap, while $\beta_1 + \beta_2 + \beta_3$ is the effect of present-bias for a sophisticated agent on the gap. If present-bias that is unperceived by the respondent were driving the shift toward greater consumption, we would expect β_1 to be positive. Column (5) shows that is in fact not the case: the coefficient is negative and indistinguishable from zero. The effect of present-bias of agents who are aware of the bias is -3.4 (estimate not distinguishable from zero)- this indicates that individuals aware of their bias, on average, do *not* have smaller gaps between ex post and ex ante consumption. The results are qualitatively similar when we add in all the covariates simultaneously in the last column of Table 3. The low R-squared of these regressions is also notable. Overall, these estimates suggest that the discrepancy that we observe between ex ante and ex post consumption cannot be explained by present-biased preferences. The estimates in Table 3 are, however, quite imprecise. For example, in column (5), the large standard error on the estimate for the hyperbolic

dummy means that the 95% confidence interval includes sizable positive effects of present bias on the gap.

Online Appendix Table C2 reports estimates of regressions corresponding to columns (2)-(6) of Table 3, where the dependent variable is instead the difference between an indicator for ex post spending most of the funds and an indicator for intending to spend most of the funds; the variable takes values -1, 0 and 1. OLS estimates are reported, though we get similar results if we instead run an ordered logistic regression (results available from authors upon request). We see that results are qualitatively similar to those in Table 3.

3.2.2. Unanticipated Shocks

We next turn to the second possible explanation for the incongruity between ex post and ex ante consumption: unanticipated shocks. The idea is that positive aggregate shocks that lead to higher current wealth or expectations about higher future income would cause respondents to save less (and hence spend more) of the extra funds than they had intended to.

In the first survey, we elicit respondents' year-ahead earnings expectations, and ask for the expected magnitude of change in year-ahead earnings relative to current earnings. In addition, both surveys collect data on the respondent's earnings; this allows us to calculate the realized (approximate year-ahead) change in earnings. Our measure of unanticipated shocks at the individual level is then the realized percent change in earnings *minus* expected percent change in earnings. A positive value of this metric indicates a positive shock to earnings (relative to expectations). We are able to construct this variable for 141 of the 154 respondents. The mean of this variable, reported in the first column of Table 4, is 5.1 percentage points (that is, on average, realized earnings changes are 5.1 percentage points better than expected changes), with the 10th percentile being -8.8, and 90th percentile being +14.1.

Column (2) of Table 4 regresses the change in MPC onto this measure of unanticipated change in earnings. The coefficient is positive and statistically significant at the 10% level, suggesting that unanticipated earnings shocks do explain some of the heterogeneity across workers in the gap between ex ante and ex post consumption. However, the coefficient suggests that, for an average unanticipated change in earnings (of +5.1 percent points), the propensity to consume increases by about 1.15 points. That is, earnings shocks explain only 4.6% of the average gap in MPC.

It is possible that individuals receive shocks along other dimensions during this period. In the absence of additional data on individual-specific shocks (which would require richer individual-level data on year-ahead expectations in early 2011, and realizations for the same outcomes in late 2011), we use state-level variations in the evolution of various economic indicators during the course of 2011 (relative to their trend during 2010) as proxies for unanticipated shocks at the individual level. The implicit underlying assumption here is that any deviations during 2011 from the trend observed in 2010 is construed as an unanticipated shock by the individual.¹¹ We consider the following economic indicators: unemployment (source: Bureau of Labor Statistics (BLS)); payroll employment (source: Survey of Business Establishments conducted by the Current Employment Statistics of the BLS); the CoreLogic National Home Price Index; Gross State Product (source: Bureau of Economic Analysis); proportion of consumer debt that is at

¹¹ In an alternate specification that yields qualitatively similar results, we use the state-level variation in changes in economic indicators during 2011 as a proxy for individual-level shocks. This is a reasonable proxy for shocks under the somewhat restrictive assumption that respondents' year-ahead expectations in early 2011 are orthogonal to their state of residence.

least 90 days delinquent (source: FRBNY Consumer Credit Panel/Equifax (CCP); see Lee and van der Klaauw, 2010, for a description of this data source); and, auto loan originations (source: CCP). The first column of Table 4 shows the variation in these indicators across states. The table uses the notation $\Delta(\Delta x)$ to denote the change in economic indicator x during 2011, relative to its change in 2010. There is substantial variation in our sample in these indicators. For example, in the 41 states that our sample spans, the mean change in the unemployment rate during 2011 (relative to the change in 2010) was -0.03 points, with the 10th percentile being -0.8 points and the 90th percentile being 0.7 points. The remaining rows in this column show substantial deviations in the 2011 changes in these variables relative to their changes in 2010.

Columns (3)-(8) of Table 4 report the OLS estimates of a regression of the gap between ex post and ex ante MPC onto each of these indicators.¹² If the shift to greater consumption were driven by shocks, we would expect the coefficient for $\Delta(\Delta \text{Unemployment})$ and $\Delta(\Delta \text{Delinquency})$ to be negative, while the others to be positive. The estimated coefficients show a mixed picture, with signs of half of the coefficients in line with this hypothesis (coefficients for the unemployment rate, payroll employment and auto originations are inconsistent with our hypothesis). However, none of the coefficients is different from zero at conventional levels of significance, except the estimate for home price changes. The last column of the table shows estimates of a specification where all the economic indicators (as well as unanticipated changes in earnings) are entered simultaneously. The coefficients for changes in home price index, and delinquency rate are statistically different from zero and are of the “correct” sign. However, we cannot reject the null hypothesis that the coefficients are jointly equal to zero (p-value = 0.282). The R-squared of the specification is low (0.062), and any significant estimates are quite small economically. For example, based on the estimates in the last column, an average change during 2011 in the home price index (of 1.5 points relative to the percent change in the index during 2010) results in a change of about 3.9 points in the dependent variable (which has a mean of about 25). Overall, the results in Table 4 indicate that, while we cannot rule out the hypothesis that differences in unanticipated shocks are a factor in explaining differences across workers in the systematic shift toward greater ex post consumption, they explain a small part of the shift.

Online Appendix Table C3 reports OLS estimates of regressions corresponding to columns (2)-(9) of Table 4, where the dependent variable is instead the difference between an indicator for ex post spending most of the funds and an indicator for intending to spend most of the funds. We get similar results using ordered logistic regressions (results available from authors upon request). We again see that conclusions are qualitatively similar to those based on the continuous gap between the MPCs, as reported in Table 4.

3.2.3. Other Explanations

We have shown that differences across workers in the systematic shift towards greater ex post consumption is not a consequence of differences in present bias and only partly explained by differences in unanticipated shocks. Furthermore, the systematic shift towards spending more of the funds than intended is hard to explain through simple measurement error; it is also not

¹² Note that we use the percent change in all indicators, except for simple changes in the unemployment and delinquency rates. Further note that for unemployment, payroll employment, and house prices, we take changes over the period January-December 2011 (and, January-December 2010); for auto originations and delinquency rates, we use changes in 2011Q4 relative to 2010Q4 (and, 2010Q4 relative to 2009Q4); and, for Gross State Product (GSP), which is available annually only, we use the changes in the annual GSP for 2011 relative to the 2010 GSP, and changes in the 2010 GSP relative to the 2009 GSP.

clear why ex post responses should suffer from greater systematic measurement error and recall bias than the ex ante responses.¹³

Two prior survey studies have also elicited both planned and ex post usage (reported retrospectively). Shapiro and Slemrod (2003), examining the consumer response to the 2001 tax rebates, find that in the initial surveys 21.8 percent of the respondents intended to mostly spend the rebate, and that in follow-up surveys the retrospective mostly spend rate had increased to 24.9 percent. Likewise, Sahm et al. (2010), analyzing the response to the 2008 tax rebates, find a mostly spend rate of 22 percent in surveys conducted when the rebates are being received, and a mostly spend rate of 25 percent in surveys conducted about a year after the receipt of the rebate. That is, prior evidence suggests that ex ante and ex post usage tend to be quite similar.

In light of this, we hypothesize that the inconsistency that we observe could possibly be a result of the respondent using different mental accounts when reporting the ex ante and ex post marginal propensities for small disaggregated tax cuts such as the payroll tax cut (Thaler, 1992). When reporting her ex ante MPC at the beginning of the year, a respondent may look ahead to the year and think of the amount in aggregate (which, for a household with median earnings of \$50,000, would amount to a hefty \$1,000), and treat this large amount as an increment to her asset account and report a low ex ante MPC. However, when receiving incremental boosts to her paycheck spread out over the course of the year (which for a median-earnings household receiving a paycheck twice a month would mean only an additional \$42 every paycheck), she may treat this small gain as current income. That could then lead to a systematic inconsistency between the ex post and ex ante marginal propensities, with a higher ex post MPC.

This then raises the question of why this explanation does not apply to the two studies mentioned above that find little difference between ex ante and ex post responses. Note that both those studies examine one-time lump-sum tax rebates, unlike a disaggregated tax cut as is the case in this paper. A mental accounting framework would yield the same ex ante and ex post MPC for such rebates, since the respondent would use the same mental account when reporting the ex ante and ex post marginal propensity for one-time transfers.

Mental accounting is only one possible explanation for the gap. We have no direct evidence on this being the case. It should also be pointed out that prior research on form-of-delivery of the tax cut (as a withholding change versus a one-time payment) finds results that are inconsistent with a mental account framework. Such a framework would suggest higher spending rates for reduced withholding, but Coronado et al. (2005) and Sahm et al. (2012) do not find evidence of this. If anything, the latter study finds the converse.

Certainly other explanations are possible for the shift toward greater spending. For example, it may be easier to have targeted and well-defined plans for using one-time tax rebates/cuts. In fact, Bronchetti et al. (2013) find that (low-income) tax filers have well-defined and targeted plans for using their refunds. That would lead to a closer correspondence between the ex ante and ex post behavioral response to lump-sum transfers, but this still cannot explain a systematic shift towards greater spending that we observe. It could be that the spending rate may grow with a lag, as has been found by Johnson et al. (2009) and Parker et al. (2013). However, if this is

¹³ It could be that recall bias from small income increments is larger. However, in order to explain the observed patterns in the data, such bias would have to be non-classical, and there is little reason to believe that would be the case. Therefore, we treat the ex post responses as being closer to the “true” responses. While the ALP does collect detailed survey data on household consumption and spending, we are unable to benchmark our responses to those data since our survey is individual-based. With our small sample size, we would need much more detailed data at the household level (for example, earnings and earnings shocks received by other working household members) in order to compare the survey responses with the spending data.

anticipated, this should already be incorporated in the ex ante responses of workers. Another possibility could be that respondents, over the course of 2011, became more certain about the extension of the tax cut into the future- in that case, we would observe a shift toward higher consumption than intended. In the second survey, respondents were asked about the probability that the tax cut would be extended into 2012. The mean belief is 49.6 percent, with a standard deviation of 28.4 percent, indicating substantial uncertainty in late-2011 about the extension of the tax cut, and casting doubt on this as an explanation for the shift toward greater consumption. Finally, there could have been some unmeasured upward revisions in respondents' wealth or balance sheets during 2011, which would have then caused them to save less (and spend more) of the tax cut. This explanation is quite unlikely given the economic environment during 2011, but it cannot be ruled out.

3.3. Heterogeneity in Tax Cut Use

3.3.1. Response Heterogeneity by Demographics

We next investigate demographic differences in response to the tax cut. Panel A (B) of Table 5 reports the ex ante (ex post) marginal propensities of the tax cut funds for various demographic groups (corresponding unweighted statistics are reported in Appendix Table C4). Across the demographic groups, the first row of Panel A shows that the average ex ante MPC varies between 9.6 (for females) and 17.6 (for males). Panel B shows that, for each demographic group, the average ex post MPC is significantly higher than the average ex ante MPC, varying between 28.4 percent for females and 43.2 percent for male respondents. The table reports a t-test for equality of ex post propensity versus ex ante propensity. In all cases, we reject the null that the two MPCs are equal at the 5% level at least. The table also reports pairwise tests for the equality of responses by demographic groups (for example, females versus males; lower-age versus higher-age, etc.).

Looking at differences by demographic groups, columns (2) and (3) of Table 5 show that males have a significantly higher average ex ante and ex post marginal propensity to consume. It is also notable that the average ex post MPPD is twice as large for females (54.1 percent versus 26.6 percent for males).

The next two columns of Table 5 show how the MPC varies by age. Theoretically, as to what relationship to expect between age and MPC is unclear. The life-cycle model would predict the MPC for an anticipated, temporary change in income to be higher for older respondents (since they have a relatively low future-current ratio). On the other hand, since younger respondents are more likely to be liquidity constrained (Hayashi, 1985; Jappelli, 1990), one may see a higher MPC for them. Panel A (B) shows the ex ante (ex post) MPC does not differ significantly by age.

Columns (6) and (7) show how the marginal propensities vary by household income. Popular notion would suggest that tax cuts would provide much needed spending money to those with lower incomes, who tend to be more liquidity constrained, and hence they should exhibit a higher MPC. However, Panel A of Table 5 shows that low-income workers (those with annual household income of less than \$75,000) report a lower ex ante MPC and a higher ex ante MPPD (differences not statistically significant). Looking at the average ex post marginal propensities in Panel B, we see that the average ex post MPC for low-income workers is about 10 points lower than that of high-income workers (difference not statistically different), and that their ex post MPPD is significantly higher than that of high-income workers. The differences in the distribution of ex post marginal propensities – with high-income workers using the largest share of the tax cuts for consumption and low-income workers using them mostly to pay down debt –

suggests that low-income workers have higher indebtedness, and have liquidity constraints that they also expect to bind in the future.

The last two columns of Table 5 show how the marginal propensities vary by awareness of the tax cut at the baseline. Only 41 of the 154 respondents (27 percent) reported being ex ante aware of the payroll tax cut. We see that those ex ante aware, on average, have a significantly lower MPPD and significantly higher MPS than their counterparts. This likely reflects demographic differences in baseline awareness regarding the tax cut. In fact, we find that male and high-income respondents are more likely to be ex ante aware. Then, it is not surprising that the ex ante marginal propensities of “aware” respondents are, on average, quite similar to those of male and high-income respondents. Notably, there is little difference in the ex post marginal propensities of the two groups.

Appendix Table C5 translates the marginal propensities into the majority use of the tax cut, and we see patterns similar to those in Table 5.

3.3.2. Response Heterogeneity by Expectations

Our survey also included questions aimed at understanding the behavioral response to the tax cuts. We next explore how the (ex ante and ex post) marginal propensities of tax cut use vary by these questions.

The first question can be seen as an indicator for the potential presence of future liquidity constraints. In the first survey, we asked respondents about their expectations about 12-month earnings changes in their current job: “*Suppose that, 12 months from now, you actually are working in the exact same job at the same place you currently work, and working the exact same number of hours. Twelve months from now, do you expect your earnings on this job, before taxes and deductions, to have gone up, or gone down, or stayed where they are now?*”. An individual who responds “*to have gone up*” to this question would arguably be less likely to be liquidity constrained in the future (and more likely to be constrained today); 58 of the 154 respondents reported that they expected their year-ahead earnings to go up. If liquidity constraints were in fact important in determining the use of tax cut funds, we would expect these respondents to (intend to) spend a greater proportion of their funds.

Respondents were also asked about the likelihood that the payroll tax cut would be extended into the future. More specifically, the first survey included the question: “*In January 2011, the FICA tax rate for employees was cut by 2%. The tax rate cut only applies to this year. What do think is the percent chance that the tax rate will be extended into future years?*”. The response was elicited on a 0-100 scale. The average perceived likelihood of the payroll tax cut being extended was 30.9 percent, with 10 percent of the respondents believing the likelihood to be 1 percent or less, and 10 percent expecting the likelihood to exceed 60 percent. The permanent income model of consumption would suggest that those perceiving the tax cuts to be more permanent would have a higher MPC.

Table 6 examines how the response to the tax cuts varies by these variables. Columns (1a) and (1b) of the table report the average marginal propensities for respondents who expect year-ahead earnings to increase and for their counterparts, respectively. Consistent with liquidity constraints being relevant for the intended use of the funds, we see that those who expect year-ahead earnings to increase report a higher average ex ante MPC, however the difference is not statistically significant. With regards to ex post use, the average MPC is very similar for the two groups (around 35 percent). We do, however, see that those who expect future earnings to go up are more likely to save the funds, and less likely to use them to pay off debt (differences not

statistically significant at 5 percent or higher); this may reflect the fact that those expecting earnings to rise may have less debt.

The last two columns of Table 6 report the tax cut responses, conditional on perceived permanence of the payroll tax cuts. Consistent with the permanent income hypothesis, those believing the tax cut extension to be more likely (defined as responses above the median –33 percent— of the subjective distribution) on average report a higher ex ante MPC. However the ex post use of the tax cut does not differ significantly for the two groups.

3.3.3. Multivariate Analysis

Table 7 explores heterogeneity in a multivariate regression framework. We include as covariates the demographic and expectations variables from the previous two sections, as well as the hyperbolic and financial literacy variables.¹⁴

Column (1) of the table reports the OLS estimates of a regression of the ex ante MPC on demographic variables. While males have a higher average ex ante MPC, the estimate is not statistically precise. An increase in the perceived likelihood of tax cut extensions from zero (that is, absolute certainty about the tax cuts not being extended past 2011) to 100 percent (that is, absolute certainty about their extension) is related with a 20.1 points increase in the ex ante MPC (on a base of 14.5), with the coefficient being significant at the 10 percent level. This supports the permanent income hypothesis, as those who consider these tax cuts more permanent plan to spend more of the extra funds. Looking across columns (2)-(3), we see that male, higher-income, and college-educated workers are more likely to plan to use the funds for saving purposes, and less likely to plan to use them for debt servicing; none of these estimates are statistically significant at the 5% level or higher though. Those aware of the tax cut at the baseline have an ex ante higher average propensity to save the tax cuts and have a lower average propensity to use them to pay off debt. The converse is the case for higher-literacy respondents. The joint tests for the significance of the demographic variables are significant in column (3). We can reject the hypotheses that the demographic variables or the expectation variables (about earnings increase and tax cut extension) are jointly zero in columns (1)-(3) combined (p-value = 0.15 for both). However, these covariates explain at most 16% of the variation in intended plans.

Columns (4)-(6) of Table 7 report the corresponding regression estimates for ex post marginal propensities. Column (4) shows that males, college-educated respondents and high-income workers have a higher average ex post MPC; only the coefficient for males is statistically significant, but we cannot reject the null that the demographic coefficients are jointly zero (p-value = 0.13). We see that, consistent with the permanent income hypothesis, the ex post MPC is increasing in the perceived likelihood of the tax cut extension, though the estimate is imprecise. But counter to the hypothesis that liquidity constraints are relevant in determining the response to tax cuts, respondents who expect future earnings to increase have a lower MPC; the estimate is however not statistically different from zero. We also see that ex ante MPC is a strong predictor of ex post MPC. The last two columns in Table 7 show that male and higher financial literacy respondents are likely to use a greater proportion of the funds for saving and a lower proportion for paying off debt. A test for the joint significance of the demographics variables in explaining the ex post plans (columns 4-6) is rejected (p-value = 0.34 for a null hypothesis of them being

¹⁴ Appendix Table C6 shows OLS estimates of regressions corresponding to Table 7, where the dependent variable is instead an indicator for mostly spending, saving, or paying off debt with the funds, ex ante and ex post. Results are qualitatively similar to those reported here.

jointly equal to zero), as is a test for the joint significance of the expectation variables (p -value = 0.55).

Appendix B, using additional data, provides further insights into the relationship between the MPC and demographics that we observe here. We show that groups that are generally identified as being liquidity constrained (such as low-income respondents) are more heavily indebted than their counterparts, are more likely to face tightening credit supply, and expect binding liquidity constraints in the future. Then our finding that low-income respondents do not have a higher MPC is not inconsistent with the permanent income hypothesis, since it predicts that a liquidity-constrained individual would exhibit a higher MPC than an unconstrained individual, but only if the constrained individual expects those constraints to relax in the future.

4. Conclusion

Using innovative survey questions, this paper investigates workers' response to the 2011 payroll tax cuts. We use a baseline survey in early-2011 to elicit *ex ante* marginal propensities of use, and a survey at the end of 2011 to elicit *ex post* use. In line with previous studies that examine how consumers react to income increases resulting from changes in tax policy, our findings reject the life-cycle/permanent income theory: we find that on average a non-trivial proportion – 36 percent – of the extra income is *ex post* reported to be spent by the respondents.

The *ex post* spending use is substantially higher than the 14.3 percent of the income that workers, on average, had intended to spend. A similar incongruity is observed when looking at mostly spending rates: while the *ex ante* mostly spend rate is 12 percent, the *ex post* rate is 39 percent. The systematic switch towards greater consumption *ex post* occurs regardless of the intended use. Notably, we find that differences in this shift across respondents: (1) are not explained by differences in time-inconsistent preferences (as would otherwise be the case under those self-control problems that the respondent is unaware of), and (2) are only partially explained by unanticipated shocks.

Our finding that only 12 percent of workers intend to spend most of the funds is lower than estimates of at least 20 percent from previous studies that employ a survey methodology and ask respondents for what they mostly plan to do with one-time tax rebates implemented since 2001 (Shapiro and Slemrod, 2003a, 2009). However, our proportion is almost identical to the estimate of 13 percent (based on planned use) found by Sahm et al. (2012) for reduced income tax withholding in 2009, which was a tax credit delivered through a mechanism similar to that for the tax cut in question here. On the other hand, the *ex post* proportion of “mostly use” is higher than those found in most prior studies that use a survey approach. This suggests that perhaps, as policy-makers had originally hypothesized, the mechanism through which the cuts were implemented (that is, as a change in withholding rather than a lump-sum transfer) possibly led consumers to spend a greater proportion of the extra funds than they would have done under alternate mechanisms. In addition, our finding that the most common *ex ante* and *ex post* use of the extra income is to pay down debt (with an *ex ante* MPPD of 53 percent, and *ex post* MPPD of 40 percent) is consistent with findings in recent studies that use surveys to elicit respondents' use of tax rebates, and is reflective of a regime of high consumer indebtedness and tightening lending standards.

Our survey approach differs from most prior studies that ask respondents for what they *plan* to do with the tax rebates/cuts, and not what they actually did, and makes little distinction between the two. Two exceptions are Shapiro and Slemrod (2003) and Sahm, Shapiro, and

Slemrod (2010), who have a prospective-retrospective design, and find largely similar ex post spending rates as the ex ante spending rates for the 2001 and 2008 tax rebates, respectively. Note that both these tax rebates are one-time transfers, opposed to the 2011 tax cut which is spread over the course of the year. More work is clearly needed to understand the circumstances in which ex ante and ex post use may or may not be the same, but our findings suggest that the assumption of no systematic discrepancy between planned and ex post use, as in Jappelli and Pistaferri (2014), may not always be reasonable. This has implications for survey design in the context of eliciting consumer response to tax cuts

Our finding that differences in present bias or unanticipated shocks explain only a small part of the differences in the shift towards greater ex post spending means that the gap remains somewhat of a puzzle. One candidate hypothesis that could possibly rationalize the discrepancy that we observe is Thaler's mental accounting theory (1990, 1992). Under this framework, when deciding on how they plan to use the funds, workers may consider the year's-worth of the tax cut (a non-trivial amount of \$1,000 for a median-income household) and think of the extra funds as an asset that should be saved, but when actually spending the small extra amounts in each paycheck, workers may think of the funds as income, which is more easily spent. That could then lead to a systematic inconsistency between ex post and ex ante marginal propensities, with a higher ex post MPC. We do not have data to test this hypothesis in our setting, and hence this explanation remains speculative. Moreover, the fact that Coronado et al. (2005) and Sahm et al. (2012) find little evidence in favor of the mental accounts hypothesis when analyzing the delivery mode of stimulus payments (one-time payments or changes in withholding) also means that this explanation should be taken with caution.

On the methodological front, our quantitative survey wording of eliciting the marginal propensity on a 0-100 scale differs from that employed in most prior survey research (except Jappelli and Pistaferri, 2014), which instead asks respondents for what they plan to do with most of the funds. While our approach does not require making distributional assumptions to arrive at an MPC estimate, we see substantial heaping at certain responses (0, 50, 100) in the data, indicative of rounding. As to which survey approach of eliciting responses to tax cuts/rebates is better, in the sense of accurately reflecting individuals' actual intentions and use, is an important question for future research.

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Appendix A

A1. Measuring Present Bias

Individuals were asked to make 6 choices in which they had to choose how to allocate \$500 between 2 checks under the following time frames and interest rates (r):

Choice	Date of 1 st Check	Date of 2 nd Check	r
A1	Today	In 1 Month	0.5%
A2	Today	In 1 Month	1%
A3	Today	In 1 Month	2.5%
B1	In 1 Year	In 1 Year and 1 Month	0.5%
B2	In 1 Year	In 1 Year and 1 Month	1%
B3	In 1 Year	In 1 Year and 1 Month	2.5%

For each choice, the respondent has to decide how much to save for the 2nd check (which equals 500 minus the amount for the first check).

According to Andreoni and Sprenger (2012), a respondent is characterized as being present biased if, for a given r, the amount allocated to the 2nd check for the choice close in time (choice A) is smaller than the amount allocated to the 2nd check for the choice farther in time (corresponding choice B). For example, if $r = 1\%$, then if the amount allocated to the 2nd check in A2 is smaller than the amount allocated to the 2nd check in B2, the respondent is present biased.

Since we have three different interest rates, a respondent may possibly be present biased as many as three times. Giné et al. (2012) count the number of times the individual is present biased. Results presented in the paper are based on labeling individuals as present-biased if they make present-biased decisions for any of the three interest rates. All regressions also include a dummy variable for whether respondents were asked first the “A” version of the allocation question (i.e. allocating funds between the present and 1 month in the future). Our results are qualitatively similar whether we use a binary indicator for the respondent ever being present biased, or the variable that counts the number of times the respondent is present biased. Among our main analysis sample, 22% of respondents allocated more to the second check in group B1 versus A1 (average difference of \$7.72 allocated to second check), 19% allocated more to the second check for choice B2 versus A2 (average difference of \$15.19) and 16% allocated more to the second check for choice B3 versus A3 (average difference of \$11.25). Overall, 36% of our main sample reported at least one present-biased choice.

A2. Measuring Financial Literacy

Individuals were asked the following four questions to determine their financial literacy. In order to have “high” financial literacy, an individual must correctly answer more than the median number of correctly answered questions. In our sample, the median number of correctly answered questions is 2, so those who correctly answered 3 or 4 questions are considered “highly” financially literate.

Question 1:

Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- 1 More than \$102*
- 2 Exactly \$102*
- 3 Less than \$102*
- 4 I don't know*

Question 2:

Suppose you had \$100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have in this account in total?

- 1 More than \$200*
- 2 Exactly \$200*
- 3 Less than \$200*
- 4 I don't know*

Question 3:

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- 1 More than today*
- 2 Exactly the same*
- 3 Less than today*
- 4 I don't know*

Question 4:

Assume a friend inherits \$10,000 today and his sibling inherits \$10,000 three years from now. Who is richer because of the inheritance?

- 1 My friend*
- 2 His sibling*
- 3 They are equally rich*
- 4 I don't know*

Appendix B: Understanding the demographic heterogeneity in tax funds use

In this section, we use additional survey evidence to get more insights about the relationship between the marginal propensity to consume and demographics that we document in Section 4.3. Conventional wisdom would suggest that liquidity-constrained individuals would be more likely to spend the tax cut funds. To the extent that income (and a college education) is an indicator of the presence of liquidity constraints, our results are inconsistent with this. We find that low-income respondents are not more likely to spend the tax cut funds, and are in fact more likely to use the funds to pay down debt (Table 5). This suggests that either these groups are more highly indebted, and/or are more likely to perceive that liquidity constraints will bind in the future (and hence place a greater premium on improving their balance sheet). However, the qualitative conclusions from Table 5 hold even after controlling for a crude measure of future liquidity constraints – expectations about changes in future earnings – in Table 7. It is possible that this measure does not fully capture the extent of future financial distress anticipated by the different groups. Here, we investigate this further.

In Table B1, we report how various measures of current and future expected financial well-being vary by the demographic groups. Each column in the table reports estimates of an OLS regression of the dependent variable onto demographic variables. Column 1 reports how beliefs about job loss over the next year, as reported in the second survey, vary by observables. The question was as follows: “*What do you think is the percent chance that you will lose your job during the next 12 months?*” The mean response in our sample is 14.9 (on a 0-100 scale). We see that the coefficient for high-income respondents is significantly negative, indicating that low-income respondents perceive less job security.

Columns (2) and (3) report beliefs about year-ahead earnings, as reported in the first and second surveys, respectively. The dependent variable in these two columns is a dummy that equals 1 if the respondent answers “to have gone up” to the question: “*Twelve months from now, do you expect your earnings on this job, before taxes and deductions, to have gone up, or gone down, or stayed where they are now?*”; the response to this question in the first survey is used in Tables 6 and 7. 37.8 and 41.1 percent of respondents expected twelve-month ahead earnings to increase in the first and second survey, respectively. The table shows that there is no significant demographic heterogeneity in the response to this question.

The remaining columns of Table B1 report how several other measures of financial distress vary across demographics. All these measures come from a separate survey, designed by us, that was administered to a different subsample over the internet, again with the RAND’s American Life Panel (ALP), in January 2011. The goal of the survey was to understand how US households were coping financially following the end of the Great Recession. Since this subsample was originally recruited into the ALP the same way as our original respondents, and is similar in terms of observable characteristics to our main sample, investigating how different measures of financial well-being vary across these respondents is informative about how the financial state of respondents differs by their demographics.

Columns (4) and (5) of Table B1 show that perceived past and future credit access do not systematically differ across the demographic groups.¹⁵ This suggests that perceived changes in future credit constraints are unlikely to explain the demographic differences in the MPC that we observe. The prior that low-income respondents should be more liquidity constrained is however confirmed in column (6), which uses a respondent's reported chance of being able to come up with \$2,000 if an emergency arose within the next month. The question, adapted from Lusardi, Schneider, and Tufano (2011), was: "*What is the percent chance (or chances out of 100) that you could come up with \$2,000 if an unexpected need arose within the next month?*". While Lusardi et al. (2011) use this as a measure of a respondent's financial fragility, we believe it is also a good proxy for liquidity constraints. The mean of this variable in our sample is only 69.2 percent. More importantly, high-income, college-educated, and male respondents report significantly higher chances of being able to deal with this kind of financial emergency, indicative of their counterparts being more liquidity-constrained. This would then suggest that their counterparts should have exhibited a higher MPC. However, column (7) shows that low-income respondents, on average, have significantly higher non-mortgage debt-to-income ratios (compared to high-income respondents, their ratio is 21.73 points higher). The higher debt of the lower-income respondents, combined with supply-side credit limitations for the non-prime since the crisis (Mian et al., 2013; Brown, Stein, and Zafar, 2015), could explain why they use more of their funds to pay off debt than the higher-income group (an ex post MPPD of 47.7 percent compared with 29.6 percent for the high-income respondents).

Finally, the last column of Table B1 uses the reported percent chance of declaring bankruptcy over the next year as the dependent variable. The question was "*What is the percent chance that over the next 12 months you [(or your spouse/partner)] will file for bankruptcy?*" The mean response to this question is 5.17 percent (on a 0-100 scale). We see that high-income and college-educated respondents report a significantly lower likelihood of this. This is consistent with the groups identified earlier (low-income, non-college, and young) expecting liquidity constraints to bind in the future.

The patterns in this table help explain why groups that are generally identified as being liquidity constrained do not have a higher MPC. They are more heavily indebted than their counterparts, are more likely to face tightening credit supply, and expect binding liquidity constraints in the future.

¹⁵ The question about past credit access, for example, was worded as follows: "*Do you believe it generally has been easier, harder or equally difficult to obtain credit or loans during the last year when compared to the year before?*" As can be seen in column (4) of Table 7, 40 percent of respondents answered "harder" to this question.

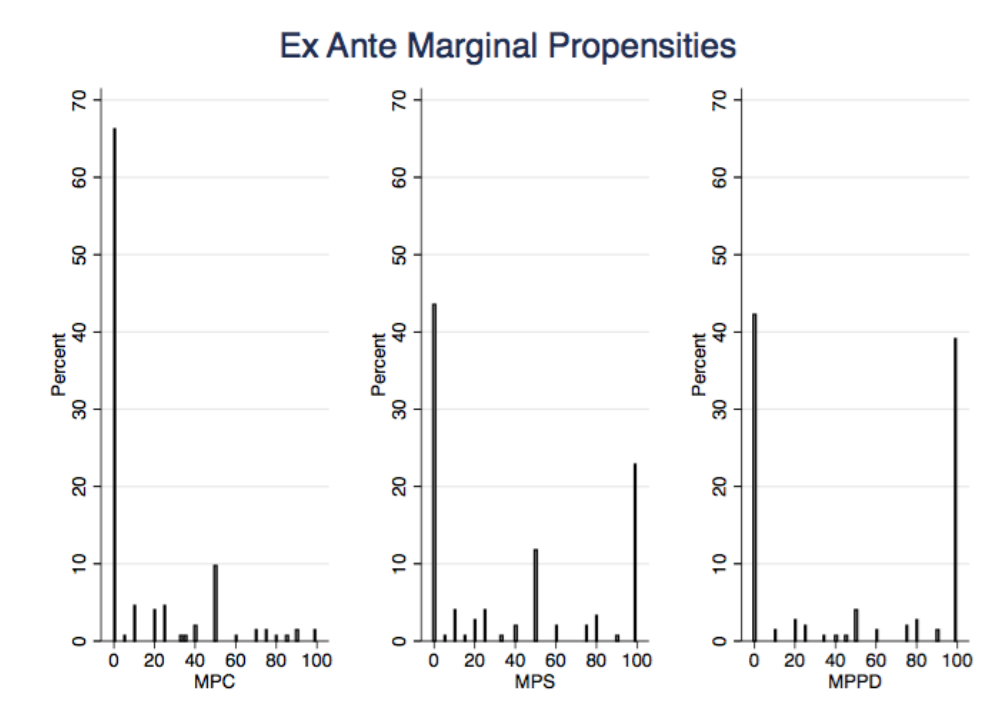


Figure 1: Distribution of ex ante Marginal Propensities

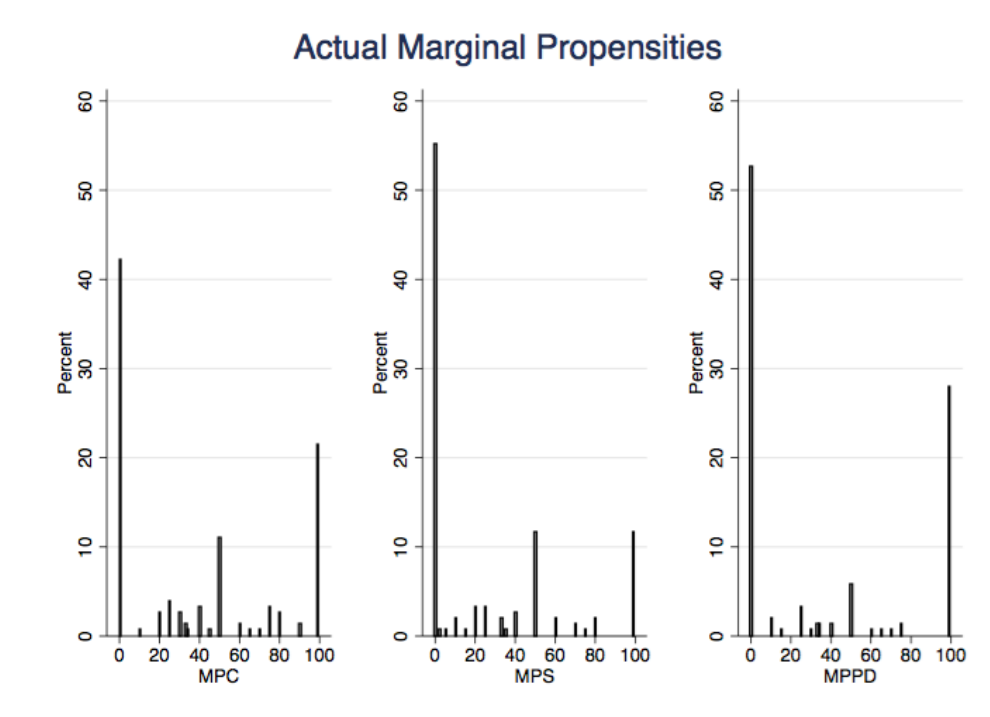


Figure 2: Distribution of ex post Marginal Propensities

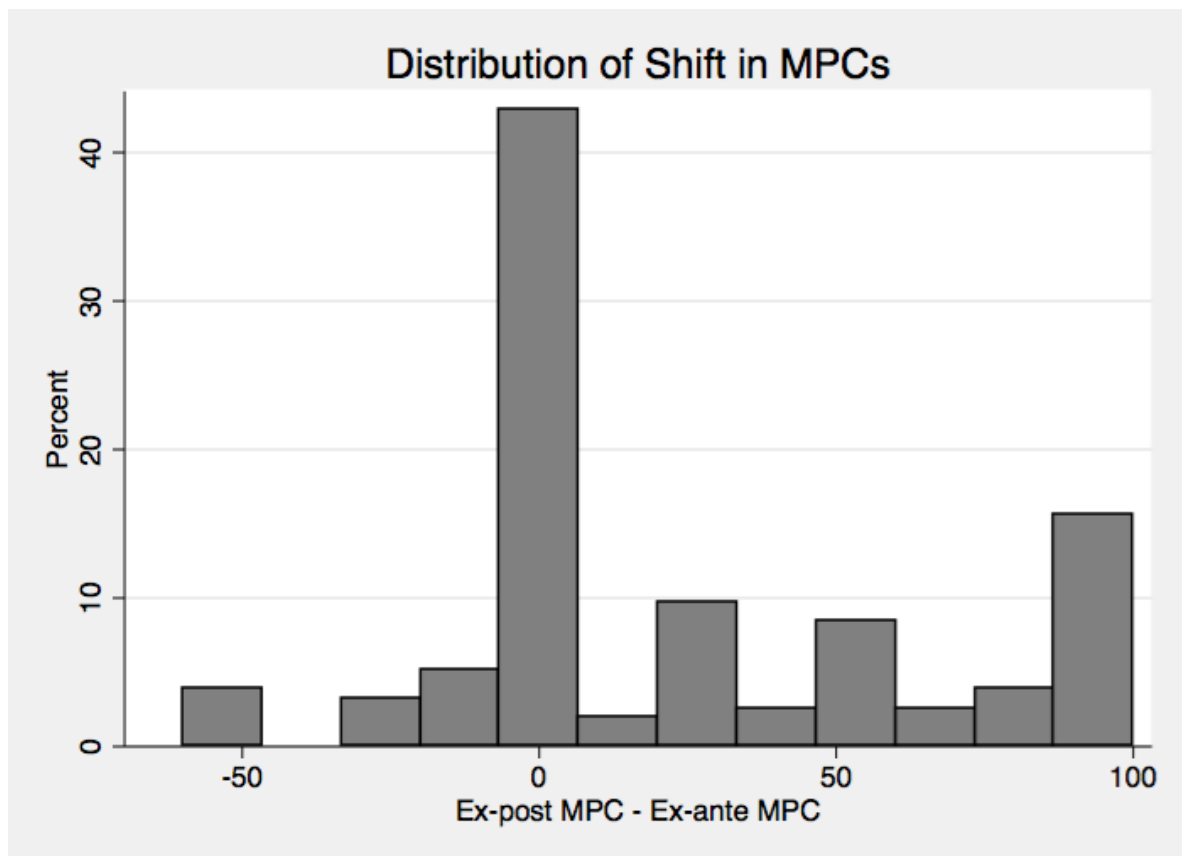


Figure 3: Distribution of the Shift in the MPCs

Table 1: Summary Statistics

	Initial Survey	Second Survey
Total number of respondents	380	362
Number of respondents working full-time	209	196
Male respondents (%)	48	51
White respondents (%)	94	94
Age	55.9	56.2
	(5.90)	(5.94)
Respondents with age > 54 years (%)	57	57
Number of schooling years	15.3	15.2
	(2.29)	(2.27)
Respondents with a College degree (%)	59	58
Annual income (\$)	92,161	90,903
	(57,895)	(56,017)
Respondents ex-ante aware of tax cut (%)	35	35
Respondents with annual income:		
< \$35,000 (%)	12	13
\$35,000-\$75,000 (%)	36	36
> \$75,000 (%)	51	51

Averages reported for continuous variables. Standard deviations in parentheses.

Table 2: Ex ante and Ex post Reported Use of Tax Cut Funds

	Ex ante^a			Ex post^b		
	Marginal Propensity ^c		"Mostly" Use ^d		Marginal Propensity	
	Unweighted (1)	Wgt. ^e (2)	Unwgt. (3)	Wgt. (4)	Unwgt. (6)	Wgt. (7)
Consume	14.31 (24.93)	13.68 (2.04)	0.12	0.12	38.86 (40.31)	35.97 (3.59)
Save	37.39 (41.19)	33.30 (3.30)	0.38	0.35	25.36 (35.05)	24.02 (3.09)
Pay down debt	48.31 (46.44)	53.02 (3.91)	0.49	0.53	35.77 (43.66)	40.01 (3.60)
					0.40	0.37
					0.24	0.21
					0.36	0.42
						0.43

For marginal propensities, mean response in first cell. Standard deviations in parentheses. For "most" uses, proportion of respondents (0-1) reported.
^a Ex ante use of tax cut funds reported in the first survey. Respondents were asked: "Please indicate what share of the extra income you are using or plan to use to..." on a 0-100 scale.

^b Ex post use of tax cut funds reported in the second survey. Question: "What did you do with the extra income? Please indicate what share of the extra income you ..." on a 0-100 scale.

^c The average response to the question in *a*.

^d Respondents are coded as using the funds to mostly consume/save/pay debt if the reported marginal propensity is the modal (highest) response.

^e Weighted numbers reported (see text for how weights are constructed).

^f Restrict the sample to those respondents who assign a modal response to one category, and there is no tie. Weighted statistics reported.

Table 3: Present-Bias and Shift in Consumption

Dependent Variable:	Hyperbolic Dummy ^a					
	(1)	(2)	(3)	(4)	(5)	(6)
College	-0.096 (0.084)	5.68 (7.48)				5.55 (7.81)
Male	0.056 (0.079)	5.02 (7.12)				8.37 (7.34)
Age	-0.003 (0.006)	0.395 (0.591)				0.332 (0.587)
High Income	-0.017 (0.084)	6.52 (7.42)				7.31 (7.50)
Ex-ante Aware of Tax Cut ^c	-0.097 (0.090)	1.81 (8.58)				-1.64 (8.87)
Hyperbolic Dummy			-3.47 (6.95)		-0.907 (7.77)	0.452 (7.82)
High Financial Literacy ^d				8.12 (9.27)	21.76 (15.00)	27.11* (15.21)
Hyperbolic Dum x High Fin Lit.					-24.23 (19.34)	-28.90 (19.62)
Constant	0.554 (0.359)	-7.06 (32.51)	24.23*** (5.47)	23.45*** (3.68)	21.74*** (5.60)	-8.75 (32.74)
Demog variables sig? ^e	0.691	0.448				0.321
R^2	0.023	0.025	0.002	0.004	0.017	0.047
Mean of Dep. Variable	0.355	24.56	23.89	24.56	23.89	23.89
Observations	152	154	152	154	152	152

OLS regression of the dependent variable onto covariates.

Robust standard errors in parentheses. ***, **, * denote significance at 1, 5, and 10%, respectively.

^a Dummy that equals 1 if the respondent is hyperbolic (see text for construction of variable).

^b The gap between the ex post MPC and the ex ante MPC.

^c Dummy that equals 1 if respondent reported knowing about the tax cut in first survey before we informed them of it.

^d Dummy that equals 1 if respondent has high financial literacy (answers at least 3 of the 4 questions about financial literacy correctly).

^e p-value for the joint significance of all demographic correlates (age; income; college; male).

Table 4: Shift in MPC and Unanticipated Shocks

	10th perc, Mean, & 90th p. of row var ^a	Dependent Variable: Ex post MPC - Ex ante MPC ^b							
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Δ(%Δ Earnings)	[-8.8; 5.1; 14.1]	0.225* (0.119)							0.234* (0.130)
Δ(ΔUnemployment Rate)	[-0.8; -0.03; 0.7]		1.47 (4.57)						2.69 (5.48)
Δ(%Δ Payroll Emp.)	[-0.64; -0.14; 0.56]			-2.54 (6.58)					-1.36 (7.21)
Δ(%Δ Home Price Index)	[-1.6; 1.5; 7.4]				1.87* (1.03)				2.61** (1.24)
Δ(%Δ Gross State Prod.)	[-3.2; -1.7; 0.26]					0.328 (2.75)			-0.343 (3.17)
Δ(Δ Delinquency Rate)	[-5.1; -1.1; 2.4]						-0.766 (0.617)		-1.66** (0.826)
Δ(%Δ Auto Originations)	[-37.9; -19.0; -5.5]							-0.052 (0.284)	-0.032 (0.303)
Constant		24.11*** (3.50)	24.26*** (3.39)	23.87*** (3.47)	21.34*** (3.70)	24.79*** (5.28)	23.41*** (3.35)	23.24*** (6.40)	16.66* (8.44)
F-test ^c									0.282
R ²		0.021	0.001	0.001	0.020	0.000	0.005	0.000	0.062
Mean of Dependent Var.		24.73	24.22	24.22	24.22	24.22	24.22	24.22	24.73
Number of Observations		141	152	152	152	152	152	152	141

Robust standard errors in parentheses. ***, **, * denote significance at 1, 5, and 10%, respectively.

^a The 10th percentile, mean, and 90th percentile values of the row variable: [10th percentile; mean; 90th percentile].

^b OLS regression of the gap between ex post MPC and ex ante MPC onto correlates.

^c p-value for the joint significance of all correlates (excluding constant).

Table 5: Marginal Propensities of Tax Cuts Use, by Demographics

All	Male	Female	Age > 54	Age ≤ 54	High Inc ^a	Low Inc	Aware ^b	Not Aware
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Ex ante								
Observations	154							
Consume	13.68 ⁺⁺⁺ (2.04)	17.63 ⁺⁺⁺⁺⁺ (3.51)	9.59 ⁺⁺⁺ (2.01)	12.50 ⁺⁺⁺ (2.38)	14.62 ⁺⁺ (2.96)	15.81 ⁺⁺⁺ (3.68)	12.14 ⁺⁺⁺ (2.30)	15.84 ⁺⁺⁺ (3.89)
Save	33.30 ⁺⁺ (3.30)	40.43 ⁺⁺ (5.06)	25.90 (4.19)	34.14 ⁺⁺ (4.34)	32.63 (4.97)	37.86 ⁺⁺⁺ (4.39)	30.00 ⁺⁺ (4.71)	49.66 ⁺⁺⁺⁺⁺ (6.70)
Pay down debt	53.02 ⁺⁺ (3.91)	41.94 ⁺⁺⁺ (5.96)	64.51 (5.03)	53.36 (5.61)	52.75 (5.34)	46.33 (5.04)	57.86 (5.67)	34.50 ⁺⁺⁺⁺⁺ (6.74)
								13.00 ⁺⁺⁺ (2.28)
								28.12 (3.60)
								58.88 ⁺⁺⁺ (4.40)
Panel B: Ex post								
Observations	154							
Consume	35.97 (3.59)	43.17 ^{**} (5.57)	28.40 (4.47)	38.95 (4.69)	33.67 (5.25)	42.10 (5.64)	31.48 (4.66)	40.59 (8.63)
Save	24.02 (3.09)	30.22 ^{**} (5.16)	17.49 (3.29)	22.50 (3.44)	25.20 (4.84)	28.35 (5.42)	20.84 (3.60)	29.55 (7.89)
Pay down debt	40.01 (3.60)	26.61 ^{***} (5.06)	54.11 (5.12)	38.56 (5.33)	41.13 (4.84)	29.56 ^{***} (4.41)	47.68 (5.34)	29.86 [*] (6.48)

Table reports the average propensities (on a 0-100 scale). Standard deviations in parentheses.

^a High income is the group of respondents with annual income ≥ \$75,000.

^b Respondent is aware if she reported knowing about the tax cut in first survey before we informed her of it.

Weighted t-test conducted for equality of ex post propensity versus ex ante propensity. +++, ++, + denote difference significant at 1, 5, and 10%, respectively.

Weighted t-test conducted for equality of responses for female against male; age > 54 vs. age ≤ 54; high

income vs. low income; aware versus not aware. **, *, denote difference significant at 1, 5, and 10 percent, respectively. Asterisks

reported on the female, age > 54, high inc., and aware columns, respectively.

Table 6: Marginal Propensities of Tax Cuts Use, by Various Expectations

	All	Initial Survey Earnings Exp ^a		Future Tax Cut Extension ^b	
		Up (1a)	Same/Down (1b)	Likely (2a)	Unlikely (2b)
Observations	154	58	96	74	80
Ex ante					
Consume	13.68 (3.67)	17.40 (3.27)	11.45 (2.48)	16.90* (3.25)	10.56 (2.17)
Save	33.30 (5.82)	32.18 (4.91)	33.97 (4.30)	32.87 (4.83)	33.72 (4.61)
Pay down debt	53.02 (7.26)	50.42 (6.45)	54.58 (4.90)	50.24 (5.74)	55.72 (5.25)
Ex post					
Consume	35.97 (5.80)	35.18 (6.30)	36.51 (4.18)	38.36 (5.06)	33.67 (5.06)
Save	24.02 (4.96)	31.18* (6.22)	19.18 (3.07)	23.47 (3.98)	24.55 (4.90)
Pay down debt	40.01 (6.46)	33.64 (5.76)	44.31 (4.44)	38.17 (5.71)	41.78 (4.68)

Table reports the average propensities (on a 0-100 scale). Weighted statistics reported. Standard deviations in parentheses.

^a 12-month ahead earnings expectations, elicited as follows: "Suppose that, 12 months from now, you actually are working in the exact same [/main] job at the same place you currently work, and working the exact same number of hours. Twelve months from now, do you expect your earnings on this job, before taxes and deductions, to have gone up, or gone down, or stayed where they are now?".

^b Extension expectations are elicited as follows: "What do think is the percent chance that the tax rate cut will be extended into future years?". Respondents above (below) the median of the distribution are coded as likely (unlikely).

Weighted t-test conducted for equality of responses in columns (a) versus corresponding column (b). ***, **, * denote difference significant at 1, 5, and 10 percent, respectively.

Table 7: Heterogeneity in Tax Cut Use

	Ex ante Propensity to		Ex post Propensity to	
	Consume	Save	Consume	Save
	(1)	(2)	(3)	(4)
College	2.55 (4.81)	8.79 (7.02)	-11.35 (8.22)	6.47 (6.99)
Male	4.98 (4.53)	7.36 (6.59)	-12.34* (7.40)	11.19* (6.57)
Age	0.25 (0.38)	0.46 (0.49)	-0.71 (0.55)	0.44 (0.52)
High Income	0.24 (4.95)	5.26 (7.11)	-5.50 (7.91)	7.39 (6.87)
Ex-ante Aware of Tax Cut ^a	4.74 (5.58)	19.30** (8.23)	-24.04*** (8.15)	1.78 (8.43)
Perceived likelihood of tax cut extensions ^b	20.11* (10.69)	-6.78 (14.39)	-13.33 (15.06)	6.02 (14.67)
12-month ahead Earnings expected to increase ^c	1.41 (4.48)	-10.29 (6.64)	8.88 (7.58)	-10.52 (6.55)
Hyperbolic Dummy ^d	-2.28 (4.40)	-4.09 (7.06)	6.37 (7.81)	-4.91 (6.57)
High Fin. Literacy Dummy ^e	-0.54 (5.44)	-17.66** (7.94)	18.20* (9.98)	9.77 (9.32)
Ex ante MP Consume ^f			0.37*** (0.11)	
Ex ante MP Save				0.34*** (0.08)
Ex ante MP Pay Debt				0.46*** (0.07)
Constant	-10.45 (21.78)	5.67 (28.44)	104.79*** (31.19)	-2.42 (29.51)
Joint Sig of Demog variables ^g	0.51	0.20	0.03	0.13
Joint Sig of expectations vars ^h	0.12	0.29	0.32	0.27
R^2	0.05	0.15	0.16	0.13
Mean of Dep Var	14.49	37.88	47.62	38.39
Observations	152	152	152	152

The dep. variable is the propensity of tax use (consumption, saving, pay down debt) on a 0-100 scale.

The table reports the OLS estimates of the dependent variables on row covariates.

Robust standard errors in parentheses. ***, **, * denote significance at 1, 5, and 10%, respectively.

^a Dummy that equals 1 if respondent reported knowing about the tax cut in first survey before we informed them of it.

^b The perceived likelihood of tax cut extensions into the future, reported in the first survey (normalized to a 0-1 scale).

^c Dummy that equals 1 if respondent expects year-ahead earnings at same job to be higher than current earnings.

^d Dummy that equals 1 if the respondent is hyperbolic (see text for construction of variable).

^e Dummy that equals 1 if the respondent has high financial literacy (answers at least 3 of the 4 fin lit questions correctly).

^f The ex ante marginal propensity to consume, reported in the first survey (on a 0-100 scale).

^g p-value for the joint significance of all demographic correlates (age; income; college; male).

^h p-value for joint significance of the two vars (likelihood of tax cut extensions; future earnings expected to increase).

APPENDIX

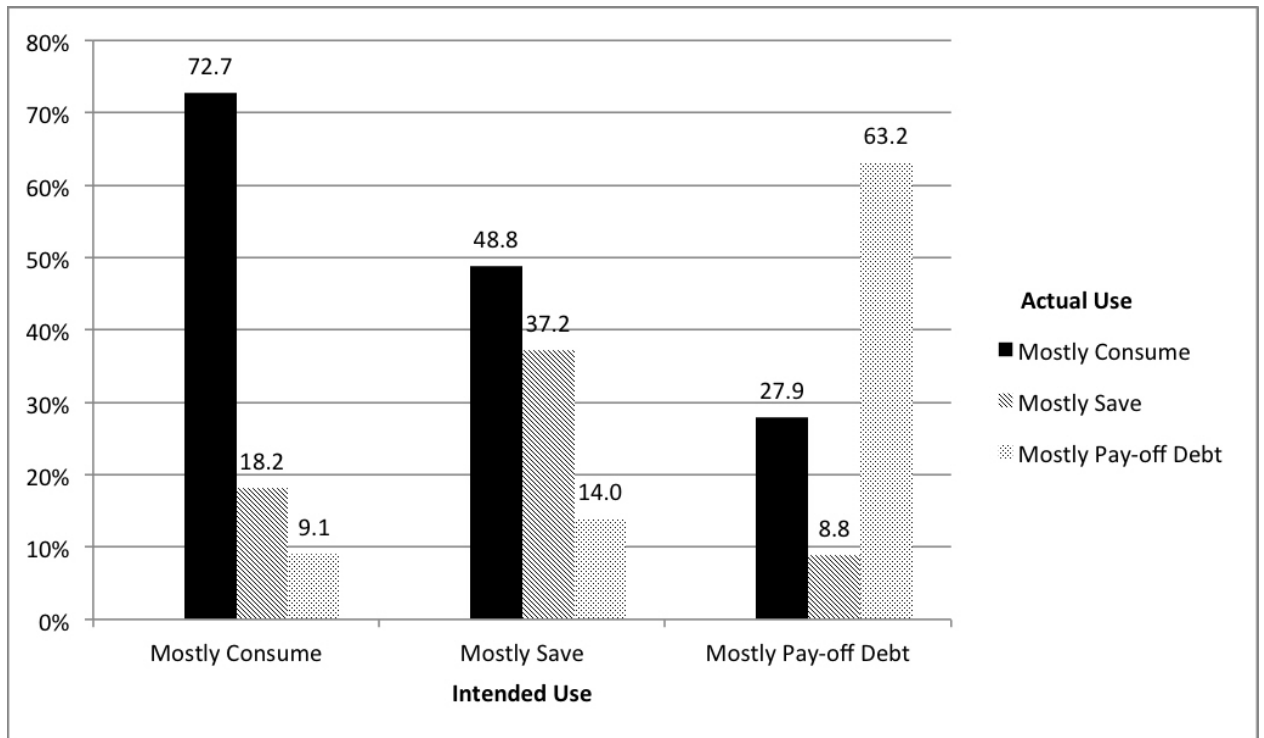


Figure A1: Ex post Use of Tax Cut Funds, Conditional on Ex ante Use

Table A1: Recent Literature on Anticipated Income Changes Caused by Tax Rebates or Tax Rate Changes

Paper	Tax Change	Reform	Data	Consumption Response	Sample Size
Parker (1999)	When workers hit SS ceiling, 1980-1993	Tax Rate Change	Consumer Expenditure Survey (CE)	50% MPC	57,051
Souleles (2002)	Reagan Economic Recovery Tax Act (1981)	Tax Rate Change	Consumer Expenditure Survey (CE)	60-90% MPC on non-durables	3,404
Shapiro and Slemrod (1995)	1992 Presidential Executive Order	Tax Rate Change	Michigan Survey of Consumers	Mostly-spend rate of 43%; no MPC reported	326
Shapiro and Slemrod (2003a)	Econ Growth & Tax Relief Reconciliation Act of 2001	Lump-sum Rebate	Michigan Survey of Consumers	Mostly-spend rate of 22%; MPC of ~33%.	10,059
Johnson, Parker and Souleles (2006)	Econ Growth & Tax Relief Reconciliation Act of 2001	Lump-sum Rebate	Consumer Expenditure Survey (CE)	20-40% MPC on non-durables	13,066
Coronado, Lupton and Sheiner (2005)	Jobs and Growth Reconciliation Act (2003)	Rebate and Tax Rate Change	Michigan Survey of Consumers	Mostly-spend rate of 20.7%; MPC of ~25%	730
Shapiro and Slemrod (2009)	Economic Stimulus Act (ESA) of 2008	Lump-sum Rebate	Michigan Survey of Consumers	Mostly-spend rate of 20%; MPC of ~33%	2,518
Parker et al. (2013)	Economic Stimulus Act (ESA) of 2008	Lump-sum Rebate	Consumer Expenditure Survey (CE)	MPC of 12-31% on non-durables; MPC of 50-90% if durables included.	17,478
Sahm, Shapiro and Slemrod (2012)	Making Work Pay (2009)	Rebate and Tax Rate Change	Michigan Survey of Consumers	Mostly-spend rate of: 13% for tax rate change 25% from tax rebate.	592

Table B1: Variation in Financial Distress Measures by Demographics

Job Loss ^a	Earnings Expectations ^b		Past Credit Access		Expected Future Credit Access		Chance Can Cover Unexp. Expenses ^e		Non-mortgage Debt-to-Inc Ratio		Chance of Declaring Bankruptcy ^f	
	First Survey (1)	Second Survey (2)	Harder ^c (3)	Harder ^d (4)	Harder ^d (5)	Harder ^d (6)	Harder ^d (7)	Harder ^d (8)	Harder ^d (9)	Harder ^d (10)	Harder ^d (11)	Harder ^d (12)
College	-1.95 (3.27)	-0.01 (0.07)	0.05 (0.08)	-0.02 (0.04)	-0.003 (0.03)	10.70*** (2.62)	5.26 (3.82)	-3.01*** (1.11)				
Male	1.66 (3.14)	0.10 (0.07)	0.06 (0.07)	0.001 (0.04)	-0.05 (0.03)	5.24** (2.59)	-2.36 (3.77)	0.11 (1.09)				
Age	0.23 (0.23)	-0.002 (0.01)	-0.01 (0.01)	0.001 (0.001)	-0.002* (0.001)	0.62*** (0.09)	-0.753*** (0.134)	-0.16*** (0.04)				
High Income	-8.04** (3.23)	0.11 (0.07)	0.04 (0.08)	0.04 (0.04)	-0.03 (0.03)	17.72*** (2.65)	-21.73*** (3.86)	-3.02*** (1.12)				
Constant	6.23 (12.66)	0.40 (0.32)	0.77** (0.33)	0.33*** (0.08)	0.39*** (0.07)	21.38*** (5.30)	82.52*** (7.77)	16.45*** (2.23)				
Demog vars sig? ^g	0.116	0.297	0.53	0.73	0.18	0.00	0.00	0.00				
R ²	0.042	0.023	0.017	0.003	0.008	0.150	0.078	0.046				
Mean	14.88	0.378	0.411	0.408	0.255	69.15	35.57	5.169				
Observations	197	209	190	733	741	733	736	733				

The table reports the OLS estimates of the dependent variables on row covariates.

Robust standard errors in parentheses. ***, **, * denote significance at 1%, 5%, and 10%, respectively.

^a Response to the question in the second survey: "What do you think is the percent chance that you will lose your job during the next 12 months?" on a 0-100 scale

^b Dummy that equals 1 if respondent expects year-ahead earnings at the same job

to be higher (versus the same, or lower) than current earnings.

^c Dummy that equals 1 if respondent says "harder" to: "Do you believe it generally has been easier, harder or equally difficult to obtain credit or loans during the last year when compared to the year before?"

^d Dummy that equals 1 if respondent says "harder" to: "During the next 12 months, do you expect that it generally will become easier, harder or equally difficult to obtain credit or loans compared to the past 12 months?"

^e Response to "What is the percent chance (or chances out of 100) that you could come up with \$2,000 if an unexpected need arose within the next month?" on a 0-100 scale.

^f Response to "What is the percent chance that over the next 12 months you [(or your spouse/partner)] will file for bankruptcy?", on a 0-100 scale.

^g p-value for the joint significance of all demographic correlates (age; income; college; male).