

B Supplementary Tables and Figures

Table B.1: Summary of the parameters for the modified CTB

	1	2	3	4
t	0	0	35	35
k	35	63	35	63
P_1	1.05	1.00	1.05	1.00
P_2	1.11	1.05	1.11	1.05
P_3	1.18	1.11	1.18	1.11
P_4	1.25	1.33	1.25	1.33
P_5	1.43	1.67	1.43	1.67
P_6	1.82	2.22	1.82	2.22

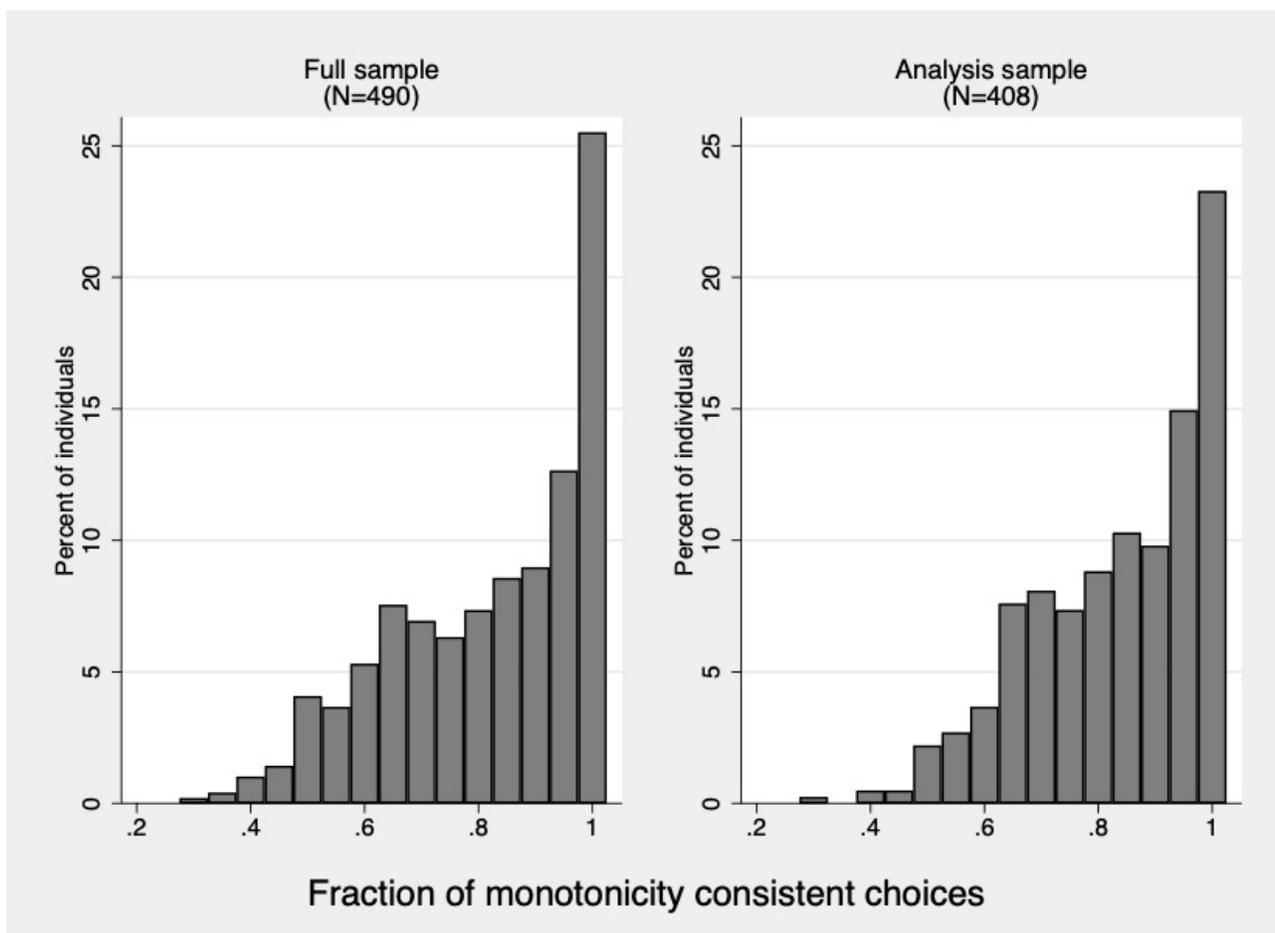


Figure B.1: Histogram of fraction of monotonic choices by individuals for full sample and analysis sample.

C Additional Exercises and Robustness Tests

Table C.1: Plan Choice and Experimental Behavior 2 (for restricted sample)

<i>Dependent Variable:</i>				
Chose Smooth Plan	(1)	(2)	(3)	(4)
Interiorness	0.523*** (0.135)			
Patience	0.488*** (0.136)			
Present Biasedness	0.111 (0.121)			
Curvature: quintile rank of α		-0.035* (0.019)		
Discount Factor: quintile rank of δ^{30}		0.041** (0.019)		
Present Bias: quintile rank of β		-0.004 (0.018)		
Quintile rank of Plan Value Ratio (PVR)			0.051*** (0.016)	
PVR > 1				0.160*** (0.047)
Constant	0.322*** (0.122)	0.779*** (0.087)	0.659*** (0.043)	0.676*** (0.039)
R^2	0.067	0.034	0.033	0.035
Observations	343	343	343	343
Joint significance test for interiorness and patience / α and δ^{30}				
F statistic	8.641	5.073		
Two sided p -value	<0.001	0.007		

Notes 

The dependent variable takes the value 1 if a participant selected one of the smooth payment plans, 0 otherwise. Interiorness takes values between 0 and 1, and it denotes the average share of the chosen option that is allocated equally between soon and later payments. Patience takes values between 0 and 1, and it denotes the average share of budget allocated to later payment. Present biasedness takes values between -1 and 1, and it denotes the average difference in patience between choices among options that have the same delay between soon and later payments and the same interest rate (the corresponding choices among options differ only because one involves the present in the soon amount, and the other does not). Ordinary least squares (OLS) estimates are presented, for which heteroscedasticity-consistent standard errors are reported in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

C.1 Individual Measurement Error

Our aggregate analysis provides statistical comparisons for estimated preference parameters and plan values between individuals who chose smooth plans and those who chose the single plan. As such, this aggregate analysis accounts for estimation errors in the preferences and plan values. The individual analysis presented in Table 4 shows differences in preferences and plan values at the *point* estimates of individual preferences. Individual estimation error could potentially alter the conclusions reached.

To evaluate the robustness to individual measurement error in preferences, we draw 1,000 simulants for each of the 348 individuals in our individual analysis. Each simulation has parameter values drawn from a multivariate normal distribution centered at the point estimates for α and δ of the individual with covariance matrix determined by the estimated covariance matrix for the individual parameters. At these simulated parameter values, we construct a simulated Plan Value Ratio (PVR). Figure C.1 graphs the CDF of the $348 \times 1000 = 348,000$ simulated PVR values separately by individuals who chose the single plan or one of the smooth payment plans. Allowing for the variation in PVRs induced by individual estimation errors, we continue to reject the null hypothesis of equal distributions of PVRs across these two groups (Mann–Whitney test, $z = -103.48$, ($p < 0.001$)).

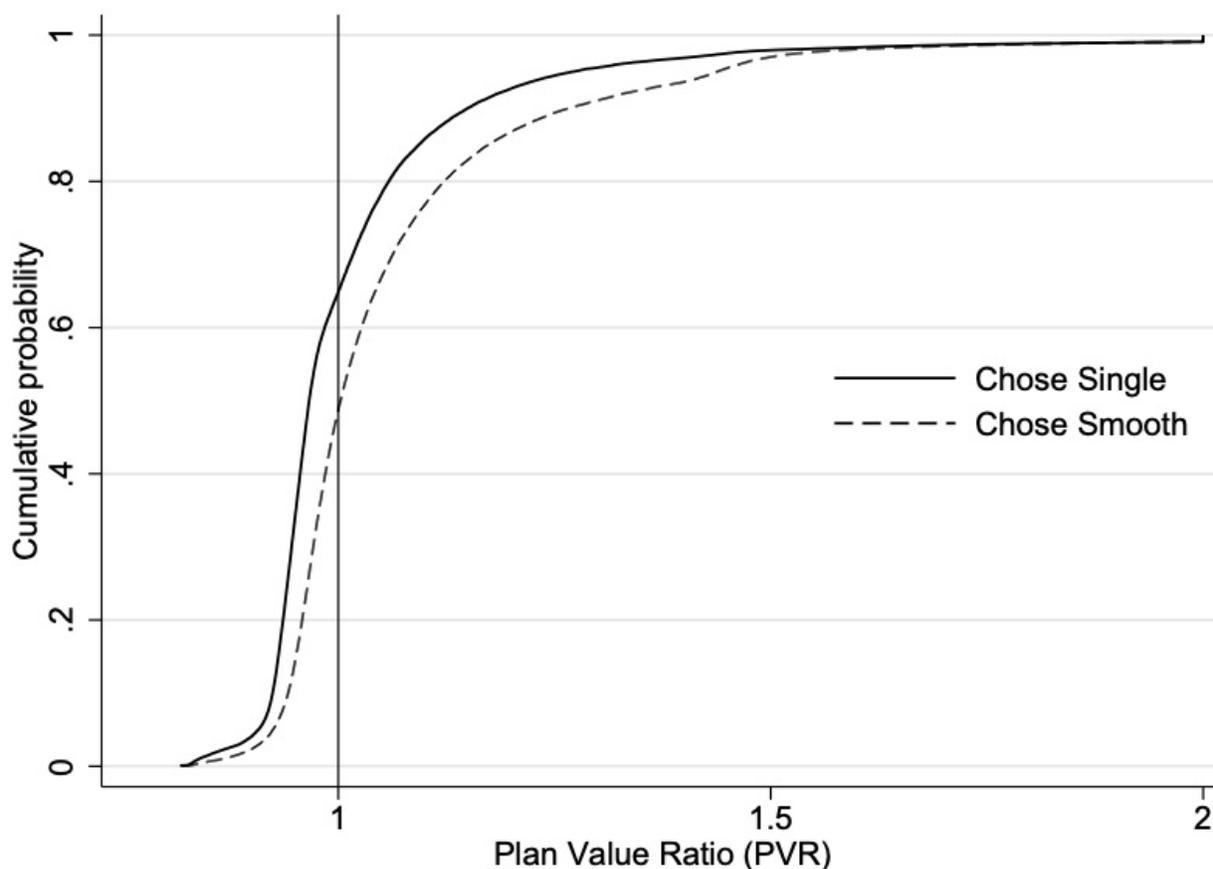


Figure C.1: CDF of simulated Plan Value Ratios (PVRs) for chose single and chose smooth groups. *Notes:* The figure graphs the CDF of the $348 \times 1000 = 348,000$ simulated PVR values separately by individuals who chose the single plan or one of the smooth payment plans.

C.2 Transaction Costs and Plan Choice

Our implemented CTB design for eliciting preferences focuses on equalizing transaction costs at each payment date by providing minimum payments. For payment plan choice, we do not require subjects to receive some minimum payment at every potential date. As such, some payment plans may incur different transaction costs than others. For example, the single payment plan only requires one trip to the bank, while the twelve payment plan requires twelve. These additional transaction costs are not modeled in our main analysis estimating plan values.

In Figure C.2, we incorporate transaction costs into our analysis determining plan values. The left hand side of Figure C.2 presents the distribution of predicted plan choices for each

individual, based on the estimated PVR_i for the pooled sample (top row), and separately for the individuals who chose the single (second row) and smooth (bottom row) payment plans. This graph highlights the stark prediction that all participants are either predicted to have the single or the twelve payment plan as the highest value plan. Indeed, within the range of our parameters, a stark cutoff exists in (α, δ) space below which the single plan is predicted to have the highest value, otherwise the twelve payment plan is valued highest. In Figure C.3, Panel A, we make this clear by simulating 100,000 preferences from two independent uniform distributions: $\alpha \in [0.1, 1]$ and $\delta \in [0.8, 1.1]$. Either the single plan or the twelve payment plan should be chosen with no intermediate choices generated. Figure C.3, Panel B also plots the next best alternative, with intermediate options of the two and six payment plans being the second highest value plan for large swathes of the parameter space.

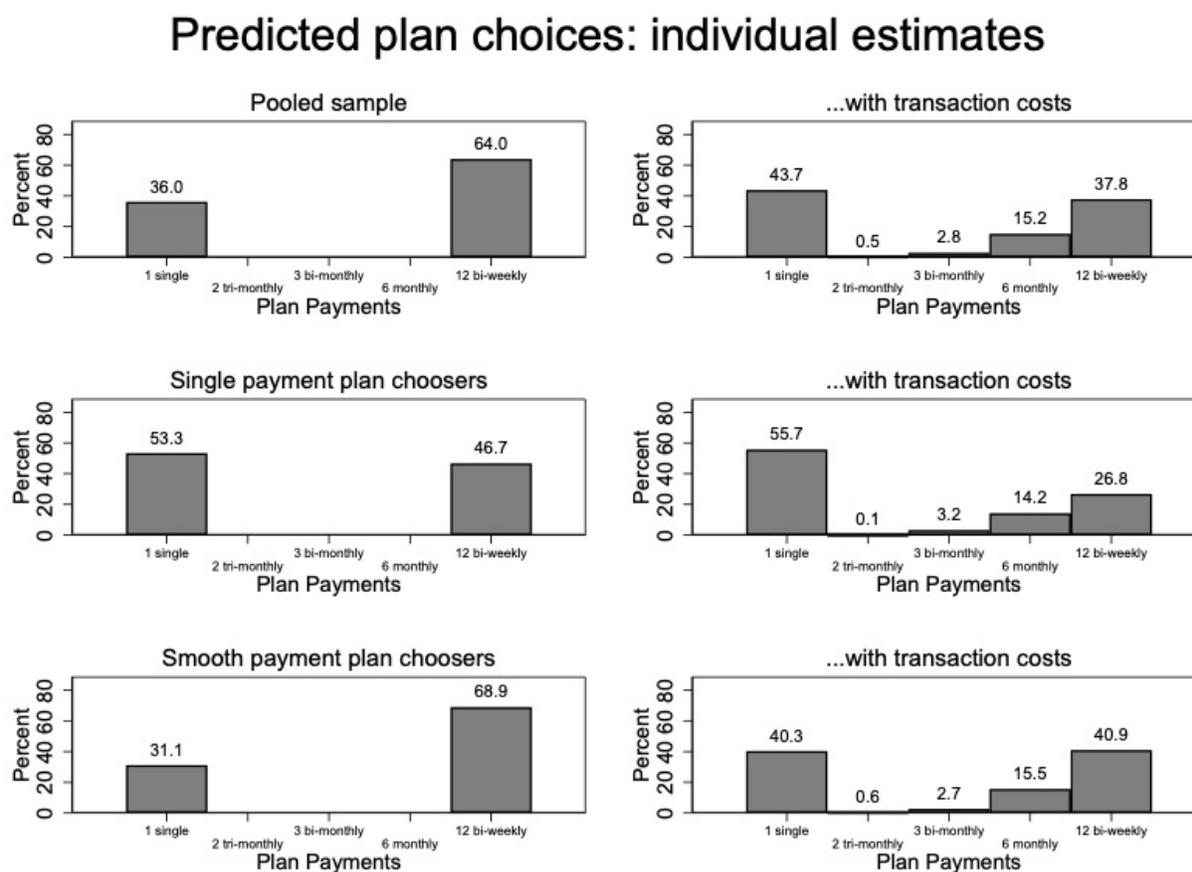


Figure C.2: Predicted plan choices from simulations based on group estimates.

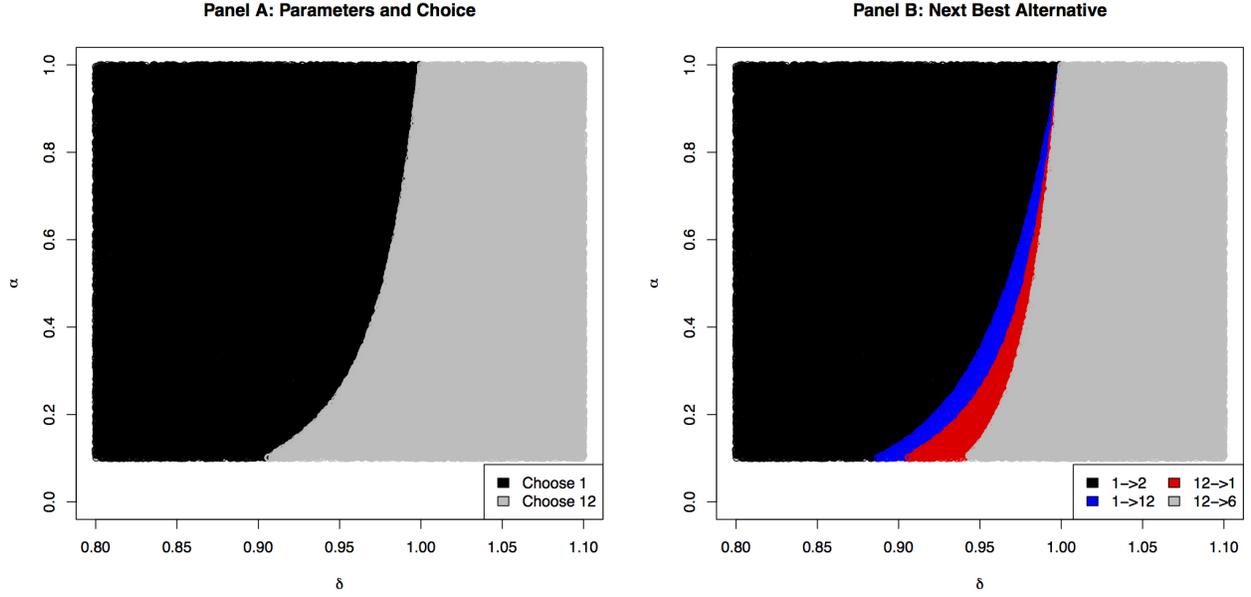


Figure C.3: Simulated Preferences and Plan Choice.

Next, we incorporate transaction costs into the analysis. We use each individual's estimated parameters 24 times and draw random transaction cost payment parameter from a Poisson distribution with a mean of GTQ25. We subtract the transaction cost parameter from the money amount in each date prescribed by a plan, and are thus included in each simulant's plan values.²⁶

Using the same simulants that generated the left side of Figure C.2 and transaction costs, we then calculate payment plan values including these transaction costs as:

$$V_{j,i} = \left[\sum_{k=s}^l \delta_i^{k-s} (x_{t+k;j} - \mathbf{1}_{x_{t+k;j} > 0} * c_i)^{\alpha_i} \right]^{1/\alpha_i}, \quad (5)$$

where i refers to the simulant, and c_i is the simulated transaction cost incorporated into plan j if a payment is prescribed. The right side of Figure C.2 shows the influence of these modest transaction costs. Generally, transaction costs increase the attractiveness of intermediate plans with fewer payments. Moreover, for those individuals who chose the single payment plan, it

²⁶Naturally, these additional simulated costs are arbitrary and non-exhaustive of all possible costs and benefits that can affect payment plan choice in addition to preference parameters and are intended for illustrative purposes.

makes that plan even more attractive.

The analysis to here shows that moderate transaction costs may make intermediate and single plans more attractive, but incorporating such transaction costs into the analysis does not alter our core conclusion. Plan values for individuals who chose single and smooth plans are predicted to deviate substantially.

Interestingly, these transactions costs may actually be an important driver of behavior within the smooth plans. Only a small fraction of individuals actually choose the twelve payment plan. Moreover, following the results in Tables 2 and 4, correlations exist between CTB behavior and plan choice within intermediate plans. For smooth payment plan subjects, the number of payments correlates significantly with estimates of α and δ^{30} .²⁷ Such correlations would be expected if there was an overarching avoidance of the most smooth plan due to frequent incurrence of transaction costs. As a further investigation of the possibility that plan choice is related to transaction costs empirically, we asked subjects the amount of time it would take to get to a bank. For the subsample who chose smooth payment plans, regressing the number of payments on an indicator for whether the individual would need more than 30 minutes to get to the bank (controlling for estimated preference parameters) yields a coefficient of -0.495 (robust s.e. = 0.19), which is statistically significant at the one percent level.

C.3 Robustness to Alternate Presentation Treatments for CTB

Our CTB design features several, cross-randomized presentation treatments. As noted in Section 2.2, subjects were randomized into seeing budgets with the sooner amount either increasing or decreasing as they moved down the task; seeing budgets in order of increasing or decreasing marginal rate of transformation, P ; and seeing the budget options with or without their participation payment included.

Table C.2 presented below replicates the structure of Table 5, adding covariates to the

²⁷A regression of number of payments on these two preference parameters and a constant for the smooth payment subsample yields a coefficient for δ^{30} of -0.11 (robust s.e. = 0.02) and a coefficient for α of -3.88 (1.64). Both coefficients differ significantly from zero at the one percent level.

regression (in column (4) of the results of Table 3) of observed plan choice on predicted plan choice. Specifically it adds a dummy of the presentation treatments to address concerns of alternate presentation effects affecting our results. Each column adds a single presentation treatment covariate and its interaction with the PVR based prediction of a smooth payment plan choice ($PVR_i > 1$).

Table C.2: Robustness and Alternative Presentation Treatments for CTB

Dep. Var.: <i>Chose Smooth Plan</i>	Alternate CTB Presentation Treatments		
	(1)	(2)	(3)
$PVR_i > 1$	0.274*** (0.062)	0.200*** (0.061)	0.132** (0.062)
Decreasing soon amount	0.215*** (0.071)		
P decreasing order		0.116 (0.073)	
Participation Payment included			-0.031 (0.074)
Interactions	-0.261*** (0.084)	-0.114 (0.087)	0.038 (0.088)
Constant	0.591*** (0.053)	0.637*** (0.051)	0.702*** (0.050)
# of Observations	408	408	408
Adjusted R-squared	0.053	0.032	0.025

Notes: The



dependent variable takes the value 1 if a participant selected one of the smooth payment plans, 0 otherwise.

$PVR > 1$ is a predicted smooth choice dummy; it takes the value of 1 if the average Plan Value Ratio for smooth is greater than for single, otherwise, it takes the value of 0. Interactions present the interaction of the relevant independent variable for each column, interacted with the dummy for predicted smooth choice (based on $PVR > 1$). Ordinary least squares (OLS) estimates are presented, for which heteroscedasticity-consistent standard errors are reported in parentheses. *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

One of the presentational treatments does alter plan value choices and estimated values of smooth and single payment plans. The first column presents the treatment varying the order of the sooner amount. The results show that the decreasing soon amount presentation does have a differential effect on the predictive power of our PVR measure. Columns 3 and 4 illustrate that the other two presentation treatments do not have a relevant influence on payment plan choices nor on estimated plan values (PVR). Importantly, however, in every specification, the coefficient of $PVR_i > 1$ remains economically and statistically significant across all specifications. These results help to ensure the robustness of our results, as the differences between payment groups are not localized to a single type of CTB elicitation.

This may be instructive for knowing which type of presentation is most well-calibrated for subsequent prediction. Our findings suggest that presentations with sooner amounts increasing within budgets may be best suited for delivering well-calibrated estimates and discernible differences across groups.

C.4 Robustness to Alternate Estimation Strategies

Andreoni and Sprenger (2012) and Andreoni, Kuhn and Sprenger (2015) discuss a number of estimation strategies for CTB data. Although we follow Andreoni, Kuhn and Sprenger (2015) in using simple OLS analysis, our exercise could be conducted with alternative methods. In Table C.3, we provide an aggregate analysis using non-linear least squares estimation of the solution function for x_t^* ,

$$x_t^* = \frac{\omega + (P\beta t_0 \delta^k)^{1/(\alpha-1)}(M - \omega)}{1 + (P\beta t_0 \delta^k)^{1/(\alpha-1)}},$$

where ω is a Stone–Geary background parameter term (Geary, 1950; Stone, 1954) that is frequently found in the literature and imposed to be either minus some daily level of consumption or a minimum subsistence level (Andersen, Harrison, Lau and Rutstrom, 2008; Andreoni, Kuhn and Sprenger, 2015) or estimated from the data (Andreoni and Sprenger, 2012). With $\omega = 0$, we reproduce the directional differences in curvature and discounting previously observed, although with less precision. And, although differences in plan values are observed across groups,

the single payment choice group is estimated to value smooth payment plans more than the single payment plan. Varying the assumption of the background parameter ω , as in Andreoni and Sprenger (2012), alters the conclusions with respect to curvature, discounting and plan values. For example, with $\omega = 10$, curvature estimates are quite similar across the payment groups, while differences in discounting and plan values are broadly in line with our prior aggregate results. Estimating ω from the data²⁸ we find ω around GTQ13-14 for each group. Based on monthly income data, this is around one-third to one-half of a day's household income, a plausible minimum subsistence level. When estimating ω , we find curvature estimates close to those from our initial specifications similar across groups, clear differences in discounting across groups, and plan values broadly in line with our prior estimates.

Harrison, Lau and Rutstrom (2012) present an alternative estimation strategy rather than the strategies implemented by Andreoni and Sprenger (2012), which yields increasing, rather than modestly diminishing, marginal utility. The estimation strategy is similar to the random choice models of Holt and Laury (2002) and Andersen, Harrison, Lau and Rutstrom (2008), applied to the Andreoni and Sprenger (2012) data.²⁹ Recent theoretical work has called into question the use of such random choice models for estimating preferences given a demonstrated non-monotonicity in choice probabilities with respect to key parameters of interest (Apesteguija and Ballester, 2018). Nonetheless, Table C.4 compares the results of the Harrison, Lau and Rutstrom (2012) estimator with the OLS estimator presented in Table 4, and the NLS estimator presented in Table C.3. As in Harrison, Lau and Rutstrom (2012), using such ML methods on CTB data yields convex utility estimates, as the estimator attempts to match the slight majority (54%) of observations at budget corners. These convex utility estimates are virtually unaffected by the differential price sensitivity across groups, with both single and smooth payment subjects having substantial estimated convexity that cannot be differentiated statistically. Although

²⁸Andreoni and Sprenger (2012) note that unlike the other parameters of interest, there is no experimental variation that identifies ω . It is identified from the functional form.

²⁹From this exercise Harrison, Lau and Rutstrom (2012) conclude the following: "And we believe that rejecting concave utility in favor of convex utility, in settings such as these, will strike most economists as a priori implausible, and raise further questions about the comprehension of subjects of this new experimental task." (p. 21)

Table C.3: Alternative Estimation Strategies

Estimation Strategy	NLS	NLS	NLS	NLS	NLS
	$\omega = 0$ (1)	$\omega = 10$ (2)	$\omega = 5$ (3)	$\omega = -5$ (4)	Estimated (5)
Curvature: α					
Chose Single Payment	0.762 (0.020)	0.856 (0.016)	0.812 (0.018)	0.711 (0.022)	0.881 (0.013)
Chose Smooth Payments	0.737 (0.013)	0.867 (0.010)	0.805 (0.012)	0.665 (0.015)	0.904 (0.006)
Monthly Discount Factor: δ^{30}					
Chose Single Payment	0.924 (0.017)	0.931 (0.015)	0.928 (0.016)	0.922 (0.018)	0.933 (0.014)
Chose Smooth Payments	0.992 (0.009)	0.983 (0.006)	0.976 (0.008)	0.997 (0.011)	0.982 (0.005)
Present Bias: β					
Chose Single Payment	1.095 (0.029)	1.075 (0.024)	1.084 (0.027)	1.103 (0.031)	1.070 (0.023)
Chose Smooth Payments	1.068 (0.014)	1.040 (0.010)	1.054 (0.013)	1.080 (0.016)	1.031 (0.009)
Background Parameter: ω					
Chose Single Payment					13.352 (1.336)
Chose Smooth Payments					14.363 (0.696)
Plan Value Ratio (PVR)					
Chose Single Payment	1.315 (0.095)	1.087 (0.048)	1.179 (0.066)	1.500 (0.139)	1.044 (0.044)
Chose Smooth Payments	1.729 (0.090)	1.215 (0.028)	1.370 (0.048)	2.252 (0.171)	1.126 (0.018)
# Observations	9,789	9,789	9,789	9,789	9,789
# Clusters	408	408	408	408	408
<hr/>					
$H_0 : \alpha_{ChoseSingle} = \alpha_{ChoseSmooth}; \chi^2(1)$	1.11 ($p = 0.29$)	0.30 ($p = 0.58$)	0.11 ($p = 0.74$)	2.99 ($p = 0.08$)	2.57 ($p = 0.11$)
$H_0 : \delta_{ChoseSingle}^{30} = \delta_{ChoseSmooth}^{30}; \chi^2(1)$	11.90 ($p < 0.01$)	10.46 ($p < 0.01$)	7.39 ($p < 0.01$)	12.52 ($p < 0.01$)	10.48 ($p < 0.01$)
$H_0 : \beta_{ChoseSingle} = \beta_{ChoseSmooth}; \chi^2(1)$	0.69 ($p = 0.41$)	1.79 ($p = 0.18$)	1.05 ($p = 0.30$)	0.45 ($p = 0.50$)	2.49 ($p = 0.12$)
$H_0 : PVR_{ChoseSingle} = PVR_{ChoseSmooth}; \chi^2(1)$	9.95 ($p < 0.01$)	5.31 ($p < 0.05$)	5.48 ($p < 0.05$)	11.65 ($p < 0.01$)	2.99 ($p < 0.10$)

Notes: Estimates are based on non-linear least squares (NLS) regression of solution function with alternative values for a Stone-Geary background parameter (ω), with standard errors that are clustered on individual level. Plan values are calculated from non-linear combinations of estimated parameters.

there are sizable estimated differences in discounting across groups, the ML method overall leads to sharp mispredictions for the level of payment plan values. Both groups are predicted to value the single payment contract substantially more than smooth contracts, as the $PVR < 1$ for both groups. However, the *Choose Single* group still has a lower PVR than the *Choose Smooth* group ($\chi^2 = 9.59, p\text{-value} < 0.01$).

C.5 Exploring Alternative Information on Curvature

Our exercise identifies curvature from a desire to smooth intertemporal payments in the CTB. Experimental designs that leave curvature unmeasured require additional assumptions to make predictions for decisions such as payment plan choice. Table C.5 examines the effects of imposing alternative assumptions for curvature. Specifically, we fix α at different values and show that these assumptions deeply influence the results.

In the first column we impose $\alpha = 0.5$ for all subjects.³⁰ In line with the discussed confounding effects of curvature, if marginal utility diminishes at the implied rate, individuals are estimated to be extremely patient. Indeed, for the 78% of subjects who choose smooth payments we estimate an aggregate monthly discount factor of around 1.7 and a remarkably high degree of future bias. Furthermore, the implied valuations for smooth payments strain plausibility with both smooth and single payment groups estimated to value smooth payment plans much more than the single payment.³¹

In columns (2) to (5) of Table C.5, we fix α at additional values of 0.75, 0.9, 0.95, and 0.99. This assumption tunes estimates of patience, payment plan values, and the differences between groups. Based upon the assumption of curvature, researchers can predict that both groups will prefer smooth contracts or both groups will prefer single contracts with potentially indiscernible differences in the strength of preference. Only in special case of α at around 0.9

³⁰This is in line with estimates from risky choice tasks such as those estimated by Andreoni and Sprenger (2012); Andreoni, Kuhn and Sprenger (2015).

³¹Given the prior findings on levels of risk aversion and a lack of correlation between risky choice tasks and curvature in CTBs, this suggests that using risky choice information could lead to substantial misprediction for such large-stakes intertemporal choices.

Table C.4: Comparison with ML Methods

Estimation Strategy	HLR (2012) MLE ($\omega = 0$) (1)	OLS ($\omega = 0$) (2)	NLS (estimated ω) (3)
Curvature: α			
Chose Single Payment	1.752 (0.169)	0.911 (0.007)	0.881 (0.013)
Chose Smooth Payments	1.503 (0.089)	0.878 (0.007)	0.904 (0.006)
Monthly Discount Factor: δ^{30}			
Chose Single Payment	0.835 (0.043)	0.893 (0.029)	0.933 (0.014)
Chose Smooth Payments	1.007 (0.023)	1.020 (0.023)	0.982 (0.005)
Present Bias: β			
Chose Single Payment	1.218 (0.088)	1.177 (0.056)	1.070 (0.023)
Chose Smooth Payments	1.190 (0.045)	1.159 (0.032)	1.031 (0.009)
Noise Parameter: μ			
Chose Single Payment	0.426 (0.066)		
Chose Smooth Payments	0.427 (0.046)		
Background Parameter: ω			
Chose Single Payment			13.352 (1.336)
Chose Smooth Payments			14.363 (0.696)
Plan Value Ratio (PVR)			
Chose Single Payment	0.451 (0.038)	0.900 (0.064)	1.044 (0.044)
Chose Smooth Payments	0.623 (0.040)	1.306 (0.085)	1.126 (0.018)
# Observations	9,789	9,789	9,789
# Clusters	408	408	408
<hr/>			
$H_0 : \alpha_{ChoseSingle} = \alpha_{ChoseSmooth}; \chi^2(1)$	1.69 ($p = 0.19$)	12.22 ($p < 0.01$)	2.57 ($p = 0.11$)
$H_0 : \delta_{ChoseSingle}^{30} = \delta_{ChoseSmooth}^{30}; \chi^2(1)$	12.20 ($p < 0.01$)	12.12 ($p < 0.01$)	10.48 ($p < 0.01$)
$H_0 : \beta_{ChoseSingle} = \beta_{ChoseSmooth}; \chi^2(1)$	0.09 ($p = 0.77$)	0.08 ($p = 0.78$)	2.49 ($p = 0.12$)
$H_0 : PVR_{ChoseSingle} = PVR_{ChoseSmooth}; \chi^2(1)$	9.59 ($p < 0.01$)	14.48 ($p < 0.01$)	2.29 ($p < 0.10$)

Notes: Estimates are based on Maximum Likelihood (ML) methods of Harrison, Lau and Rutstrom (2012) (HLR), ordinary least squares (OLS) regression, or non-linear least squares (NLS) regression of solution function with standard errors that are clustered on individual level. Plan values are calculated from non-linear combinations of estimated parameters.

Table C.5: Alternative Curvature Information

	(1)	(2)	Fixing α (3)	(4)	(5)	Estimated α (6)
Curvature: α						
Chose Single Payment	0.500 (NA)	0.750 (NA)	0.900 (NA)	0.950 (NA)	0.990 (NA)	0.887 (0.005)
Chose Smooth Payments	0.500 (NA)	0.750 (NA)	0.900 (NA)	0.950 (NA)	0.990 (NA)	0.887 (0.005)
Monthly Discount Factor: δ^{30}						
Chose Single Payment	1.051 (0.185)	0.952 (0.084)	0.897 (0.031)	0.879 (0.015)	0.865 (0.003)	0.901 (0.036)
Chose Smooth Payments	1.718 (0.140)	1.216 (0.050)	0.989 (0.016)	0.923 (0.008)	0.873 (0.001)	1.007 (0.020)
Present Bias: β						
Chose Single Payment	2.822 (0.785)	1.657 (0.231)	1.204 (0.067)	1.083 (0.030)	0.994 (0.006)	1.238 (0.077)
Chose Smooth Payments	1.988 (0.226)	1.391 (0.079)	1.122 (0.025)	1.045 (0.012)	0.987 (0.002)	1.144 (0.029)
Plan Value Ratio (PVR)						
Chose Single Payment	7.434 (6.882)	1.471 (0.369)	0.924 (0.069)	0.824 (0.028)	0.760 (0.005)	0.955 (0.085)
Chose Smooth Payments	198.778 (128.823)	3.350 (0.527)	1.155 (0.046)	0.909 (0.015)	0.773 (0.002)	1.239 (0.069)
# Observations	9,789	9,789	9,789	9,789	9,789	9,789
# Clusters	408	408	408	408	408	408
$H_0 : \delta_{ChoseSingle}^{30} = \delta_{ChoseSmooth}^{30}; \chi^2(1)$	6.49 ($p < 0.05$)	6.46 ($p < 0.05$)	6.44 ($p < 0.05$)	6.44 ($p < 0.05$)	6.47 ($p < 0.05$)	6.51 ($p < 0.05$)
$H_0 : \beta_{ChoseSingle} = \beta_{ChoseSmooth}; \chi^2(1)$	1.04 ($p = 0.31$)	1.19 ($p = 0.27$)	1.30 ($p = 0.25$)	1.35 ($p = 0.25$)	1.48 ($p = 0.22$)	1.29 ($p = 0.26$)
$H_0 : PVR_{ChoseSingle} = PVR_{ChoseSmooth}; \chi^2(1)$	2.20 ($p = 0.14$)	8.54 ($p < 0.01$)	7.83 ($p < 0.01$)	7.13 ($p < 0.01$)	6.61 ($p < 0.05$)	7.91 ($p < 0.01$)

Notes: Not Available (NA). Estimates are based on ordinary least squares (OLS) regression of equation (3) with standard errors that are clustered on individual level. Utility estimates and plan values are calculated from non-linear combinations of regression coefficients. The standard errors reported in parentheses are calculated using the delta method. Null hypotheses tested after regression of equation (3) with interactions for plan choice with k , t_0 and $\ln(P)$, with standard errors clustered at individual level.

will the assumed value of curvature correctly tune patience to successfully differentiate between payment plan groups. Incidentally, as shown in column (6) of Table C.5, this is close to what is estimated on aggregate using curvature information inherent to our CTB elicitation strategy.