Racial Heterogeneity in Consumption Responses to the Economic Impact Payment*

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Abstract

We investigate how the consumption responses to the Economic Impact Payment during the pandemic (commonly known as the pandemic stimulus check) differed across racial groups, and what account for the differences. If only the family size and the age are controlled, as in the baseline regression of Parker et al. (2022), in addition to the race, Black and Hispanic households exhibit a higher marginal propensity to consume (preferred estimate of their MPC being 0.29) than Whites (0.16) in response to monetary transfers under the Economic Impact Payment. This racial heterogeneity is accounted for by differences in liquid wealth holding.

JEL classification: E21, E62, H31, J15
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1 Introduction

In response to severe economic consequences of the COVID-19 pandemic, the U.S. federal government distributed three waves of Economic Impact Payments (EIPs) to households. Using the special questions added to the Consumer Expenditure Surveys (CE) pertaining to the EIPs, Parker et al. (2022) estimated consumption expenditure responses of the households to EIP receipts. They found that the marginal propensity to consume (MPC) out of an EIP receipt was smaller compared with the estimates of the MPC out of previous stimulus payments in 2001 and 2008, possibly because of the lockdown and other constraints on spending during the pandemic and other pandemic programs and social insurance, which also helped U.S. households during the same period. At the same time, they found that households with lower liquid wealth entering the pandemic increased consumption expenditures more following an EIP receipt. This is consistent with the idea of hand-to-mouth, with which liquid asset holding is a main determinant of the MPC.

In this paper, we extend the analysis of Parker et al. (2022) and ask if the consumption responses to EIP receipts are different across households of different racial groups, and, if racial heterogeneity in consumption responses exist, whether it is accounted for by racial differences in liquid asset holding and other observables. Ganong et al. (2023) use typical income shocks in the proprietary administrative data during the pre-pandemic period and found that Black and Hispanic households adjust their consumption expenditures more strongly to income shocks than White households, and nearly all of the racial differences are explained in a statistical sense by differences in liquid asset holding. Our paper revisits the question of Ganong et al. (2023) using the CE data during the pandemic period.

Studying the MPC, especially its racial heterogeneity, is important at least for the following three reasons. First, the MPC is an important determinant of the macroeconomic effects of fiscal stimulus and the monetary transmission. As the Heterogeneous-Agent New-Keynesian (HANK) models imply higher significance of the MPC as a determinant of the economic dynamics compared with the representative-agent dynamics stochastic general equilibrium (DSGE) model, the recent emergence of the HANK models brought back the interests in the MPC in the literature. Second, the heterogeneity in the MPC indicates heterogeneous effects of policy changes or other shocks. Since consumption is an important determinant of individual welfare, the MPC heterogeneity indicates heterogeneous effects of various policies to individual welfare. Third, deepening our knowledge in the MPC guides us to build a better theory of consumption-saving decision. For example, if the MPC is higher for households with less liquidity, this indicates that liquidity constraint is an important determinant of consumption-saving decision, which is lacking in the workhorse representative-agent DSGE model. If other factors are found to be important in shaping the racial heterogeneity in the MPC, incorporating these factors enable us to have a better theory of the heterogeneous consumption-saving decisions.

There are three main findings. First, the MPC out of an EIP receipt tends to be estimated lower than the MPC out of previous stimulus payments, as Parker et al. (2022) find, but the MPC is generally estimated to be higher for Black and Hispanic households than White ones. For example, when we pool Black and Hispanic households for higher statistical power, their contemporaneous (3-month of the EIP receipt) MPC is 0.29, while the MPC of White households is 0.16. The cumulative MPC over the 6-month horizon is 0.79 for Black and Hispanic households, which is more than three times the MPC of White households (0.25). The finding that Black and Hispanic households exhibit a higher MPC is consistent with the finding of Ganong et al. (2023), who use a different dataset

from a different period (pre-pandemic period) and a different methodology to identify the MPC. Second, when a control for liquidity holding is added in addition to the race control, the extra MPC associated with lack of liquidity is estimated to be positive for some consumption categories, while the extra MPC associated with being Black or Hispanic is estimated to be either statistically insignificant or negative. Although statistical power is limited, point estimates indicate that the contemporary MPC is larger for households with lack of liquidity, both among White households and among Black or Hispanic households. This is consistent with the interpretation that the MPC is higher for hand-to-mouth households, and Black and Hispanic households tend to exhibit a higher MPC because they are more likely to be hand-to-mouth. Third, when the MPC is estimated with an additional control for using an EIP receipt mainly for expenses rather than paying off debt or saving, households who answered that they used an EIP receipt mainly for expenses are associated with a higher contemporaneous MPC for multiple consumption categories. This is consistent with the fact that more Black and Hispanic households answered that they used an EIP receipt mainly for expenses.

The rest of the paper is organized as follows. The next section briefly summarizes the current state of the literature regarding the aggregate MPC and its heterogeneity. Section 3 describes the Economic Impact Payment during the pandemic. Section 4 provides description of the data we use for our empirical analysis. Section 5 explains our empirical methodology. We show our results in Section 6, before we conclude in Section 7.

2 Literature on the Aggregate MPC and its Heterogeneity

The MPC is traditionally estimated using micro data, measuring consumption responses to income changes.[1] Here I classify the literature into three groups. First groups uses normal income shocks, and estimate consumption responses of individual households to the normal income shocks. Lusardi (1996) combine the Consumer Expenditure Survey (CE) and the Panel Study of Income Dynamics (PSID) and estimate that the annual MPC with respect to food consumption, strictly nondurable consumption, and nondurable consumption are 0.4-0.5, 0.3-0.4, and 0.2-0.3, respectively. Blundell et al. (2008) also combine the CE and the PSID, use the combined dataset to estimate their structural model of consumption and saving decisions, and find that nondurable consumption responds by the annual elasticity of 0.05 to a transitory income shock, but the elasticity becomes 0.37 among households with low wealth. Ganong et al. (2023) use administrative bank account data and find that the average MPC of consumption spending to a typical labor income shock is 0.22, with a much smaller response for high liquidity households. They also find that the responses of Black and Hispanic households are 50 and 20 percent larger, respectively.

The second group uses an economic stimulus payment. Often papers use unpredicted variations in timing or amount of economic stimulus payments to identify changes in consumption expenditures due to unexpected income changes. Johnson et al. (2006) use the special questions to the CE related to the 2001 Income Tax Rebates and estimate that the quarterly MPC of strictly nondurable goods is about 0.02-0.05, while the quarterly MPC of nondurable goods is 0.23-0.80. They also find that households with low liquid wealth or low income exhibit a higher MPC. Parker et al. (2013) use the same methodology and the CE for the Economic Stimulus Payments of 2008, and exploit variations of the amount and the timing of the stimulus payments to identify consumption responses

[1] Carroll et al. (2017) summarizes estimates of the MPC. See Table 1. Here I only summarize literature studying the consumption responses of U.S. households.

to unexpected income changes. They find that the quarterly MPC of nondurable consumption goods and services is about 0.12-0.3. They also find a significant effect on the purchase of durable goods and related services, primarily the purchase of vehicles, bringing the average MPC of total CE consumption expenditures to about 0.5-0.9 of the payments during the three-month period of receipt. Parker et al. (2022) also use the same methodology and the CE to estimate the MPC out of the Economic Impact Payment, and find that the MPC of strictly nondurables, nondurable goods and services, and all CE goods and services for the first EIP is 0.07-0.08, 0.08-0.10, and 0.23-0.28, respectively. They argue that the MPC is lower than what are estimated for previous stimulus payments probably because of the lockdown and other supply restrictions during the pandemic, and because of other government transfers during the pandemic. Coronado et al. (2005) combine the Michigan Survey of Consumers (MSC) and the Current Population Survey (CPS) and estimate the MPC out of child credit rebate and the reduction in withholdings, which are part of the Jobs and Growth Tax Relief and Reconciliation Act of 2003. They find that the aggregate MPC out of the child tax credit and the reduced withholding of income taxes is 0.28 for the first 6-month and 0.36 for the year, even though these subsidies are pre-announced and expected. Salm et al. (2010) combine the MSC with aggregate data and estimate the MPC out of the 2008 Tax Rebate. They find that the aggregate annual MPC is 0.30-0.35.

Third group of studies uses changes in income not due to normal income changes or economic stimulus payments. Since these are often predictable, the results are interpreted in the context of the permanent income hypothesis (PIH). According to the PHI, the MPC to an anticipated change in income should be zero. Parker (1999) uses the CE and changes in the social security taxes, and finds that the quarterly MPC of predicted changes in the social security tax payment to nondurable consumption expenditures is about 0.2. Using the CE and income tax refunds, which are predictable, Souleles (1999) finds that the quarterly MPC for food, strictly nondurables, and total consumption expenditures are 0.03-0.06, 0.05-0.09, and 0.34-0.64, respectively. Both results are inconsistent with the PIH. On the other hand, Hsieh (2003) use the CE and the fact that every resident in Alaska receives annual payments from the state's Alaska's Permanent Fund in a predictable manner, and find that indeed the quarterly MPC of Alaskan residents to these annual payments is zero for nondurable consumption. Hausman (2016) uses a household consumption survey and other data sources and finds that the annual MPC out of veterans' bonus of 1936 is estimated to be 0.6-0.75. Spending was concentrated on cars and housing.

3 Economic Impact Payments (EIPs)

In order to help households cope with financial difficulties during the COVID-19 pandemic, the U.S. federal government authorized three rounds of Economic Impact Payments (EIPs, or commonly known as pandemic stimulus checks) through the IRS. The first EIP (EIP1) was provided under the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), which was signed into law on March 27, 2020. The IRS started depositing the EIP1 into bank accounts in mid-April 2020 for households whose bank information was available to the IRS. For other households, the IRS started mailing a paper check or a prepaid EIP card starting in mid-April. However, because of the delay of the procedure, most of the paper checks were sent out in May. Overall, according to Parker et al. (2022), 62% of all EIP1s were disbursed in April 2020. About 33% of EIP1s were disbursed in May 2020, meaning that 95% of EIP1s were disbursed in April or May 2020. The remaining 5% were disbursed during the rest of 2020. In terms of the amount of the EIP1, the base payment is $1,200 for an individual, $2,400 for a couple filing tax jointly, and additional payments of $500 for

each qualifying dependent under age 17. Individuals received the base amount fully if the most recently filed adjusted gross income (AGI) was under $75,000 for an individual, $112,500 for a head of household, and $150,000 for couples filing jointly. If the AGI was above the income threshold, the amount of the EIP1 was reduced by $5 for every $100 of AGI over the income threshold.

The second EIP was provided under the Coronavirus Response and Relief Supplemental Appropriations Act of 2021 (CRRSAA), which was signed into law on December 27, 2020. Almost all of EIP2s were disbursed in January 2021. The base amount of the EIP2 was $600 for an individual, $1,200 for a couple filing jointly, and additional payments of $600 for each qualifying dependent under age 17. The same income threshold and the phaseout rate as the EIP1 were applied.

The third EIP was provided under the American Rescue Act of 2021 (ARP), which was signed into law on March 11, 2021. The amount of payments were larger than the first EIPs. The base payment is $1,400 for an individual, $2,800 for a couple filing jointly, and additional payments of $1,400 for each qualifying dependent. Unlike the first two EIPs, dependents over the age of 17 were also eligible for additional payments. The income thresholds were the same as in the EIP1, but the phaseout rate was set to be more aggressive. As a result, tax filers with a 2020 AGI above $80,000 for an individual, $120,000 for a head of household, and $160,000 for a couple filing jointly, regardless of the number of qualifying dependents, did not receive an EIP3. The timing of disbursement of the EIP3 was also concentrated. 74% of all EIP3s were distributed in March 2021, and 18% were disbursed in April 2021. The remaining 8% were distributed over the remainder of 2021.

Parker et al. (2022) argue that the timing of disbursements of the EIPs makes it more difficult to identify the effects of the stimulus checks to consumption expenditures compared with the previous stimulus checks in 2001 and 2008. In the earlier stimulus payments, paper checks were mailed out, and since it took a longer time to print and mail out all the checks, the timing of receiving the stimulus checks were randomized using the social security number over about 10 weeks. On the contrary, EIPs were disbursed within a shorter amount of time, without randomized timing. Indeed, households who received the EIPs later tend to be those whose bank information was not available to the IRS. In other words, the timing of receiving the EIPs were far from random. Moreover, because of the lockdown, supply shortages, and multiple EIPs during the pandemic, households might not have spent the EIPs. This might be the reason why the estimated consumption responses to EIPs were weaker in Parker et al. (2022), especially for the EIP2 and the EIP3. This encourages Parker et al. (2022) to use a more refined empirical methodology (discussed in Section 5.2). We decided to focus on the EIP1 exactly because of the issues associated with the EIP2 and the EIP3.

4 Data

Section 4.1 provides general description of the Consumer Expenditure Surveys (CE), the dataset we use for our analysis. Section 4.2 shows descriptive statistics of the overall CE sample as well as statistics for different racial groups.

4.1 Consumer Expenditure Surveys (CE)

The Consumer Expenditure Survey (CE) is maintained by the Bureau of Labor Statistics (BLS) and provide data on expenditures, income, and demographic characteristics of households in the United States. The data are continuously available since 1980. CE data are collected in two surveys: the Interview Survey for major and/or recurring items and the Diary Survey for more

minor or frequently purchased items. Following Parker et al. (2022), we use the Interview Survey. The unit of the survey is called the Consumer Unit (CU), but we use the terms CU and household interchangeably. A CU is interviewed up to four times with three-month intervals about their spending over the previous three months (reference period). Although a significant dollar share of spending data is reported at the monthly level, a little over half of spending is only reported for the entire three-month reference period. Thus, we use the data at the (overlapping) three-month frequency.

What makes the CE particularly useful for studying consumption responses to stimulus payments in the past is that the BLS added special questions regarding the stimulus payments in the Interview Survey. Johnson et al. (2006) and Parker et al. (2013) used special questions regarding the 2001 and 2008 stimulus payments to estimate the consumption responses to stimulus payments. Also for the EIPs, following the passage of the CARES Act, the BLS added a module of questions about the EIPs to the Interview Survey, starting in June 2020. Unfortunately, the bulk of payments under the EIP1 were disbursed in April 2020, but the special questions related to the EIP1 were not included in the May 2020 survey, which forced Parker et al. (2022) and us to drop CUs which were interviewed in May 2020, since there is no way to know whether and how much CUs received under the EIP1 if they were interviewed in May 2020. The special questions in the CE ask the date of receipt, the number of EIPs received, the amount received, which member or members of the CU the payment was for, and the mode of receipt (by check, direct deposit, or debit card).

Following previous research on consumption expenditure responses to stimulus payments using the CE, we use four measures of consumption expenditures at three month frequency, when we run our regressions: (1) food, which includes food consumed away from home, food consumed at home, and purchases of alcoholic beverages; (2) strictly nondurable expenditures, which includes some services and adds expenditures such as household operations, gas, and personal care following Lusardi (1996); (3) nondurable expenditures on goods and services, which adds semi-durable categories like apparel, reading materials, and health care (only out-of-pocket spending by the household) following previous research using the CE survey; and (4) total expenditures, which adds durable expenditures such as home furnishings, entertainment equipment, and auto purchases. Appendix A provides detailed description as to how to construct the four measures of consumption expenditures.

4.2 Descriptive Statistics

Table 1 documents descriptive statistics of the CE sample related to the EIP1 that we use for our analysis. The first column shows the statistics we calculated, and when available, we document the corresponding statistics reported by Parker et al. (2022) in the second column. The comparison is for making sure that we process the CE dataset in the same way as Parker et al. (2022), before we extend their analysis by introducing racial differences in consumption responses. According to our CE sample, 79% of households received EIP1, while 21% did not. The average quarterly spending according to our CE sample for four consumption categories that we calculated are close to what Parker et al. (2022) reported. Regarding of the timing of the EIP1 receipt, according to our sample, 55% received an EIP1 in April, 35% in May, and 8% in June. The fraction of households who received an EIP1 in April is lower than 62%, which is reported by the Bureau of Financial Services, but this is mainly because the CE did not ask CUs about EIP1s yet in its May interview, which causes Parker et al. (2022) as well as us to drop CUs in the May interview cycle. But the distribution of the timing of EIP1 receipts that we obtained is identical to what Parker et al. (2022)

Table 1: EIP-Related Statistics of the CE Sample

	Our Calculation	Parker et al. (2022)
Number of Households		
Total	2,536 (100.0%)	NA
Recipient	1,999 (78.8%)	NA
Non-Recipient	537 (21.2%)	NA
Number of Observations		
Total	5,843	5,808
Treated	3,561	3,544
Non-Treated	2,282	2,264
Average Quarterly Consumption Spending		
Food and alcohol	$2,299	$2,258
Strictly nondurables	$4,466	$4,429
Nondurables goods and services	$6,015	$5,962
All CE goods and services	$14,679	$14,381
Distribution of EIP1 Receipts across Months		
April 2020	54.6%	54.6%
May 2020	35.4%	35.4%
June 2020	7.7%	7.7%
July to November 2020	2.3%	2.3%
Share of EIP1s by Method of Disbursement		
By direct deposit	74.5%	74.5%
By check	23.4%	23.4%
By debit card	2.1%	2.1%
Share of EIP1s by Reported Main Use		
Mostly for expenses	56.4%	56.4%
Mostly paid off debts	17.8%	17.8%
Mostly added to savings	25.9%	25.9%
EIP1 Amount		
Mean EIP1 amount	$2,090	$2,098

Notes: Based on the final sample and average CU weights for both us and Parker et al. (2022). See Section 5.1 for how to construct the final sample. The number of observations is calculated from the regression that measures the estimated response of consumption expenditures to EIP receipt using all CE goods and services (refined methodology) in Table 3 (Note that the number of observations can change depending on the regression).

reported. In terms of the method of EIP1 receipts, according to our CE sample, 75% received by direct deposit, 23% by check, and 2% by debit card. These numbers are also identical to the numbers reported by Parker et al. (2022). The special questions related to EIPs by the CE include main use of EIP receipts. According to this special question, 56% of EIP recipients used the EIPs mainly for expenses, 18% mainly paid off debts, and 26% mainly saved. These numbers are again identical to what are reported by Parker et al. (2022). We come back to implications of different usages of EIP1 receipts in Section 6.3. Mean EIP1 amount is about $2,100 for both our analysis and Parker et al. (2022).

Table 2 shows descriptive statistics of CUs belonging to different racial groups. The race of a CU is defined by the race that the respondent reported in the interview.[2] In our sample, about 70% of households are White, 12% are Black, 12% are Hispanic, and the remaining 6% belong to "Other,"

[2] While Hispanic is an identity and is orthogonal to a race, we follow the convention and call all CUs whose head identifies as Hispanic as Hispanic CUs regardless of their race. Then we use the self-reported race of the head to determine the race of each non-Hispanic CU.

Table 2: Descriptive Statistics for Racial Groups

	Overall	White	Black	Hispanic	Other
Number of Households					
Total	2,530	1,782	296	312	140
(Percent of total)	(100.0)	(70.4)	(11.7)	(12.3)	(5.6)
Recipient	2,061	1,520	189	215	130
(Percent of total)	(81.3)	(82.2)	(82.2)	(76.9)	(77.2)
Non-Recipient	474	331	41	64	39
(Percent of total)	(18.7)	(17.8)	(17.8)	(23.1)	(22.8)
CU Characteristics					
Average family size	2.2	2.1	2.1	2.7	2.6
Average number of adults	1.9	1.8	1.9	2.2	2.2
Male-headed	1,182	877	83	138	89
(Percent of race category)	(46.8)	(36.4)	(35.8)	(49.4)	(52.8)
Female-headed	1,341	964	146	142	79
(Percent of race category)	(53.1)	(63.6)	(64.2)	(50.6)	(47.2)
Average age of head	54.5	56.6	52.9	47.7	46.8
Mean income	$81,654	$84,639	$61,913	$73,457	$104,518
Median income	$60,105	$61,080	$49,076	$57,081	$86,366
Mean liquid wealth	$28,128	$32,622	$7,191	$13,415	$24,764
Median liquid wealth	$6,000	$8,000	$1,000	$2,500	$8,000
Liquid wealth less than $2,000	317	208	39	45	17
(Percent of race category)	(29.2)	(24.8)	(57.8)	(44.1)	(21.4)
Average Quarterly Consumption Spending					
Food and alcohol	$2,299	$2,318	$1,839	$2,502	$2,545
Strictly nondurables	$4,466	$4,559	$3,721	$4,562	$4,580
Nondurable goods and services	$6,015	$6,261	$4,801	$5,705	$6,011
All CE goods and services	$14,679	$15,260	$11,627	$13,723	$15,615
Distribution of EIP1 Receipts across Months					
April 2020	54.6%	54.0%	52.5%	58.1%	59.0%
May 2020	35.4%	35.5%	39.8%	32.8%	34.1%
June 2020	7.7%	8.4%	4.3%	6.5%	6.9%
July to November 2020	2.3%	2.1%	3.4%	2.6%	0.0%
Share of EIP1s by Method of Disbursement					
By direct deposit	74.6%	73.9%	76.7%	75.3%	77.5%
By check	23.4%	23.7%	22.9%	23.4%	21.4%
By debit card	2.0%	2.4%	0.4%	1.3%	1.1%
Share of EIP1s by Reported Main Use					
Mostly for expenses	56.4%	54.7%	59.2%	63.4%	56.3%
Mostly added to savings	25.8%	28.5%	16.3%	17.3%	29.2%
Mostly paid off debts	18.0%	16.8%	25.5%	19.3%	15.5%
EIP1 Amount					
Mean EIP1 amount	$2,090	$2,057	$1,904	$2,301	$2,483

Notes: Based on the final sample and average CU weights. See Section 5.1 for how to construct the final sample. For household's race, only households whose reference person did not change throughout the interviews are used (2,530 households). The number of observations refers to that of the estimated response of consumption expenditures to EIP receipt using all CE goods and services (refined methodology) in Table 3 (Note that the number of observations can change depending on the regression). For the male-headed and female-headed households, only households whose sex of the reference person did not change throughout the interviews are used (2,523 households). For income, we use a CU's first FINCBTXM or pre-tax family annual income during the 12 months prior to the first interview, following Parker et al. (2022). For liquid wealth, the sample size is 1,084 households. Other households do not report liquid wealth holding. One third of the final CE sample that reported liquid wealth holds less than $2,000 in liquid assets using average weights.

which include Native Americans, Asians, Pacific Islanders, and multi-race. For all racial groups, the fraction of EIP1 recipients are around 80%. The mean household size is 2.2 and the average number of adults is 1.9 for the entire CE sample. The household size as well as the number of adults per household are both higher among Hispanics and other racial groups. Somewhat surprisingly, there are more female-headed households among White and Black households than Hispanic and Other households. Among White and Black households, 64% are female-headed. The average age of household heads is 54.5 for the entire CE sample, but the heads are younger among Hispanics (47.7) and Others (46.8).

The mean and the median income for the entire CE sample is $81,700 and $60,100. The numbers are lower among Black ($61,900 and $49,100) and Hispanic ($73,500 and $57,100) households. Other racial groups exhibit a higher income because of Asians. The patterns across racial groups are similar with liquid asset holding as well. The overall mean and median liquid asset holding is $28,100 and $6,000. The numbers are lower among Black and Hispanic households. For example, the median liquid asset holding is $1,000 for Black households and $2,500 among Hispanic households, while it is $8,000 for White and Other households. Naturally, the fraction of CEs whose liquid asset holding is under $2,000, which is a proxy of the fraction of hand-to-mouth, is 29% overall, but is higher among Black (58%) and Hispanic (44%) households than White households (25%) and Others (21%). These patterns regarding racial heterogeneity are consistent with what Nakajima (2023) reported, using the Current Population Survey (CPS) and the Survey of Consumer Finances (SCF). Average consumption expenditures are also lower among Black and Hispanic households, more evidently for broader definitions of consumption expenditures. For example, the average quarterly consumption expenditures including all goods and services in the CE Survey is $14,700, while it is $11,600 for Black households and $13,700 for Hispanic households.

As for the statistics regarding to the EIP1, The distribution of EIP1 receipts across months is not very different across racial groups; about 90% received either in April or May 2020. The distribution of the disbursement method is also similar across racial groups. About 75% of all recipients across racial groups received EIP1s by direct deposit. On the other hand, the distribution of the reported main use of the EIP1 differs across racial groups. In particular, more Black (26%) and Hispanic (19%) households used EIP1 receipts to pay off debts than White households (17%). The fraction of households who mainly used EIP1 receipts for expenses is higher among Black (59%) and Hispanic (63%) households than White households (55%). Finally, the average EIP1 amount is slightly higher among Hispanic and Other households. The overall average is $2,100, while the average EIP1 amount is $2,300 among Hispanic households and $2,500 among Others. This is consistent with the fact that these two groups exhibit a larger family size, and the baseline EIP1 amount depends on the family size.

5 Methodology

This section outlines our empirical methodology. Section 5.1 describes how we select our sample and clean the CE dataset. We follow closely what Parker et al. (2022) did. Section 5.2 describes the empirical methodology employed by Parker et al. (2022). Section 5.3 outlines how we extend their methodology to investigate racial heterogeneity in the consumption responses to EIP1 receipts.

5.1 Sample Selection and Cleaning

We use the same sample selection criteria and the same sample cleaning procedure as Parker et al. (2022), which is described to the details here. Following Parker et al. (2022), we use two sample criteria, which we call *baseline sample* and *final sample*. Parker et al. (2022) call the former *all households* and the latter *final sample*. The two sample criteria are used for two different sets of regressions in Parker et al. (2022), which we describe in the next section. Let us start with the baseline sample. A CU i in year/month t is included in the baseline sample after the following sample selection and cleaning procedure.

1. The CU i had to be interviewed in June or July 2020 regarding the EIP1. Notice that an interview asks about the last three months before the interview month. If a CU was interviewed in June 2020, the CU was asked about March, April, and May 2020. If a CU was interviewed in July 2020, the CU was asked about April, May, and June 2020. Also notice that most of EIP1 was disbursed in April (62%) and May (33%) 2020. Ideally it would have been great if CUs were asked about EIP1 in the May 2020 interview, since the May 2020 interview includes the EIP1 in April 2020, but the May 2020 interview did not include special questions about EIP1. The August 2020 interview asked about May, June, and July 2020, but since those interviewed in August 2020 were also interviewed in May 2020 as well, and we do not know who got EIP1 in May 2020, this unfortunately makes the August 2020 interview not useful. Since all CUs are at most interviewed four times (four quarters), we use 2019Q3, 2019Q4, 2020Q1, 2020Q2, 2020Q3, 2020Q4, and 2021Q1 waves of the CE.

2. We drop every observation reporting to be living in student housing ($CUTENURE = 6$).

3. We drop every observation with $AGE\_REF > 85$ or $AGE\_REF < 21$ (AGE_REF is the age of the reference person in the CU), and with $AGE2 > 85$ or $AGE2 < 21$ ($AGE2$ is the age of the spouse in the CU) if $AGE2$ is not missing (i.e., there is a spouse in the CU).

4. Except for the first observation of a CU (ΔAGE_REF, which is AGE_REF in the current quarter minus AGE_REF in the previous quarter, cannot be defined in the first observation), we drop every observation with $\Delta AGE\_REF > 1$ or $\Delta AGE\_REF < 0$ as long as SEX_REF (sex of the reference person) is the same in these two consecutive interviews. Similarly, We drop every observation with $\Delta AGE2 > 1$ or $\Delta AGE2 < 0$ as long as $\Delta AGE2$ is defined (meaning that a spouse exists and it is not the first interview of a CU), SEX_REF is the same and the marital status $MARITAL1$ is the same in these two consecutive interviews.

5. Except for the first observation of a CU (ΔFAM_SIZE, which is the family size in the current quarter minus the family size in the previous quarter, cannot be defined in the first interview), we drop every observation that has $\Delta FAM\_SIZE > 3$ or $\Delta FAM\_SIZE < -3$.

6. We drop the bottom 1% observations in terms of per-adult-equivalent nondurable consumption expenditures in each interview month. The per-adult-equivalent consumption expenditures can be calculated by dividing the total family consumption expenditures by the family size, which counts an adult as 1 and a child as 0.6 adult.

7. The CU i must have been interviewed at least in two consecutive quarters. This is because we use differences in consumption expenditures from the previous quarter, which requires two consecutive observations.

8. In the CNT20 file of the CE, which includes special questions regarding EIPs, if a CU does not have an EIP information, it is assumed that the CU did not receive an EIP. Notice that there is another possibility that the CU did not report receipt.

9. We also assume that EIP1 was only received between April and November of 2020. This is because CUs started receiving EIP2 in December 2020.

10. In addition, we assume November 2020 EIPs that are too small to be EIP1 to be EIP2 and thus we drop them out. These are the EIPs with payment size smaller than $600 times family size.

11. We drop EIPs (Parker et al. (2022) report that there were seven instances) reported to be received as tax refund. Since the option of reporting an EIP as "tax refund" was added in July 2021, and when this options was chosen, it is impossible to tell if this was under EIP1 or EIP2.

The procedure to create the final sample requires two modifications to the procedure described above. First, step 3 is modified such that we do not drop observation with $AGE\_REF > 85$ or $AGE2 > 85$. Parker et al. (2022) note that there are many recipients of EIPs among households older than 85 years old, and this modification is to increase the sample size in the final sample. Second, we drop CUs with income above a certain threshold which depends on marital status and family structure. Specifically, for married CUs, the income threshold is $\$400,000$. All married CUs whose family income is above $\$400,000$ are dropped. For CUs with multiple adults but a single (not married) reference person, the income threshold is $\$425,000$. For single CUs with and without kids, the income threshold is $\$225,000$ and $\$175,000$, respectively.[3] The reasoning behind this modification is to make CUs who received EIPs and CUs who did not as close as possible. Because of the income restriction, many high-income CUs did not receive EIPs, and thus including them in the control group makes the pool of control CUs and the pool of treated CUs different. This additional step is introduced between steps 6 and 7 above.

5.2 Methodologies of Parker et al. (2022)

Since our methodology is an extension of Parker et al. (2022), we start by describing their methodologies in this section. They employ two types of methodologies. First is what we call the *baseline methodology*. This is the same methodology employed in Johnson et al. (2006) and Parker et al. (2013), in order to estimate the consumption responses to the tax rebates disbursed in 2001 and 2008. Second is what we call the *refined methodology*. Let's start with the baseline methodology. Using the baseline sample (discussed in Section 5.1), the following consumption equation is estimated:

$$\Delta C_{i,t} = \beta_0 EIP1_{i,t} + \beta_1 EIP1_{i,t-1} + \gamma_0 + \gamma_1 age_{i,t} + \gamma_2 \Delta FamSize_{i,t} + \tau_t + \epsilon_{i,t} \tag{1}$$

i denotes the CU, and t denotes the interview year/month (notice that an interview covers the previous three months). $\Delta C_{i,t}$ is the simple difference in consumption expenditures of a CU i in year/month t from the previous interview. There are two separate regressions depending on $EIP1_{i,t}$. In the first regression, $EIP1_{i,t}$ is an indicator variable, taking the value 1 is a CU reported receiving

[3] These income threshold levels are taken from Table C.5 of Parker et al. (2022).

EIP1 in the previous three months, and 0 otherwise. In the second regression, $EIP1_{i,t}$ is the dollar amount of the EIP1 that a CU reported receiving in the previous three months. $EIP1_{i,t-1}$ is intended to capture the effect of receiving an EIP in the previous quarter. In particular, $EIP1_{i,t-1}$ is positive if a CU received an EIP in the three months covered in the previous interview. γ_0 is the intercept. $age_{i,t}$ and $\Delta FamSize_{i,t}$ are controls and γ_1 and γ_2 capture the effects of the two controls. $age_{i,t}$ is the age of the respondent in the CU i in year/month t. This is to control for the life-cycle pattern in the consumption behavior. $\Delta FamSize_{i,t}$ is the change in the family size from the previous quarter. τ_t is the time dummy. $\epsilon_{i,t}$ is the error term. Notice that Parker et al. (2022) use the average sample weights for each CU across all observations and run weighted least square regressions.

Parker et al. (2022) go on to try the refined methodology, because "estimates of the spending responses based on this exact methodology — while having the advantage of being most comparable to earlier work — are small, statistically weak, and unstable compared to these earlier analyses." For the refined methodology, they made four changes. First, they introduce income cutoffs so that the sample of CUs who did not receive EIPs are more similar to the sample of CUs who did. Unlike earlier studies which rely on the random timing of the tax rebate disbursements, the pandemic checks were disbursed to all recipients without a randomized timing, and thus identification of the consumption responses to receiving EIPs depend on the different consumption behavior between CUs who received EIPs and those who did not. The income threshold is discussed above in Section 5.1. Second, they normalize consumption expenditures of a CU i by the average consumption expenditures of the CU i. More specifically, they define $\widetilde{X}_{i,t}$ as follows:

$$\widetilde{X}_{i,t} = X_{i,t}/\bar{C}_i \tag{2}$$

where $\bar{C}_{i,t}$ is the average consumption expenditures of the CU i. The reasoning behind this adjustment is that, unlike the times when the previous tax rebates were disbursed, the pandemic was a time of unprecedented consumption volatility. Third, they allow the intercept of the regression γ_0 to be different between for CUs who received an EIP and CUs who did not receive an EIP. Specifically, the regression (1) is now modified to the following:

$$\Delta\widetilde{C}_{i,t} = \beta_0\widetilde{EIP1}_{i,t} + \beta_1\widetilde{EIP1}_{i,t-1} + \gamma_0 + \gamma_1\widetilde{age}_{i,t} + \gamma_2\Delta\widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t + \epsilon_{i,t} \tag{3}$$

where $\widetilde{C}_{i,t}$ and $\widetilde{EIP1}_{i,t}$ are consumption expenditures and either the indicator variable for an EIP receipt or the dollar amount of an EIP, normalized by the average consumption expenditures of a CU i. $\widetilde{age}_{i,t}$ and $\widetilde{FamSize}$ are age and family size normalized by the average consumption expenditures of the CU i. R_i is an indicator variable which takes the value 1 if the CU received an EIP1 and 0 if the CU did not. This, together with the additional coefficient α allows the intercept to differ between CUs who received an EIP and CUs who did not.

The fourth modification that Parker et al. (2022) made is to follow Borusyak et al. (2024) allow differences in MPC or β_0 and β_1, over time, and is unbiased under generalized parallel trends assumptions. Following Parker et al. (2022), the estimation method is presented in the following three-step procedure.

1. Use all the observations of CUs which never received an EIP or which have not yet received an EIP, and run the regression below:

$$\Delta\widetilde{C}_{i,t} = \gamma_0 + \gamma_1\widetilde{age}_{i,t} + \gamma_2\Delta\widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t + \epsilon_{i,t} \tag{4}$$

2. For all the observations of CUs which received an EIP, compute $\Delta\hat{C}_{i,t}$ defined as follows:

$$\Delta\hat{C}_{i,t} = \Delta\widetilde{C}_{i,t} - \left(\gamma_0 + \gamma_1\widetilde{age}_{i,t} + \gamma_2\Delta\widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t\right) \tag{5}$$

where γ_0, γ_1, γ_2, τ_t, and α are the values obtained in step 1.

3. We can interpret the discrepancy $\Delta\hat{C}_{i,t}$ as caused by EIPs, on average. In other words, we could run the following regression to estimate β_0 and β_1:

$$\Delta\hat{C}_{i,t} = \beta_0\widetilde{EIP1}_{i,t} + \beta_1\widetilde{EIP1}_{i,t-1} + \hat{\epsilon}_{i,t} \tag{6}$$

5.3 Extensions to Parker et al. (2022)

The main question of our paper is whether and to what extent the consumption responses to an EIP receipt differ across racial groups. In order to capture both the differences in the average MPC and the differences in the response to a stimulus payment, we extend the baseline methodology by Parker et al. (2022) as follows:

$$\begin{aligned}\Delta C_{i,t} = \beta_0 EIP1_{i,t} + \beta_1 EIP1_{i,t-1} + \gamma_0 + \gamma_1 age_{i,t} + \gamma_2\Delta FamSize_{i,t} + \tau_t \\ + \sum_{j=B,H} \mathbb{1}_{Race=j}\left(\gamma_j + \beta_{0,j}EIP1_{i,t} + \beta_{1,j}EIP1_{i,t-1}\right) + \epsilon_{i,t}\end{aligned} \tag{7}$$

The first line of the regression equation (7) is the same as what Parker et al. (2022) use, without modeling racial heterogeneity. In the second line, the terms in the summation are activated when the CU is either Black ($j = B$) or Hispanic ($j = H$). γ_j represents the higher MPC of either Black or Hispanic CUs on average, and $\beta_{0,j}$ and $\beta_{1,j}$ represent a higher MPC out of an EIP1 receipt either contemporaneously or three months later, respectively. We also run regressions in which Black and Hispanic households are lumped together, in order to overcome the small sample size.

We make similar extensions for the refined method of Parker et al. (2022). Specifically, the methodology consists of the following three steps:

1. Use all the observations of CUs which never received an EIP or which have not yet received an EIP, and run the regression below:

$$\Delta\widetilde{C}_{i,t} = \gamma_0 + \gamma_1\widetilde{age}_{i,t} + \gamma_2\Delta\widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t + \sum_{j=B,H}\mathbb{1}_{Race=j}\gamma_j + \epsilon_{i,t} \tag{8}$$

The terms in the summation controls for the racial differences in the MPC.

2. For all the observations of CUs which received an EIP, compute $\Delta\hat{C}_{i,t}$ defined as follows:

$$\Delta\hat{C}_{i,t} = \Delta\widetilde{C}_{i,t} - \left(\gamma_0 + \gamma_1\widetilde{age}_{i,t} + \gamma_2\Delta\widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t + \sum_{j=B,H}\mathbb{1}_{Race=j}\gamma_j\right) \tag{9}$$

where γ_0, γ_1, γ_2, τ_t, α, and γ_j are the values obtained in step 1.

3. We can interpret the discrepancy $\Delta\hat{C}_{i,t}$ as caused by EIPs, on average. In other words, we could run the following regression to estimate β_0 and β_1, as well as $\beta_{0,j}$ and $\beta_{1,j}$:

$$\Delta\hat{C}_{i,t} = \beta_0\widetilde{EIP1}_{i,t} + \beta_1\widetilde{EIP1}_{i,t-1} + \sum_{j=B,H} \mathbb{1}_{Race=j}\left(\beta_{0,j}\widetilde{EIP1}_{i,t} + \beta_{1,j}\widetilde{EIP1}_{i,t-1}\right) + \hat{\epsilon}_{i,t} \tag{10}$$

Later we also include a dummy variable indicating lack of liquidity into our regressions to see if the racial differences in the estimated consumption responses to an EIP1 receipt can be explained by differences in liquid asset holding. When we investigate the role of liquidity, we add a new term for a dummy variable which indicates lack of liquidity in all regressions described above. We define CUs with lack of liquidity as CUs whose liquid asset holding is under \$2,000. We also tried different threshold values, and found that results are found to be robust with different threshold values. Detailed description of the regressions with a control for liquidity is found in Appendix C.

6 Results

6.1 Racial Heterogeneity in MPC

Before we explore racial heterogeneity in consumption expenditure responses to an EIP receipt, let us compare the average consumption responses that we estimate with those reported by Parker et al. (2022) and other previous studies using the CE. Table 3 summarizes the results. Panels 1 and 2 show our estimates. Panel 1 shows β_0 based on the baseline methodology, and Panel 2 shows β_0 based on the refined methodology. For each methodology, we first show the results when we use the amount of EIP1 receipts as the variable $EIP_{i,t}$, which means that β_0 represents the average fraction of an EIP1 receipt that CUs spent within the same quarter of the EIP1 receipt. In other words, this is the MPC. Then we show the case in which we use the indicator of an EIP1 receipt as the variable $EIP_{i,t}$. In this case, the estimated β_0 represents the average dollar amount that CUs spent out of an EIP1 receipt. If the estimated coefficient β_0 is divided by the average amount of the EIP1, one could recover something close to the average MPC. In Panels 3 and 4, we show the same estimates reported by Parker et al. (2022). In Panel 5, we report estimated MPCs from other stimulus payments, based on Johnson et al. (2006) and Parker et al. (2013).

Regarding our estimates reported in Panels 1 and 2 of Table 3, let us make three remarks. First, for both baseline and refined methodologies, the point estimates indicate that the expenditure responses to an EIP1 receipt are small for all nondurable consumption definitions (0.01-0.07), but the responses are moderate (0.19-0.22 for the estimated MPC) for all CE goods and services. Although our point estimates tend to be smaller than what Parker et al. (2022) obtained, the small estimated consumption responses for all nondurable consumption expenditures are also true in their estimates. Second, the refined methodology is indeed effective; it produces similar coefficients for consumption responses as those based on the baseline methodology but with smaller standard errors. This is true in our results as well as those of Parker et al. (2022). Coefficients for nondurable goods and services and all CE goods and services exhibit the p-value of at most 0.05. Third, compared with the estimated MPC from past economic stimulus payments in 2001 and 2008, which are reported in Panel 5, the consumption expenditure responses tend to be smaller with the EIP1. For example, according to the refined methodology, our estimated MPC for nondurable goods and services is 0.065 and the estimate of Parker et al. (2022) is 0.102, while the estimated MPC is 0.386 for the 2001 Tax Rebates and it is 0.121 for the 2008 Economic Stimulus Payments. For all CE goods and

Table 3: Estimated Response of Consumption Expenditures to EIP Receipt: Comparison with Parker et al. (2022) and Other Previous Studies

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Baseline Methodology				
MPC (Amount of EIP1)	0.046	0.048	0.042	0.218
	(0.035)	(0.046)	(0.063)	(0.220)
Dollars Spent ($\mathbb{1}[EIP1 > 0]$	159.3*	228.1*	264.6	1083.5
	(89.9)	(126.2)	(163.2)	(671.5)
2. Refined Methodology				
MPC (Amount of EIP1)	0.011	0.036*	0.066**	0.192***
	(0.016)	(0.019)	(0.023)	(0.058)
Dollars Spent ($\mathbb{1}[EIP1 > 0]$	11.4	48.9	86.4*	316.3***
	(25.7)	(36.2)	(43.8)	(95.8)
3. Parker et al. (2022), Baseline Methodology				
MPC (Amount of EIP1)	0.043	0.071	0.077	0.280
	(0.032)	(0.044)	(0.059)	(0.217)
Dollars Spent ($\mathbb{1}[EIP1 > 0]$	157.3*	296.4*	375.0*	1278.8*
	(89.9)	(130.2)	(167.8)	(647.5)
4. Parker et al. (2022), Refined Methodology				
MPC (Amount of EIP1)	0.011	0.075***	0.102***	0.234***
	(0.016)	(0.020)	(0.028)	(0.059)
Dollars Spent ($\mathbb{1}[EIP1 > 0]$	6.5	96.4**	80.8*	336.5***
	(25.3)	(36.6)	(46.4)	(96.6)
5. Estimated MPC in Previous Studies				
2001 Tax Rebates	NA	0.248*	0.386**	NA
		(0.114)	(0.135)	
2008 Stimulus Payments	0.016	0.079*	0.121*	0.516**
	(0.027)	(0.046)	(0.055)	(0.179)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. Numbers in Panels 3 and 4 are taken from Tables 6 and 3 of Parker et al. (2022), respectively. Estimated MPCs for the 2001 Tax Rebates and those for the 2008 Stimulus Payments in Panel 5 are taken from Johnson et al. (2006) and Parker et al. (2013), respectively. For the baseline methodology, the baseline sample with 5,921 observations is used, and β_0 from the regression (1) with 4 types of consumption expenditures are shown. For the refined methodology, the final sample is used, with 3,561 treated observations and 2,279 untreated observations, and β_0 from the regression (6) with 4 types of consumption expenditures are shown.

services, our estimated MPC is 0.192, and the estimated MPC by Parker et al. (2022) is 0.234, but it is 0.516 for the 2008 Economic Stimulus Payments. Parker et al. (2022) argue that this is at least partly due to the supply restrictions and the lockdown in 2020 and other government subsidies, when the EIP1 disbursements were made.

Table 4 shows our first main result. The table shows how consumption responses to an EIP receipt are different for Black and Hispanic households, when we use the refined methodology of Parker et al. (2022). We also conducted regressions based on the baseline methodology, but all the coefficients are statistically insignificant (the p-value being higher than 0.05). The results based on the baseline methodology are shown in Table B.1 in Appendix B. We only show on the regressions associated with the MPC, since the heterogeneity in the MPC is our focus. In the upper panel (Panel 1) of Table 4, we estimate the heterogeneous consumption responses to an EIP receipt separately for

Table 4: Race-Specific Responses of Expenditures to EIP Receipt (Refined Methodology)

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Black and Hispanic Separately Treated				
β_0	0.030*	0.056**	0.086***	0.208***
	(0.014)	(0.022)	(0.026)	(0.063)
$\beta_{0,B}$	−0.030	−0.112**	−0.133**	0.042
	(0.036)	(0.053)	(0.066)	(0.135)
$\beta_{0,H}$	−0.042	−0.013	−0.005	0.130
	(0.030)	(0.043)	(0.054)	(0.128)
β_1	−0.019	−0.031	−0.093***	−0.060
	(0.017)	(0.022)	(0.029)	(0.077)
$\beta_{1,B}$	0.064*	0.029	0.076	0.388**
	(0.037)	(0.051)	(0.064)	(0.171)
$\beta_{1,H}$	−0.009	0.056	0.041	−0.124
	(0.034)	(0.039)	(0.061)	(0.158)
2. Black and Hispanic Pooled				
β_0	0.014	0.044*	0.077***	0.159***
	(0.018)	(0.021)	(0.025)	(0.062)
$\beta_{0,BH}$	−0.020	−0.046	−0.057	0.133
	(0.026)	(0.036)	(0.045)	(0.099)
β_1	−0.020	−0.028	−0.087***	−0.068
	(0.016)	(0.021)	(0.028)	(0.074)
$\beta_{1,BH}$	0.037	0.044	0.055	0.273**
	(0.028)	(0.034)	(0.047)	(0.116)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. Regressions are based on the refined methodology. β_0 is the contemporaneous response to an EIP1 receipt, shown as MPC. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,B}$, $\beta_{0,H}$, and $\beta_{0,BH}$ are additional contemporaneous responses to an EIP receipt for CUs with Black and Hispanic head, and Black and Hispanic CUs pooled, respectively. $\beta_{1,B}$, $\beta_{1,H}$, and $\beta_{1,BH}$ are the additional responses after three months to an EIP receipt for CUs with Black and Hispanic head, and Black and Hispanic CUs pooled, respectively. The baseline regressions by race contain 5,907 observations. The treated sample has 3,550 observations and the untreated sample has 2,279 observations.

Black and Hispanic CUs. β_0 is the MPC for households not Black or Hispanic, and $\beta_{0,B}$ is the additional consumption responses for Black households. $\beta_{0,H}$ is the same for Hispanic households. β_1 is the additional consumption response of households not Black or Hispanic, one quarter after an EIP receipt. $\beta_{1,B}$ and $\beta_{1,H}$ are the additional consumption responses one quarter after an EIP receipt for Black and Hispanic households, respectively. Since estimating the effects for Black and Hispanic households separately causes us lose statistical power, in the bottom panel (Panel 2), we pool Black and Hispanic households together, and repeat the same set of regressions.

In Panel 1 of Table 4, β_0 represents the consumption response in the same quarter as an EIP receipt by White and Other households. It is estimated to be 0.06 for strictly nondurable goods, 0.09 for nondurable goods and services, and 0.21 for all CE goods and services. They are not only statistically significant (the p-value less than 0.001 for the last two consumption categories), but also larger than the point estimates when all racial groups are pooled together (Panel 2 of

Table 3). However, $\beta_{0,B}$ and $\beta_{0,H}$, which represent how Black and Hispanic households change their consumption expenditures when they receive an EIP, are either negative (meaning that their consumption responses are smaller than White and Other households) or statistically insignificant (the p-value above 0.05), for consumption categories except for all CE goods and services (the last column). According to the last column of Panel 1, the consumption responses of Black and Hispanic households in the first quarter after an EIP receipt are not different in a statistically significant way, but the point estimates are positive, meaning that their consumption responses are stronger. In the next quarter, $\beta_{1,B}$ is 0.388, meaning that Black households increase consumption expenditures by 39 cent per dollar more than White and Other households. The consumption responses of Hispanic households in the next quarter are not statistically significant (the p-value above 0.05) and the point estimate is negative.

In Panel 2 of Table 4, we pool Black and Hispanic households together for higher statistical power, and estimate how their consumption responses differ from those of White and Other households. We again focus on the results associated with all CE goods and services since the results are statistically stronger. First of all, β_0, which represents the contemporaneous MPC of White and Other households out of an EIP receipt, is estimated to be 0.16, and it is statistically significant (the p-value less than 0.001). This is slightly smaller than the estimated MPC using pooled sample (0.19), but this is reasonable since other racial groups exhibit a higher MPC. $\beta_{0,BH}$, which represents the additional MPC of Black and Hispanic households in the current quarter, is estimated to be 0.13. This is not statistically significant at 5% level but the p-value is 0.09. In other words, the data support the hypothesis that Black and Hispanic households exhibit a higher MPC, with moderate statistical power. β_1, which represents the additional MPC for White and Other households one quarter after an EIP receipt, is estimated to be moderately negative (–0.07) but it is statistically insignificant (the p-value above 0.05). Finally, $\beta_{1,BH}$, the additional MPC for Black and Hispanic households one quarter after an EIP receipt, is estimated to be 0.27, and it is statistically significant (at 1% level). This point estimate indicates that the long-term MPC of Black and Hispanic households will be significantly larger than that of White and Other households.

Table 5 shows the contemporaneous (3-month of the EIP receipt) and longer-term (3-month of the EIP receipt and the next 3-month combined) MPC for different racial groups, calculated based on the estimated coefficients in Table 4. Again, since all the estimated coefficients pertaining to the baseline methodology were statistically insignificant at 5% level, we only show the results based on the refined methodology. The implied MPC based on the baseline methodology is summarized in Table B.2 in Appendix B. We show the MPC when Black and Hispanic households are treated separately in Panels 1 and 2, while we show the MPC when they are pooled together in Panels 3 and 4. Let us make four remarks. First, mostly, only the MPC associated with all CE goods and services are statistically significant, and the estimated MPC is economically large. Therefore, we focus on reporting the MPC based on all CE goods and services. Second, in both cases of treating Black and Hispanic households separately or pooling them together, Black and Hispanic households exhibit a higher contemporaneous (3-month of EIP receipts) MPC relative to White households.[4] In case Black and Hispanic households are pooled together, the 3-month MPC of White households is 0.16, while the Black and Hispanic MPC is 0.29, close to twice as large as the MPC of Whites. Third, the longer-term (3-month of EIP receipts and the next 3-month) MPC is larger. In other

[4] We do not separate Other households from White ones and call them White households for brevity, since the majority of the households who are not Black or Hispanic are White. But our results are robust to whether to include Others or not.

Table 5: Race-Specific MPC to EIP Receipt (Refined Methodology)

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Contemporaneous MPC, Black and Hispanic Separately Treated				
Overall	0.011	0.036*	0.066**	0.192***
	(0.016)	(0.019)	(0.023)	(0.058)
White	0.030*	0.056**	0.086***	0.208***
	(0.014)	(0.022)	(0.026)	(0.063)
Black	−0.001	−0.055	−0.047	0.249*
	(0.035)	(0.051)	(0.064)	(0.132)
Hispanic	−0.012	0.043	0.081	0.337**
	(0.028)	(0.041)	(0.052)	(0.126)
2. Implied Longer-Term MPC, Black and Hispanic Separately Treated				
Overall	0.006	0.056	0.059	0.382**
	(0.040)	(0.048)	(0.060)	(0.153)
White	0.040	0.082	0.080	0.356*
	(0.037)	(0.053)	(0.066)	(0.160)
Black	0.043	−0.113	−0.110	0.826**
	(0.069)	(0.104)	(0.136)	(0.322)
Hispanic	−0.053	0.111	0.111	0.490*
	(0.064)	(0.090)	(0.107)	(0.264)
3. Contemporaneous MPC, Black and Hispanic Pooled				
Overall	0.011	0.036*	0.066**	0.192***
	(0.016)	(0.019)	(0.023)	(0.058)
White	0.014	0.044*	0.077***	0.159***
	(0.018)	(0.021)	(0.025)	(0.062)
Black or Hispanic	−0.006	−0.002	0.020	0.292**
	(0.024)	(0.034)	(0.043)	(0.096)
4. Implied Longer-Term MPC, Black and Hispanic Pooled				
Overall	0.006	0.056	0.059	0.382**
	(0.040)	(0.048)	(0.060)	(0.153)
White	0.008	0.060	0.067	0.250
	(0.043)	(0.051)	(0.064)	(0.156)
Black or Hispanic	0.005	0.012	0.008	0.789***
	(0.052)	(0.072)	(0.091)	(0.228)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. Computed based on the estimated coefficients shown in Table 4, using the refined methodology. Longer-term MPC is the sum of the contemporaneous response and the response in the next quarter. The baseline regressions (overall) contain 5,921 observations and the baseline regressions by race contain 5,907 observations. The final sample is used. For the regression using the refined methodology, the treated sample has 3,550 observations and the untreated sample has 2,279 observations.

words, the cumulative consumption responses are rising over the 6-month horizon. When Black and Hispanic households are pooled, the MPC for the White is 0.16 for the first 3 months, but the cumulative MPC for the 6 months is 0.25. According to the regressions in which we separately treat Black and Hispanic households, the MPC for White households is 0.21 in over the 3-month horizon, and 0.36 for the 6-month horizon. Fourth, the cumulative longer-term MPC is even higher for Black and Hispanic households. Their MPC for the first 3 months is 0.29, but the cumulative MPC increases to 0.79 for the 6 months after EIP receipts. This is more than three times as large

Table 6: Estimated MPC in Response to EIP Receipt by Liquidity

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. All Households				
Contemporaneous MPC				
MPC with liquidity ($\geq \$2,000$)	0.097***	0.066*	0.123**	0.207*
	(0.022)	(0.035)	(0.044)	(0.119)
MPC without liquidity ($< \$2,000$)	0.156***	0.133**	0.200***	0.286**
	(0.028)	(0.038)	(0.044)	(0.120)
Longer-Term MPC				
MPC with liquidity ($\geq \$2,000$)	0.219***	0.105	0.184*	0.783**
	(0.053)	(0.087)	(0.110)	(0.323)
MPC without liquidity ($< \$2,000$)	0.209***	0.122	0.197*	0.052
	(0.062)	(0.090)	(0.101)	(0.263)
2. Black and Hispanic Households Separately Treated				
Contemporaneous MPC with Liquidity ($\geq \$2,000$)				
White	0.111***	0.089**	0.158***	0.257*
	(0.024)	(0.037)	(0.045)	(0.125)
Black	0.033	−0.080	−0.044	0.303
	(0.047)	(0.085)	(0.102)	(0.259)
Hispanic	0.132**	0.055	0.046	0.098
	(0.044)	(0.060)	(0.082)	(0.232)
Contemporaneous MPC without Liquidity ($< \$2,000$)				
White	0.116***	0.167*	0.249***	0.314*
	(0.032)	(0.080)	(0.047)	(0.136)
Black	0.038	−0.001	0.048	0.360*
	(0.045)	(0.080)	(0.093)	(0.210)
Hispanic	0.137**	0.134*	0.048	0.155
	(0.047)	(0.065)	(0.093)	(0.231)
3. Black and Hispanic Households Pooled				
Contemporaneous MPC with Liquidity ($\geq \$2,000$)				
White	0.098***	0.076*	0.137**	0.217*
	(0.023)	(0.036)	(0.045)	(0.121)
Black or Hispanic	0.084**	−0.004	0.016	0.195
	(0.034)	(0.056)	(0.071)	(0.195)
Contemporaneous MPC without Liquidity ($< \$2,000$)				
White	0.106**	0.149***	0.228***	0.290**
	(0.031)	(0.041)	(0.046)	(0.134)
Black or Hispanic	0.091**	0.070	0.106	0.268
	(0.035)	(0.056)	(0.067)	(0.162)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. All MPC are based on regression coefficients obtained using the refined methodology. Longer-term MPC is the sum of the contemporaneous response and the response in the next quarter. The treated sample has 1,617 observations and the untreated sample has 1,060 observations.

as the MPC for White households over the 6-month horizon.

6.2 Liquidity Holding and MPC

Since both Parker et al. (2022) and Ganong et al. (2023) find that lower liquid wealth is correlated with stronger consumption responses to income shocks, and Ganong et al. (2023) find that racial differences in consumption responses can be accounted for by differences in liquid wealth holding, we also modify our regressions by adding liquid wealth holding as an additional control. The resulting estimated MPCs are summarized in Table 6. The details of the regressions we run for the analysis in this section are found in Appendix C, and the detailed results of the regressions behind the MPCs, using both the baseline methodology and the refined methodology, are found in Appendix B.

Before discussing the results shown in Table 6, let us make three remarks. First, in order to add liquidity holding to the regressions, we need to drop many CUs who did not report liquidity, which hurts the statistical power of the analysis. In regressions without liquidity, we have 5,907 observations, while we only have 2,677 observations who reported liquid wealth holding. Second, liquid asset holding is one of the questions that are only asked in the first interview of a CU. Therefore, the reported liquid asset holding can be used as the indicator of liquidity when the CU made a decision about consumption expenditures which are reported in the first interview. However, the reported liquid wealth holding might not reflect the trust state of liquidity in the consumption expenditures reported in subsequent interviews. This implies that the effects of liquidity to the consumption responses to EIP receipts might be well identified only in the first observation of a CU. In other words, the statistical power to identify the longer-term MPC might be limited. Third, we assume that a CU lacks liquidity if the CU holds less than $\overline{Liq} = \$2,000$ of reported liquid wealth. The trade-off we face is, we want to set $\overline{Liq}$ as low as possible, to separate CUs with low liquid wealth holding, but then we have less CUs who are classified as lack of liquidity. At the end, we chose $\overline{Liq} = \$2,000$ so that 1/3 of CUs are classified as lacking liquidity, while 2/3 are classified as not lacking liquidity. This is the same threshold for lacking liquidity used by Parker et al. (2022). But since Back and Hispanic CUs tend to hold lower liquid wealth, we have disproportionately small number of Black and Hispanic CUs who are classified as not lacking liquidity, which further hurts the statistical power of the regressions.

Having discussed these caveats, Table 6 summarizes the MPCs out of EIP receipts, with an additional control for liquid wealth holding. A CU is classified as lacking liquidity if the reported liquid wealth holding is under $2,000, and as not lacking liquidity otherwise. We only show MPCs based on the regressions with the refined methodology, since many coefficients turned out to be statistically insignificant at 5% level if the baseline methodology is employed (see Table B.3 in Appendix B). In Panel 1, we do not use the race as a control. As for the contemporaneous MPC, point estimates indicate that, for all consumption expenditure categories, the MPC of CUs with lack of liquidity is higher than the CUs with ample liquid wealth. For example, for all CE goods and services, the MPC for CUs who lack liquidity is estimated to be 0.29, while the MPC for CUs with ample liquidity is 0.21. This is consistent with the existing literature emphasizing the role of liquidity in shaping the consumption responses to income shocks. However, the additional consumption responses due to lack of liquidity ($\beta_{0,Liq}$) are mostly statistically insignificant (see Table B.3). For longer-term consumption responses to EIP receipts, the MPC of CUs without liquidity somehow is estimated to be either similar or smaller than the MPC of CUs with liquidity.

Panels 2 and 3 contain the MPC when we include both the race control and the liquidity control. In Panel 2 we estimate the consumption responses to EIP receipts of Black and Hispanic households separately, while in Panel 3, we pool Black and Hispanic households together and estimate the dif-

ferences of their consumption responses relative to White (and Other) households. Consistent with the result of Ganong et al. (2023), when we add a control for liquidity, the additional consumption responses by Black or Hispanic households either become statistically insignificant at 5% level, or negative, depending on consumption expenditure categories (the regression coefficients are shown in Table B.4 and B.6). For example, let us focus on the MPC associated with all CE goods and services, when Black and Hispanic households are pooled together (last column of Panel 3 of Table 6). The point estimate of the contemporaneous MPC with liquidity is 0.22 for Whites and 0.20 for Blacks and Hispanics, but the difference is not statistically significant at 5% level. Similarly, the MPC without liquidity is 0.29 for Whites and 0.27 for Blacks and Hispanics, but again, the difference is statistically insignificant. If we look at nondurable goods and services, the MPC with and without liquidity is lower for Black and Hispanic households compared with White households, although the MPC conditional on the race is higher for the MPC without liquidity. However, the coefficient associated with being Black or Hispanic is not statistically significant at 5% level. The differences created when the liquidity control is introduced on top of the racial control are basically the same when we treat Black and Hispanic households separately (Panel 2). In sum, when the liquidity is controlled, the racial differences in consumption responses to EIP receipts disappear in a statistical sense. Of course, the result might be because of the caveats discussed above.

6.3 Usage of Stimulus Payment and MPC

In this section, we explore how the reported use of the stimulus payment is correlated with the estimated MPC, using a special question in the CE. Although the literature of measuring the MPC is mostly focusing on the consumption response to a stimulus payment, it is also known that many households use the stimulus payment to either save or repay debt. Salm et al. (2010) report that 20% of respondents in the University of Michigan survey answered that they would use the 2008 tax rebates to mostly increase spending, while 52% answered that they would use it to mostly pay off debt. A more recent paper by Koşar et al. (2023) echoes the finding; they use the FRB NY Survey of Consumer Expectations (SCE) and report that most households answered that they used the pandemic checks to pay down debt, rather than spending immediately to consume.

In Table 7, we summarize the results of the regressions (Panel 1) and the implied MPCs (Panels 2 and 3), but with an indicator of the primary usage of the EIP1 receipt. The indicator is one if the reported primary usage of an EIP receipt is to spend, and zero if the reported primary usage of an EIP1 receipt is either to save or to pay off debt. $\beta_{0,Expenses}$ and $\beta_{1,Expenses}$ represent the additional consumption responses if the primary usage is to spend in the current and the next quarter, respectively. We only show the results based on the refined methodology, since the regression results with the baseline methodology turned out to be mostly statistically insignificant at 5% level. The results with the baseline methodology are summarized in Table B.8 in Appendix B. We want to make three remarks about the results summarized in Table 7. First, for all consumption categories except for all CE goods and services (the last column), the contemporaneous MPC for those who report they primarily used the EIP1 receipt for either repaying debt or saving is statistically insignificant. Second, on the other hand, for strictly nondurables and nondurable goods and services, the contemporaneous MPC for those who used the EIP1 receipt primarily for expenditures is statistically significant (the p-value less than 0.001), at 0.07 and 0.11, respectively. Even for all CE goods and services, the point estimate of the contemporaneous MPC for those who used the EIP1 receipt primarily for expenditures is higher (0.23) than the contemporaneous MPC for those who primarily saved or repaid debt (0.16). Basically, there is a significant difference

Table 7: Consumption Response to EIP Receipt by Usage (Refined Methodology)

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Regression Coefficients				
β_0	0.012	0.001	0.014	0.161*
	(0.018)	(0.028)	(0.035)	(0.078)
$\beta_{0,Expenses}$	0.011	0.067*	0.101**	0.063
	(0.024)	(0.031)	(0.039)	(0.085)
β_1	−0.006	−0.013	−0.063*	0.003
	(0.015)	(0.020)	(0.027)	(0.072)
$\beta_{1,Expenses}$	−0.060	−0.093	−0.200*	−0.077
	(0.016)	(0.071)	(0.111)	(0.397)
2. Contemporaneous MPC				
Using EIP1 on Debts or Savings	0.012	0.001	0.014	0.161*
	(0.018)	(0.028)	(0.035)	(0.078)
Using EIP1 on Expenses	0.023	0.068***	0.114***	0.225***
	(0.022)	(0.021)	(0.027)	(0.064)
3. Long-term MPC				
Using EIP1 on Debts or Savings	0.018	−0.012	−0.036	0.326*
	(0.043)	(0.063)	(0.081)	(0.190)
Using EIP1 on Expenses	−0.015	0.043	0.029	0.372
	(0.062)	(0.073)	(0.111)	(0.397)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. β_0 is the contemporaneous response to an EIP1 receipt. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,Expenses}$ and $\beta_{1,Expenses}$ are the interactions between an EIP receipt in the current and the previous quarter and using the EIP on expenses, respectively. In the regressions using the baseline methodology, there are 5,935 observations. In the regressions using the refined methodology, there are 3,573 treated observations and 2,279 untreated observations.

in terms of the estimated contemporaneous MPC for those who primarily repaid debt or saved upon receiving the EIP1 (statistically zero) and the contemporaneous MPC for those who primarily spent the EIP receipt (positive). Third, the long-term MPC is mostly statistically insignificant for all consumption categories.

We reported in Table 2 (second panel from the bottom) how reported main usage of EIP1 receipts differs across racial groups. While 55% of White households reported they used EIP1 receipts mainly for expenses, the fraction is higher for Hispanic (63%) and Black (59%) households. In addition, a higher proportion of Black and Hispanic households than White households used EIP1 receipts to pay off debt, and a lower proportion of them used mainly for saving. The proportion who mainly used EIP1 receipts for replaying debt is 17% among White household, compared with 26% among Black and 19% among Hispanic households. On the other hand, the proportion who mainly saved EIP receipts is 29% among White household, compared with 16% among Black and 17% among Hispanic households. Although both households who mainly used EIP1 receipts for saving and those who mainly used EIP1 receipts to pay off debt exhibit a lower MPC out of an EIP1 receipt, the higher proportion among Black and Hispanic households than White ones who mainly used EIP1 receipts for spending is consistent with a higher MPC among Black and Hispanic households.

7 Concluding Remarks

We utilize the rich demographic information and the special questions regarding the EIP1 of the CE and estimate differential consumption responses to a stimulus payment across racial groups, and investigate the determinants of the racial differences. We find that, although the estimated MPC is generally low except for all CE goods and services, as Parker et al. (2022) find, Black and Hispanic households exhibit a higher MPC (0.29) than White households (0.16). We also find that, when we control for liquidity holding, the racial differences seem to disappear, which is consistent with the interpretation that a higher fraction of low liquidity households among the Blacks and the Hispanics is behind the estimated stronger consumption responses of the Blacks and then Hispanics. We also find that households who report that they used EIP1 receipts mostly for expenditures exhibit a higher MPC, which is consistent with a higher proportion among Black and Hispanic households who used the pandemic checks for expenditures.

The findings are consistent with the hand-to-mouth model that lack of liquidity is an important determinant of the consumption responses to a stimulus check, and racial differences of consumption responses are observed because of the different liquidity holding across racial groups. However, we don't have sufficient sample size to explore different channels, such as potential difficulty of racial minorities of borrowing against home equity in case of need, which also could create racial differences in consumption responses to a stimulus payment. We hope future research deepens our understanding of alternative channels which could create heterogeneity in consumption responses.

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Appendix

A Detailed Description of the CE Variables

This appendix provides detailed description of the variables in the CE that we use for the analysis. Following Parker et al. (2022), we use following files: FMLI193-FMLI211 and CNT20. Each of the FMLIXXX files includes CU characteristics as well as quarterly expenditures obtained from the Interview Survey. We use the data from 2019Q3 (FMLI193) to 2021Q1 (FMLI211) since CUs interviewed during these quarters potentially received EIP1. CNT20 is a file containing answers to the special questions related to EIP (Economic Impact Payments) in 2020.

Variables used in FMLIXXX data sets are: NEWID (interview identifier), QINTRVMO (interview month), FINLWT21 (final weight), AGE_REF (age of the reference person), AGE2 (age of the spouse), FAM_SIZE (family size), PERSLT18 (number of kids), SEX_REF (sex of the reference person), MARITAL1 (marital status), CUTENURE (housing tenure), FINCBTXM (family annual income in the last 12 months), liquid assets a year before (LIQUDYRX), and expenditures in various categories. As for expenditure categories, Parker et al. (2022) use four types of expenditures, which we follow. Below we list the four types of expenditure categories and how to construct them from the CE. PQ and CQ represent the expenditures in the past (calendar) quarter and current (calendar) quarter. They are separately used to compute expenditures in different calendar quarters, but here we do not distinguish the two and always sum up the two.

(1) **Food and alcohol:** FOODPQ (food) + FOODCQ + ALCBEVPQ (alcoholic beverages) + ALCBEVCQ

(2) **Strictly nondurables:** Food and alcohol + UTILPQ (utilities, fuels and public services) + UTILCQ + TOBACCPQ (tobacco and smoking supplies) + TOBACCCQ + PERSCAPQ (personal care) + PERSCACQ + HOUSOPPQ (household operations) + HOUSOPCQ + TRNOTHPQ (local public transportation, excluding on trips) + TRNOTHCQ + GASMOPQ (gasoline and motor oil) + GASMOPQ + MISCPQ (miscellaneous expenditures) + MISCCQ

(3) **Nondurable goods and services:** Strictly nondurables + APPARPQ (apparel and services) + APPARCQ + HEALTHPQ (healthcare) + HEALTHCQ + READPQ (reading materials) + READCQ (Lusardi (1996) includes EDUCAPQ (education) + EDUCACQ but Johnson et al. (2006) exclude them)

(4) **All CE goods and services:** TOTEXPPQ + TOTEXPCQ. TOTEXPPQ (total expenditures) includes nondurable goods and services + HOUSPQ (housing, which includes UTILPQ (utilities) and HOUSOPPQ (household operations)) + TRANSPQ (transportation, which includes TRNOTHPQ (local public transportation) and GASMOPQ (gasoline and motor oil)) + ENTERTPQ (entertainment) + EDUCAPQ (education) + LIFINSPQ (life and other personal insurance) + CASHPQ (cash contribution) + RETPENPQ (retirement, pensions, Social Security contribution)

In the CNT20 data set, we use CONTCODE (indicator if the household received EIP) and CONTEXPX (amount of EIP received).

B Additional Tables

This appendix provides additional tables. Table B.1 corresponds to Table 4 in Section 6.1, which employs the refined methodology. In this table, results based on the baseline methodology are shown. The table is not in the main text since none of the coefficients are estimated to be statistically significant with the baseline methodology. Table B.2 is the contemporaneous and longer-term MPC implied by the regression coefficients shown in Table B.1. This table corresponds to Table 5 in Section 6.1, which employs the refined methodology.

Tables B.3, B.4, B.5, B.6, and B.7 provide further details associated with liquidity, which is the main topic of Section 6.2. Table 6 summarizes the results in the five tables presented here. Table B.3 shows the consumption responses in the short-term (3 months) and in the longer-term (6 months), using both the baseline methodology (Panel 1) and the refined methodology (Panel 2), but

Table B.1: Race-Specific Responses of Expenditures to EIP Receipt, using Baseline Methodology

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Black and Hispanic Separate (Baseline Methodology)				
β_0	0.067	0.051	0.018	0.311
	(0.040)	(0.054)	(0.071)	(0.25)
$\beta_{0,B}$	−0.023	−0.026	−0.040	−0.431
	(0.057)	(0.078)	(0.109)	(0.472)
$\beta_{0,H}$	−0.054	0.034	0.168	0.018
	(0.052)	(0.072)	(0.124)	(0.323)
β_1	−0.031	−0.017	−0.064	−0.242
	(0.033)	(0.079)	(0.087)	(0.356)
$\beta_{1,B}$	−0.032	−0.145	−0.164	0.709
	(0.085)	(0.126)	(0.137)	(0.736)
$\beta_{1,H}$	0.062	0.142	0.032	0.241
	(0.065)	(0.147)	(0.197)	(0.518)
2. Black and Hispanic Pooled (Baseline Methodology)				
β_0	0.049	0.038	0.013	0.238
	(0.039)	(0.052)	(0.068)	(0.243)
$\beta_{0,BH}$	−0.024	0.028	0.096	−0.102
	(0.042)	(0.059)	(0.091)	(0.292)
β_1	−0.047	−0.016	−0.066	−0.241
	(0.032)	(0.070)	(0.078)	(0.321)
$\beta_{1,BH}$	0.038	0.032	−0.039	0.427
	(0.055)	(0.112)	(0.138)	(0.444)

Notes: This table corresponds to Table 4, which employs the refined methodology. In this table, results based on the baseline methodology are shown. $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. β_0 is the contemporaneous response to an EIP1 receipt, shown as MPC. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,B}$, $\beta_{0,H}$, and $\beta_{0,BH}$ are additional contemporaneous responses to an EIP receipt for CUs with Black and Hispanic head, and Black and Hispanic CUs pooled, respectively. $\beta_{1,B}$, $\beta_{1,H}$, and $\beta_{1,BH}$ are the additional responses after three months to an EIP receipt for CUs with Black and Hispanic head, and Black and Hispanic CUs pooled, respectively. The baseline regressions by race contain 5,907 observations. The treated sample has 3,550 observations and the untreated sample has 2,279 observations.

Table B.2: Race-Specific MPC to EIP Receipt

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Contemporaneous (3-month) MPC (Baseline Methodology)				
Overall	0.045	0.048	0.041	0.216
	(0.034)	(0.046)	(0.062)	(0.220)
White	0.067	0.051	0.018	0.311
	(0.040)	(0.054)	(0.071)	(0.251)
Black	0.044	0.0025	−0.022	−0.121
	(0.056)	(0.076)	(0.104)	(0.469)
Hispanic	0.013	0.086	0.186	0.328
	(0.077)	(0.067)	(0.122)	(0.306)
2. Implied Longer-Term (6-month) MPC (Baseline Methodology)				
Overall	0.055	0.091	0.010	0.365
	(0.066)	(0.098)	(0.127)	(0.483)
White	0.103	0.086	−0.028	0.379
	(0.077)	(0.118)	(0.153)	(0.569)
Black	0.024	−0.112	−0.272	0.225
	(0.138)	(0.189)	(0.251)	(1.366)
Hispanic	0.056	0.296	0.340	0.656
	(0.117)	(0.209)	(0.271)	(0.699)
3. Contemporaneous (3-month) MPC (Baseline Methodology)				
Overall	0.046	0.048	0.041	0.216
	(0.034)	(0.046)	(0.062)	(0.220)
White	0.049	0.038	0.013	0.238
	(0.039)	(0.052)	(0.068)	(0.243)
Black or Hispanic	0.024	0.066	0.109	0.136
	(0.039)	(0.054)	(0.090)	(0.286)
4. Implied Longer-Term (6-month) MPC (Baseline Methodology)				
Overall	0.055	0.091	0.010	0.301
	(0.066)	(0.098)	(0.127)	(0.481)
White	0.051	0.060	−0.040	0.236
	(0.074)	(0.111)	(0.143)	(0.541)
Black or Hispanic	0.040	0.147	0.114	0.458
	(0.094)	(0.157)	(0.202)	(0.709)

This table corresponds to Table 5. Computed based on the estimated coefficients shown in Table B.1. Longer-term MPC is the sum of the contemporaneous response and the response in the next quarter. The baseline regressions (overall) contain 5,921 observations and the baseline regressions by race contain 5,907 observations. The final sample is used. For the overall regression using the refined methodology, the treated sample has 3,561 observations and the untreated sample has 2,269 observations. For the race-specific regressions using the refined methodology, the treated sample has 3,550 observations and the untreated sample has 2,279 observations.

without controlling for race. Table B.4 shows the regression coefficients of consumption responses to EIP receipts, controlling for both liquidity and race. Panel 1 shows the results using the baseline methodology, while Panel 2 shows the results of the refined methodology. In this table, we treat Black and Hispanic households separately. Table B.5 is the MPC by race and liquidity implied by the regression coefficients shown in Table B.4. We only show the contemporaneous MPC (consumption responses in the quarter of EIP receipts), since the results regarding longer-term MPC are

statistically weaker. Table B.6 is similar to Table B.4 but we pool Black and Hispanic households together when running the regressions, in hope for higher statistical power. Table B.7 shows the MPC based on regression coefficients shown in Table B.6.

Table B.8 corresponds to Table 7 in the main text. The former contains results using the baseline methodology, while the latter contains results based on the refined methodology. As we discussed in the main text, we decided to show only the latter in the main text, since most estimated regression coefficients turned out top be statistically insignificant at 5% level if the baseline methodology is used.

Table B.3: Estimated Response of Consumption Expenditures to EIP Receipt by Liquidity

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Baseline Methodology				
β_0	0.083*	0.087	0.052	0.432
	(0.043)	(0.063)	(0.081)	(0.337)
$\beta_{0,Liq}$ ($< \$2,000$)	0.044	0.027	−0.042	0.228
	(0.052)	(0.077)	(0.147)	(0.524)
β_1	−0.060	0.081	0.095	0.989*
	(0.050)	(0.160)	(0.169)	(0.492)
$\beta_{1,Liq}$ ($< \$2,000$)	−0.028	−0.270	−0.406*	−1.372**
	(0.067)	(0.176)	(0.186)	(0.541)
Contemporaneous MPC				
MPC with liquidity ($\geq \$2,000$)	0.083*	0.087	0.052	0.432
	(0.043)	(0.063)	(0.081)	(0.337)
MPC without liquidity ($< \$2,000$)	0.127**	0.114	0.010	0.660
	(0.053)	(0.081)	(0.159)	(0.570)
Longer-Term MPC				
MPC with liquidity ($\geq \$2,000$)	0.105	0.256	0.199	1.852**
	(0.092)	(0.184)	(0.215)	(0.682)
MPC without liquidity ($< \$2,000$)	0.165	0.039	−0.290	0.937
	(0.111)	(0.186)	(0.332)	(1.124)
2. Refined Methodology				
β_0	0.097***	0.066*	0.123**	0.207*
	(0.022)	(0.035)	(0.044)	(0.119)
$\beta_{0,Liq}$ ($< \$2,000$)	0.059*	0.067	0.077	0.079
	(0.032)	(0.044)	(0.054)	(0.141)
β_1	0.025	−0.026	−0.062	0.370*
	(0.045)	(0.036)	(0.046)	(0.226)
$\beta_{1,Liq}$ ($< \$2,000$)	−0.108***	−0.117**	−0.140*	−0.889***
	(0.033)	(0.049)	(0.064)	(0.189)
Contemporaneous MPC				
MPC with liquidity ($\geq \$2,000$)	0.097***	0.066*	0.123**	0.207*
	(0.022)	(0.035)	(0.044)	(0.119)
MPC without liquidity ($< \$2,000$)	0.156***	0.133**	0.200***	0.286**
	(0.028)	(0.038)	(0.044)	(0.120)
Longer-Term MPC				
MPC with liquidity ($\geq \$2,000$)	0.219***	0.105	0.184*	0.783**
	(0.053)	(0.087)	(0.110)	(0.323)
MPC without liquidity ($< \$2,000$)	0.209***	0.122	0.197*	0.052
	(0.062)	(0.090)	(0.101)	(0.263)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. β_0 is the contemporaneous response to an EIP1 receipt. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,Liq}$ and $\beta_{1,Liq}$ are the interaction terms between an EIP receipt in the current and the previous quarter and liquid asset holding of less than \$2,000. In the regressions using the baseline methodology, there are 2,753 observations. In the regressions using the refined methodology, there are 1,617 treated observations and 1,060 untreated observations.

Table B.4: Race-Specific Responses of Expenditures to EIP Receipt after Controlling for Liquidity

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Baseline Methodology				
β_0	0.090*	0.087	0.055	0.506
	(0.045)	(0.065)	(0.084)	(0.350)
$\beta_{0,B}$	−0.085	−0.011	0.065	0.114
	(0.078)	(0.126)	(0.139)	(0.538)
$\beta_{0,H}$	−0.040	0.031	−0.030	−0.720
	(0.083)	(0.106)	(0.171)	(0.493)
$\beta_{0,Liq}$ ($< \$2,000$)	0.052	0.025	−0.044	0.272
	(0.051)	(0.078)	(0.154)	(0.551)
β_1	−0.070	0.071	0.068	0.907*
	(0.051)	(0.176)	(0.186)	(0.469)
$\beta_{1,B}$	0.034	−0.208	−0.131	0.445
	(0.103)	(0.254)	(0.263)	(0.619)
$\beta_{1,H}$	0.100	0.120	0.233	0.537
	(0.100)	(0.100)	(0.193)	(1.022)
$\beta_{1,Liq}$ ($< \$2,000$)	−0.017	−0.244	−0.386*	−1.416**
	(0.057)	(0.168)	(0.179)	(0.579)
2. Refined Methodology				
β_0	0.111***	0.089**	0.158***	0.257*
	(0.024)	(0.037)	(0.045)	(0.125)
$\beta_{0,B}$	−0.078*	−0.169*	−0.201*	0.046
	(0.046)	(0.083)	(0.097)	(0.231)
$\beta_{0,H}$	0.020	−0.034	−0.111*	−0.158
	(0.045)	(0.060)	(0.054)	(0.227)
$\beta_{0,Liq}$ ($< \$2,000$)	0.005	0.078*	0.092*	0.057
	(0.033)	(0.045)	(0.054)	(0.147)
β_1	0.023	−0.051	−0.099*	0.396*
	(0.028)	(0.043)	(0.053)	(0.174)
$\beta_{1,B}$	−0.021	0.015	0.106	0.587*
	(0.072)	(0.013)	(0.190)	(0.313)
$\beta_{1,H}$	0.025	0.097	0.163*	−0.091
	(0.049)	(0.061)	(0.074)	(0.297)
$\beta_{1,Liq}$ ($< \$2,000$)	−0.106***	−0.108*	−0.135*	−0.993***
	(0.033)	(0.048)	(0.060)	(0.190)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. β_0 is the contemporaneous response to an EIP1 receipt, which is the contemporaneous MPC. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,B}$ and $\beta_{0,H}$ are additional contemporaneous responses to an EIP receipt for CUs with Black and Hispanic head, respectively. $\beta_{1,B}$ and $\beta_{1,H}$ are the additional responses after three months to an EIP receipt for CUs with Black and Hispanic head. The final sample is used. The baseline regressions contain 2,753 observations. For the refined regressions, the treated sample has 1,617 observations and the untreated sample has 1,060 observations.

Table B.5: Race-Specific MPC to EIP Receipt after Controlling for Liquidity

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Contemporaneous MPC (Baseline Methodology)				
With Liquidity ($\geq \$2,000$)				
Overall	0.083*	0.087	0.052	0.432
	(0.043)	(0.063)	(0.081)	(0.337)
White	0.090*	0.087	0.055	0.506
	(0.045)	(0.065)	(0.084)	(0.350)
Black	0.005	0.076	0.120	0.620
	(0.084)	(0.135)	(0.179)	(0.607)
Hispanic	0.050	0.118	0.025	−0.214
	(0.085)	(0.110)	(0.171)	(0.516)
Without Liquidity ($< \$2,000$)				
Overall	0.127**	0.114	0.010	0.660
	(0.053)	(0.081)	(0.159)	(0.570)
White	0.142**	0.113	0.011	0.778
	(0.054)	(0.085)	(0.172)	(0.626)
Black	0.057	0.102	0.076	0.892
	(0.086)	(0.133)	(0.181)	(0.593)
Hispanic	0.102	0.143	−0.018	0.058
	(0.092)	(0.119)	(0.200)	(0.599)
3. Contemporaneous MPC (Refined Methodology)				
With Liquidity ($\geq \$2,000$)				
Overall	0.097***	0.066*	0.123**	0.207*
	(0.022)	(0.035)	(0.044)	(0.119)
White	0.111***	0.089**	0.158***	0.257*
	(0.024)	(0.037)	(0.045)	(0.125)
Black	0.033	−0.080	−0.044	0.303
	(0.047)	(0.085)	(0.102)	(0.259)
Hispanic	0.132**	0.055	0.046	0.098
	(0.044)	(0.060)	(0.082)	(0.232)
Without Liquidity ($< \$2,000$)				
Overall	0.156***	0.133**	0.200***	0.286**
	(0.028)	(0.038)	(0.044)	(0.120)
White	0.116***	0.167*	0.249***	0.314*
	(0.032)	(0.080)	(0.047)	(0.136)
Black	0.038	−0.001	0.048	0.360*
	(0.045)	(0.080)	(0.093)	(0.210)
Hispanic	0.137**	0.134*	0.048	0.155
	(0.047)	(0.065)	(0.093)	(0.231)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. Computed based on the estimated coefficients shown in Table B.4. Longer-term MPC is the sum of the contemporaneous response and the response in the next quarter. The final sample is used. The baseline regressions contain 2,753 observations. For the refined regressions, the treated sample has 1,617 treated observations and the untreated sample has 1,060 untreated observations.

Table B.6: Race-Specific Responses of Expenditures to EIP Receipt after Controlling for Liquidity Using Two Race Categories

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Baseline Methodology				
β_0	0.090*	0.086	0.051	0.490
	(0.045)	(0.065)	(0.084)	(0.348)
$\beta_{0,BH}$	−0.053	0.019	0.003	−0.453
	(0.065)	(0.087)	(0.139)	(0.419)
$\beta_{0,Liq}$ ($< \$2,000$)	0.051	0.025	−0.042	0.288
	(0.051)	(0.078)	(0.153)	(0.548)
β_1	−0.065	0.080	0.081	0.919*
	(0.052)	(0.174)	(0.183)	(0.469)
$\beta_{1,BH}$	0.034	0.003	0.100	0.488
	(0.103)	(0.170)	(0.181)	(0.741)
$\beta_{1,Liq}$ ($< \$2,000$)	−0.031	−0.269	−0.419**	−1.430**
	(0.064)	(0.166)	(0.178)	(0.575)
2. Refined Methodology				
β_0	0.098***	0.076*	0.137**	0.217*
	(0.023)	(0.036)	(0.045)	(0.121)
$\beta_{0,BH}$	−0.015	−0.079	−0.122*	−0.022
	(0.035)	(0.054)	(0.065)	(0.172)
$\beta_{0,Liq}$ ($< \$2,000$)	0.007	0.073*	0.091*	0.073
	(0.032)	(0.044)	(0.054)	(0.145)
β_1	0.024	−0.037	−0.090*	0.325*
	(0.028)	(0.042)	(0.052)	(0.172)
$\beta_{1,BH}$	0.006	0.051	0.144	0.273
	(0.046)	(0.067)	(0.092)	(0.239)
$\beta_{1,Liq}$ ($< \$2,000$)	−0.108***	−0.117**	−0.144*	−0.918***
	(0.033)	(0.049)	(0.063)	(0.191)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. β_0 is the contemporaneous response to an EIP1 receipt, shown as MPC. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,BH}$ and $\beta_{1,BH}$ are additional responses in the current and the next quarter to an EIP receipt for CUs with either Black or Hispanic head. The final sample is used. The baseline regressions contain 2,753 observations. For the refined regressions, the treated sample has 1,617 treated observations and the untreated sample has 1,060 untreated observations.

Table B.7: Race-Specific MPC to EIP Receipt after Controlling for Liquidity Using Two Race Categories

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
1. Contemporaneous MPC (Baseline Methodology)				
With Liquidity ($\geq \$2,000$)				
Overall	0.083*	0.087	0.052	0.432
	(0.043)	(0.063)	(0.081)	(0.337)
White	0.090*	0.086	0.051	0.490
	(0.045)	(0.065)	(0.084)	(0.348)
Black or Hispanic	0.037	0.105	0.055	0.037
	(0.069)	(0.094)	(0.142)	(0.464)
Without Liquidity ($< \$2,000$)				
Overall	0.127**	0.114	0.010	0.660
	(0.053)	(0.081)	(0.159)	(0.570)
White	0.141**	0.110	0.009	0.778
	(0.054)	(0.085)	(0.172)	(0.625)
Black or Hispanic	0.088	0.130	0.012	0.325
	(0.075)	(0.101)	(0.165)	(0.523)
3. Contemporaneous MPC (Refined Methodology)				
With Liquidity ($\geq \$2,000$)				
Overall	0.097***	0.066*	0.123**	0.207*
	(0.022)	(0.035)	(0.044)	(0.119)
White	0.098***	0.076*	0.137**	0.217*
	(0.023)	(0.036)	(0.045)	(0.121)
Black or Hispanic	0.084**	−0.004	0.016	0.195
	(0.034)	(0.056)	(0.071)	(0.195)
Without Liquidity ($< \$2,000$)				
Overall	0.156***	0.133**	0.200***	0.286**
	(0.028)	(0.038)	(0.044)	(0.120)
White	0.106**	0.149***	0.228***	0.290**
	(0.031)	(0.041)	(0.046)	(0.134)
Black or Hispanic	0.091**	0.070	0.106	0.268
	(0.035)	(0.056)	(0.067)	(0.162)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. Computed based on the estimated coefficients shown in Table B.6. Longer-term MPC is the sum of the contemporaneous response and the response in the next quarter. The final sample is used. The baseline regressions contain 2,753 observations. For the refined regressions, the treated sample has 1,617 treated observations and the untreated sample has 1,060 untreated observations.

Table B.8: Consumption Response to EIP Receipt by Usage (Baseline Methodology)

	Food and Alcohol	Strictly Nondurables	Nondurable Goods & Services	All CE Goods & Services
β_0	0.062	0.061	0.057	0.043
	(0.053)	(0.065)	(0.080)	(0.283)
$\beta_{0,Expenses}$	−0.065	−0.121	−0.122	0.273
	(0.066)	(0.093)	(0.135)	(0.442)
β_1	−0.031	0.003	−0.060	−0.138
	(0.031)	(0.064)	(0.075)	(0.310)
$\beta_{1,Expenses}$	−0.115	−0.167	−0.281	0.214
	(0.091)	(0.137)	(0.171)	(1.416)
Contemporaneous MPC				
Using EIP1 on Debts or Savings	0.062	0.061	0.057	0.043
	(0.053)	(0.065)	(0.080)	(0.283)
Using EIP1 on Expenses	−0.003	−0.060	−0.065	0.316
	(0.042)	(0.068)	(0.110)	(0.360)
Long-term MPC				
Using EIP1 on Debts or Savings	0.093	0.125	0.055	−0.052
	(0.102)	(0.135)	(0.167)	(0.619)
Using EIP1 on Expenses	−0.151	−0.283	−0.471*	0.708
	(0.126)	(0.178)	(0.249)	(1.498)

Notes: $*$: $p < 0.05$, $**$: $p < 0.01$, $***$: $p < 0.001$. This table corresponds to Table 7, which employs the refined methodology. β_0 is the contemporaneous response to an EIP1 receipt. β_1 is the response to an EIP1 receipt in the previous quarter. $\beta_{0,Expenses}$ and $\beta_{1,Expenses}$ are the interactions between an EIP receipt in the current and the previous quarter and using the EIP on expenses, respectively. In the regressions using the baseline methodology, there are 5,935 observations. In the regressions using the refined methodology, there are 3,573 treated observations and 2,279 untreated observations.

C Model with Controls for both Race and Liquidity

This appendix provides the details of the regressions with both racial and liquidity controls, used in Section 6.2. After adding an indicator of (lack of) liquidity to Equation (7), the baseline regression with an indicator of (lack of) liquidity becomes the following:

$$\begin{aligned}\Delta C_{i,t} = {} & \beta_0 EIP1_{i,t} + \beta_1 EIP1_{i,t-1} + \gamma_0 + \gamma_1 age_{i,t} + \gamma_2 \Delta FamSize_{i,t} + \tau_t \\ & + \mathbb{1}_{Liq<\overline{Liq}} \left(\gamma_{Liq} + \beta_{0,Liq} EIP1_{i,t} + \beta_{1,Liq} EIP1_{i,t-1}\right) \\ & + \sum_{j=B,H} \mathbb{1}_{Race=j} \left(\gamma_j + \beta_{0,j} EIP1_{i,t} + \beta_{1,j} EIP1_{i,t-1}\right) + \epsilon_{i,t} \quad \text{(C.1)}\end{aligned}$$

The second line in Equation above is the addition to measure effects of (lack of) liquidity. $\mathbb{1}_{Liq<\overline{Liq}}$ is an indicator function which takes a value one (zero) if liquidity holding of the CU is below (above) the threshold value $\overline{Liq}$. We set the benchmark threshold value as $\overline{Liq} = \$2,000$. γ_{Liq} is the average effect of lack of liquidity on the MPC, and $\beta_{0,Liq}$ and $\beta_{1,Liq}$ are the effects of lack of liquidity to MPC in the current quarter and the next quarter. Similarly, the refined methodology becomes the following with an addition of the liquidity control:

1. Use all the observations of CUs which never received an EIP or which have not yet received an EIP, and run the regression below:

$$\Delta \widetilde{C}_{i,t} = \gamma_0 + \gamma_1 \widetilde{age}_{i,t} + \gamma_2 \Delta \widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t + \sum_{j=B,H} \mathbb{1}_{Race=j} \gamma_j + \mathbb{1}_{Liq<\overline{Liq}} \gamma_{Liq} + \epsilon_{i,t} \quad \text{(C.2)}$$

2. For all the observations of CUs which received an EIP, compute $\Delta \hat{C}_{i,t}$ defined as follows:

$$\Delta \hat{C}_{i,t} = \Delta \widetilde{C}_{i,t} - \left(\gamma_0 + \gamma_1 \widetilde{age}_{i,t} + \gamma_2 \Delta \widetilde{FamSize}_{i,t} + \alpha R_i + \tau_t + \sum_{j=B,H} \mathbb{1}_{Race=j} \gamma_j + \mathbb{1}_{Liq<\overline{Liq}} \gamma_{Liq}\right) \quad \text{(C.3)}$$

   where γ_0, γ_1, γ_2, τ_t, α, γ_j, and γ_{Liq} are the values obtained in step 1.

3. We can interpret the discrepancy $\Delta \hat{C}_{i,t}$ as caused by EIPs, on average. In other words, we could run the following regression to estimate β_0 and β_1, $\beta_{0,j}$, $\beta_{1,j}$, $\beta_{0,Liq}$ and $\beta_{1,Liq}$:

$$\begin{aligned}\Delta \hat{C}_{i,t} = {} & \beta_0 \widetilde{EIP1}_{i,t} + \beta_1 \widetilde{EIP1}_{i,t-1} + \sum_{j=B,H} \mathbb{1}_{Race=j} \left(\beta_{0,j} \widetilde{EIP1}_{i,t} + \beta_{1,j} \widetilde{EIP1}_{i,t-1}\right) \\ & + \mathbb{1}_{Liq<\overline{Liq}} \left(\beta_{0,Liq} \widetilde{EIP1}_{i,t} + \beta_{1,Liq} \widetilde{EIP1}_{i,t-1}\right) + \hat{\epsilon}_{i,t} \quad \text{(C.4)}\end{aligned}$$