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WORKING PAPER NO. 325

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November 2012

This version December 2012

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Tullio Jappelli* and Luigi Pistaferri**

Abstract

We use responses to survey questions in the 2010 Italian Survey of Household Income and Wealth that ask consumers how much of an unexpected transitory income change they would consume. We find that the marginal propensity to consume (MPC) is 48 percent on average, and that there is substantial heterogeneity in the distribution. We find that households with low cash-on-hand exhibit a much lower MPC than affluent households, which is in agreement with models with precautionary savings where income risk plays an important role. The results have important implications for the evaluation of fiscal policy, and for predicting household responses to tax reforms and redistributive policies. In particular, we find that a debt-financed increase in transfers of 1 percent of national disposable income targeted to the bottom decile of the cash-on-hand distribution would increase aggregate consumption by 0.82 percent. Furthermore, we find that redistributing 1% of national disposable from the top to the bottom decile of the income distribution would boost aggregate consumption by 0.1%.

Keywords: Marginal Propensity to Consume, Fiscal Policy, Consumption Heterogeneity.

JEL codes: E21, D91.

Acknowledgements: We thank seminar participants at the MPC Conference at the Center for American Progress (Washington D.C.). We acknowledge financial support from the Italian Ministry of Universities and Research (Jappelli) and the European Research Council starting grant 284024 (Pistaferri).

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1. Introduction

Knowledge on how consumers respond to income shocks – the Marginal Propensity to Consume (MPC) – is crucial for evaluating the macroeconomic impact of tax and labor market reforms, and for the design of stabilization and income maintenance policies. Distinguishing whether consumption responds differently to transitory or permanent income changes is equally important. In this paper, we use information on how much consumers would spend of an unexpected windfall gain equal to their average monthly income. Hence, we can characterize empirically the distribution of MPC in response to an unexpected transitory variation in income.

In a standard life-cycle permanent income model, consumption is proportional to lifetime disposable resources (or permanent income), and hence all consumers respond in a similar way to income shocks, that is, there is no heterogeneity in the MPC. Models with precautionary savings, liquidity constraints or bequest motives, in contrast, suggest that consumers respond differently to changes in their economic resources. Indeed, the MPC of prudent individuals falls with household resources; liquidity constrained consumers exhibit higher MPC than households who can access credit markets to smooth consumption; and if bequests are luxury goods, rich individuals consume a smaller fraction of their lifetime resources.[1] In addition to these level effects, the composition of household resources may also matter. For instance, households burdened with large debts might react to a positive change in income by reducing their debt rather than spending (Dynan, 2012; Mian and Sufi, 2010). Moreover, if most of the wealth is locked into illiquid assets, households must cut consumption even in the face of a negative transitory income shock (Kaplan and Violante, 2011).

The importance of the consumer response to fiscal policies is attracting renewed attention given the large fiscal stimulus packages enacted by governments on both sides of the Atlantic to counteract the Great Recession. One of the major problems for policymakers is to assess the effectiveness of such policies as debt-financed fiscal packages or redistributive programs that maintain the public deficit unchanged. For instance, fiscal reforms that increase the tax burden of the rich are often advocated as a way to finance unemployment insurance schemes or other welfare programs. As mentioned above, in standard life-cycle models, these revenue-neutral redistributive policies produce no consumption effects in the aggregate because of homogeneity in the MPC. In these models, the consumption of the rich is no more than a scaled-up version of the consumption of the poor and any increase in the latter's consumption is matched exactly by a decline in the consumption of the former. However, more realistic models with precautionary savings or liquidity

[1] See, e.g., Dynan, Skinner and Zeldes (2004).

constraints show MPC heterogeneity. Since aggregate consumption depends on the distribution of MPC within the population, redistributive fiscal policy potentially might boost national income.

A major problem in estimating the MPC is isolating the exogenous shocks to income which can be used to track consumption behavior after a shock. Parker (1999), Souleles (1999), and Johnson, Parker and Souleles (2006) use quasi-experiments in which exogenous changes come from transitory tax changes. Blundell, Pistaferri and Preston (2008) rely on a statistical decomposition of income shocks and the covariance restrictions imposed by the theory on the joint behavior of income and consumption, and use long panel data to relate income shocks to consumption changes. Survey questions containing responses to hypothetical income changes are a third alternative[2] And the strategy adopted in this study, which relies on a unique question in the 2010 Italian Survey of Household Income and Wealth (SHIW). The survey is designed to elicit information on how much people would consume or save were they unexpectedly to receive a reimbursement equal to their average monthly income. The responses to this question provide a sample distribution of the MPC that we can relate to observable characteristics and, most importantly, compare with the predictions of intertemporal consumption models.

In our sample, we find that the average MPC is 48 percent, at the high-end of current estimates based on survey data on observed consumption and income changes.[3] Most importantly, we find quite substantial heterogeneity in people's responses, ranging from zero to 1 across the entire distribution of the household's resources. In particular, households with low cash-on-hand exhibit a much higher MPC than affluent households, which is in agreement with models where income risk or liquidity constraints play an important role. The empirical distribution of the MPC can be used to perform some simple policy simulations designed to predict the consumption response to tax interventions. We consider the cases of both government enacting a transfer policy financed by issuing debt and government redistributing income from rich to poor in a revenue-neutral scheme. We find that the response of aggregate consumption to these policies is substantially higher than in a benchmark case when the MPC is assumed to be the same for each all household.

Our approach is based on the assumption that there is no systematic discrepancy between the intention to spend and actual spending behavior. Given this assumption, a first advantage of our approach is that it solves the econometric problems of identifying genuine income shocks and isolating their effect on consumption, from other confounding forces. A second advantage is that,

[2] See Shapiro and Slemrod (1995; 2003) and Sahm, Shapiro and Slemrod (2009).
[3] E.g., Johnson, Parker and Souleles (2006) find that households spent between 20% and 40% of the 2001 US tax rebate on non-durable goods, in the first 3 months after its receipt. Sahm, Shapiro and Slemrod (2009) find an MPC of about one-third.

relative to experimental approaches and statistical decompositions of income shocks, where absence of long panels forces researchers to make strong distributional assumptions about the relationship between consumption growth and shocks to households' resources, no such assumptions are needed in our context. A third advantage is that the survey question delivers the MPC for each household, while in most studies in the literature, the sample sizes are too small to obtain precise estimates of MPC for specific population groups defined by age, education, or household resources - hence most focus on average MPC. This means that researchers are unable to evaluate the effect of redistributive policies on aggregate consumption.

The paper is organized as follows. Section 2 discusses the theoretical predictions about the MPC and reviews various methods proposed for its estimation, focusing particularly on studies that rely on direct survey questions. Section 3 describes the data and the question used to elicit the MPC. Section 4 presents the descriptive analysis and regression results relating the MPC to demographic variables, household resources, and proxies for credit constraints. Section 5 provides a series of policy experiments to illustrate how MPC heterogeneity affects the aggregate consumption response to tax reforms and redistributive fiscal policy. Section 6 concludes.

2. Theoretical predictions and empirical approaches

The standard life-cycle model and the permanent income hypothesis suggest that consumption should react to unanticipated income shocks, and that the response should be stronger for permanent than for transitory income shocks.[4] Our survey question refers to a transitory income shock, and hence we would expect a relatively low consumption response.

In models with quadratic utility, the MPC is equivalent to the annuity factor and is independent of household resources (the sum of current assets and the present discounted value of income). In the infinite version of the model, the annuity factor is (approximately) equal to the real interest rate, while in the finite-life version of the model MPC increases with age because the elderly have a shorter horizon over which to smooth consumption.

In contrast to models with quadratic utility, models with prudent individuals predict that MPC will depend on the level of household resources. Carroll and Kimball (1996) show that adding income uncertainty to the standard optimization problem with preferences characterized by prudence, produces a concave consumption function in which MPC from cash-on-hand declines with the level of wealth. The intuition is that consumers with less wealth have less ability to protect

[4] The same models suggest that consumption does not respond to anticipated income changes.

their consumption against income shocks. This means that as their wealth reduces, their fear of low income realization increases, which intensifies the strength of their precautionary saving motive.

Binding liquidity constraints also change some of the implications of the standard models. If people want to borrow but face binding liquidity constraints, the current marginal utility of consumption is high relative to future periods. Therefore an unexpected positive income shock raises current consumption one-to-one, regardless of the persistence of the shock. This assumes that the income shock is not large enough to overcome the credit constraint, which may be a reasonable assumption in the context of the survey question we exploit. [5]

Any test of the theoretical predictions regarding the size of the MPC involves the problem of identifying the type of income change faced by consumers. Jappelli and Pistaferri (2011) survey the methodologies used by applied researchers to identify exogenous income changes: (a) quasi-experimental settings in which researchers use episodes when income changes exogenously (in an expected or unexpected way) due, for example, to tax reforms; (b) making specific assumptions about the income process in order to distinguish the distribution of shocks from actual income realizations;[6] (c) using the difference between realized and subjective expectations of income to identify the unanticipated component of income. Each of these approaches can then be used to measure the impact of exogenous income changes on consumption. A useful alternative is to sidestep the problem of identifying income changes, and to ask direct survey questions about the response of consumption to hypothetical or actual changes in income. In this paper we use this approach. Our direct survey question is designed to estimate the response of consumption to an unanticipated transitory income change.[7]

Shapiro and Slemrod (1995; 2003) and Sahm, Shapiro and Slemrod (2009) have used this approach extensively in the US context. In particular, they rely on survey data to measure individual responses to actual or hypothetical tax policies. Household responses to tax rebates are coded

[5] The bequest motive for saving is a further cause of MPC heterogeneity. A bequest typically is modeled as a luxury good, which leads to consumption being a concave function of cash-on-hand. Hence, when cash-on-hand increases by a given income amount, the poor mostly consume it, while the rich mostly save it to contribute to a bequest.

[6] Identifying such shocks from income realizations is difficult because people often have information that is not observable by the econometrician. For instance, they may know in advance that they will face a temporary change in their incomes (e.g. seasonal lay-off, or a tax rebate). When this change is realized, the econometrician measures it as a shock while, in fact, it is an expected event.

[7] Other studies estimate the effect of anticipated tax changes on consumption using quasi-experimental approaches. The best known applications use features of the tax system, such as social security payroll caps (Parker, 1999), tax refunds (Souleles, 1999), pre-announced tax cuts (Souleles, 2002), and the recent tax rebates or stimulus payments (Johnson, Parker and Souleles, 2006; Parker, Souleles, Johnson and McClelland, 2011; Agarwal, Liu and Souleles, 2007; and Misra and Surico, 2012). These studies typically find evidence of excess sensitivity of consumption to anticipated income changes induced by tax reductions, with relatively larger responses among low-wealth and low-income households, which is consistent with liquidity constraints. Given the small sample sizes and short panels, the evidence on heterogeneity in these studies is limited to group comparisons and rarely is precisely estimated.

according to three categories: mostly spend, mostly save, mostly pay off debt.[8] Given the qualitative nature of the survey questions, they rely on distributional assumptions to translate mostly-spend rates into an aggregate MPC. Shapiro and Slemrod (1995) examined the effectiveness of President Bush's temporary reduction in income tax with-holding in 1992.[9] One month after the tax change was implemented, they surveyed about 500 taxpayers and asked: (a) whether they were aware that income tax withholding had decreased, and (b) what they were planning to do with the extra money in their paychecks, i.e., mostly save it or mostly spend it. They found that 40 percent of those interviewed planned to spend the extra take-home pay, suggesting that even a temporary tax change can be effective for increasing household spending.

Analysis of the 2001 income tax rebate reports a lower estimate of the marginal propensity to consume (22% of interviewed households reported plans to spend the tax rebate), and little evidence of myopia or liquidity constraints (Shapiro and Slemrod, 2003). Sahm, Shapiro and Slemrod's (2009) analysis of the 2008 tax stimulus provides intermediate findings (an MPC of about one-third) and also that the lowest income group and the group with no stock ownership have slightly higher mostly-spend rates than the higher-income groups and stock owners but the differences are small and statistically insignificant. Their final conclusion is that less-well-off households are not more likely than rich households to spend a tax rebate.[10]

3. The survey question

To characterize the MPC, we rely on the following question posed to respondents to the 2010 SHIW:

> *Imagine you unexpectedly receive a reimbursement equal to the amount your household earns in a month. How much of it would you save and how much would you spend? Please give the percentage you would save and the percentage you would spend.*

The survey covers a cross-section of 7,951 households and provides detailed information on demographic variables, income, consumption, wealth (broken down into real assets, financial assets,

[8] E.g., the question in the Michigan survey was: "Thinking about your family's financial situation this year, did the tax rebate lead you mostly to increase spending, mostly to increase saving, or mostly to pay off debt?"
[9] The change was transitory since it was offset by a planned smaller tax refund in 1993.
[10] Sahm, Shapiro and Slemrod (2009) also compare the pattern of answers provided in response to other US surveys that address the same question in slightly different ways. They compare 12 surveys conducted by nationally recognized polling organizations, and find that they are relatively consistent in relation to frequency of responses in the mostly spend/mostly save categories.

and various debt components). We will see that it contains also useful variables to measure credit constraints, attitudes to risk, financial literacy, and other characteristics that potentially might affect the MPC.

The SHIW covers a representative sample of the Italian resident population.[11] Data are collected through personal interviews. Questions concerning the whole household are addressed to the household head or the person most knowledgeable about the family's finances; questions on individual incomes are answered by the individual household member wherever possible. The unit of observation is the family, which is defined as including all persons residing in the same dwelling who are related by blood, marriage, or adoption. Individuals described as "partners or other common-law relationships" are also treated as family.

Note that, in contrast to surveys that ask for qualitative information (mostly save/mostly spend) about how people spend temporary tax rebates, the question we analyze is hypothetical and quantitative (people are asked what percentage of the reimbursement they would spend). The advantage of quantitative survey responses is that they overcome the problem of comparing responses across individuals who might interpret the statement "mostly spend/mostly save" in different ways. Another advantage is that by asking for a numerical value for the MPC, avoids the problem of obtaining an aggregate MPC from the aggregation of qualitative responses. Finally, the design of the survey question addresses the potential problem that consumers' responses to income changes depends on the size of the change. The survey question ties the amount of the reimbursement to the monthly income as opposed to asking how the respondent would spend a fixed sum of money (i.e., a $500 tax rebate).[12]

Three caveats are needed related to: (a) consumption vs. spending, (b) external validity, (c) and quality of interviews. First, the question refers to the marginal propensity to spend, not to consume, and the two differ by the propensity to use the refund to purchase durable goods. If the response is that they intend to spend a large part of the refund, this could refer to a plan to buy a durable good rather than to spend on non-durable goods. In the first case, people "mostly save" the refund despite declaring that they would spend 100 percent of it, making it more correct to use the term "marginal propensity to spend" rather than "marginal propensity to consume". While acknowledging the importance of this distinction, we prefer the acronym MPC and its conventional

[11] The sample design is similar to the Labour Force Survey conducted by ISTAT (the Italian national statistics agency). Sampling is carried out in two stages: the first covers the selection of municipalities, the second the selection of households. Municipalities are categorized into 51 strata, defined by 17 regions and 3 classes of population size (over 40,000, 20,000-40,000, less than 20,000). All municipalities in the first group are included; those in the second and third groups are selected randomly with a probability proportional to their population size. In the second stage households are selected randomly from registry office records (Bank of Italy, 2012).

[12] Questions about the US 2008 tax rebate may suffer from a "size effect," if the magnitude of the rebate was small relative to the incomes of many households.

use.[13] Second, most of the interviews took place between April and July 2011, when the economy was experiencing a prolonged recession, and hence it might not be obvious how to extrapolate distribution of the MPC estimated during a recession, to normal times or expansionary periods. A final caveat, common to all research eliciting subjective expectations or behavior in hypothetical scenarios, is that respondents might have little incentive to answer the questions truthfully, might have trouble understanding the wording of the questions, or might in practice display quite different behavior from their reported behavior. In the last section of the paper we check that the pattern of responses is not affected by measures of financial literacy available in the survey, or by limiting the sample to interviews with high quality responses

4. Empirical evidence

4.1. Descriptive evidence

Figure 1 plots the distribution of the responses to the survey question on MPC. It shows a heavy concentration of responses in three categories. Around 22 percent of respondents reported that they would spend nothing out of the reimbursement (MPC=0), around 16 percent reported that they would spend the entire reimbursement amount (MPC=1), and around 24 percent said they would spend 50 percent of it. These responses are therefore reminiscent of the "mostly save", "mostly spend" and "partly save/partly spend" coding used by Shapiro and Slemrod in their qualitative assessment of the MPC. Figure 1 shows a "heaping" at rounded values (10%, 20%, etc.).

The sample mean of the MPC is 48 percent, substantially higher than the predictions of standard consumption models on the impact of a transitory shock.[14] A possible explanation for this large deviation from the theoretical benchmarks is that the question does not distinguish between durable and non-durable consumption. Another explanation is that many households belong to population groups for whom liquidity constraints or myopia are important. For these reasons, we focus on the relation of the MPC with observable characteristics and in particular on the difference in the MPC across the distribution of household resources.

[13] The importance of distinguishing between non-durable and total spending is highlighted by Parker, Souleles, Johnson and McClelland (2012), who find that households spent 12-30% of their 2008 US stimulus payments on non-durable goods, but this rose to 50-90% when durable goods are included.

[14] Kaplan and Violante (2010) investigate this issue simulating a life-cycle model in which consumers have isoelastic preferences, face income risk during their working lives, and retire at age 65. They conclude that the MPC with respect to permanent shocks is considerably larger than the MPC with respect to transitory shocks (0.7 vs. 0.06). Blundell, Pistaferri and Preston (2008) provide empirical estimates of the MPC with respect to income shocks, that are not too dissimilar to these theoretical benchmarks.

We start by exploring therelationship between MPC and cash-on-hand, defined as the sum of household disposable income and financial wealth, net of consumer debt. Figure 2 shows that average MPC declines sharply with cash-on-hand, from around 65 percent in the lowest cash-on-hand percentile to some 30 percent for the richest households.[15] Above we noted a large concentration of responses in the MPC=0 and MPC=1 categories. Figures 3 and 4 plot the fraction of respondents reporting MPC values at the two extremes of 0 and 1, by cash-on hand percentiles. The fraction of MPC=0 is only 10 percent for the poorest households, and increases steadily to 40 percent in the richer segment of the sample (Figure 3). The fraction reporting MPC=1 declines from 40 percent to 10 percent across the cash-on-hand distribution (Figure 4). This descriptive evidence is indicative of two aspects: first, there is wide MPC heterogeneity; second, MPC declines sharply with household resources.

4.2. Regression evidence

To characterize better the determinants of MPC variability in our sample we rely on regression analysis. Summary statistics for the main variables used in our estimation are presented in Table 1; Table 2 reports the baseline regressions. Since the dependent variable is censored from above and below, we use a two-limit Tobit estimator.[16] We present the main results, then focus on credit constraints and finally perform robustness checks.

The first specification in column (1) includes only demographic variables: age dummies, gender, marital status, education, family size, dummies for city size, and residence in the South. Except for family size, all coefficients are statistically different from zero. In particular, the MPC is roughly constant throughout the working life, declining after retirement by about 7 percentage points (the omitted category is the 60+ age group). This pattern contrasts with the predictions of standard consumption models that MPC, with respect to transitory shocks, increases with age. One possible explanation is that bequest motives, survival risk or risk of large medical expenses lead elderly households to save a larger fraction of their windfall income than younger households. Married couples show a slightly lower MPC, while more educated households display slightly lower MPC. Regional and city size dummies signal that the reported MPC tends to be higher for households in the South and in larger cities.[17]

[15] Using a completely different approach based on matching actual and predicted consumption transition probabilities, Jappelli and Pistaferri (2004) estimate an MPC of 0.4 for the low educated and 0.10 for the high educated, confirming a negative relation between measures of permanent income (measured here as education) and the MPC.
[16] The results presented below are unchanged if we use a simple OLS estimator.
[17] None of the results change if we replace the South dummy with a full set of regional dummies.

However, some of these differences might be explained by correlation with omitted measures of household resources, as indicated graphically by the pattern in Figure 3. In column (2) we add cash-on-hand quintile dummies to the list of regressors. The results confirm a strong negative correlation between MPC and cash-on-hand. The coefficients are precisely estimated and decline monotonically with the quintile dummies. In particular, going from the first to the fifth cash-on-hand quintile is associated with a 30 percentage point decline in the MPC. Interestingly, the strongest decline occurs at low levels of wealth (an 11 percentage point decline between the first and second quintiles). Adding household resources changes the impact of education and age and reduces the size and significance of other coefficients. In particular, the age dummies are smaller and show a slightly increasing pattern during the working life, although there is still a decline after retirement. The third specification, in column (3), adds a dummy for unemployed household heads. While all other coefficients are unaffected, we find that the MPC is 7 percentage points higher for the unemployed, perhaps an indication of binding borrowing constraints or higher incidence of debt.

It may be more appropriate to focus on people in the labor force, who face rather different constraints and shocks to their resources (e.g., income and unemployment shocks) with respect to the elderly, for whom health shocks, bequest motives, and survival risk play more important roles. Table 3 repeats the estimation, but excluding households older than 60. The results are largely confirmed: (1) a strong negative correlation between MPC and cash-on-hand, (2) a roughly constant age pattern of MPC during the working life,[18] and (3) a positive, albeit less precisely estimated, coefficient of the unemployment dummy.

The effect of cash-on-hand on MPC may be due in part to changes in disposable income and in part to changes in financial assets, net of debt. Table 4 presents a breakdown of the cash-on-hand distribution into its three components, adding dummies for income and financial assets quintiles, and dummies for homeownership and positive debt.[19] The results in Table 4 column 1 show that each of the three components of cash-on-hand are strongly negatively correlated with the MPC. Going from the first to the fifth income quintile results in an 11 percentage point decline in the MPC, while going from the first to fifth quintile of financial assets results in a 26 point decline. Again, the steepest declines occur at low levels of income and of financial wealth (5 and 11 points, respectively). The dummy for positive debt, as expected, is negative and precisely estimated. Households with debt have an MPC 9 points lower than the rest of the sample. A plausible interpretation is that these households would use part of the reimbursement to pay off their debts,

[18] Figure 1 in Meghir and Pistaferri (2010) shows that in models with quadratic utility and finite horizon the MPC with respect to transitory shocks only rises substantially after around retirement, so data may not have the power to detect small increases over the working stage of the life cycle.
[19] We also introduce the value of real assets: the coefficient is close to zero and imprecisely estimated.

rather than increasing their spending. On the other hand, the coefficient of the dummy for homeownership is rather small and not statistically different from zero.

When we introduce the unemployment dummy, in column 2 we find that the coefficient is slightly lower than in Table 2 (0.056 vs. 0.07) and is less precisely estimated. The results for the sample excluding the elderly confirm the same patterns for the income and financial assets quintile dummies, but no role for the unemployment variable (as in the specification with cash-on-hand in Table 3).

4.3. Credit constraints

As already pointed out, the strong negative correlation between MPC and cash-on-hand might be explained by precautionary saving, liquidity constraints, or a combination of the two. Liquidity constrained individuals increase spending one-to-one if they receive additional income. In practice, cash-on-hand might be strongly correlated with access to credit, and lack of it might exclude people from the credit market.

Similarly, the response of prudent individuals to an additional unit of income depends on cash-on-hand. Poor consumers live on the edge of (precautionary) fear, and hence an extra unit of income leads to a higher MPC. Rich consumers, instead, have already accumulated resources to smooth consumption, and hence have a lower MPC.

As noted by Deaton (1991), it is hard to distinguish empirically between borrowing constraints and precautionary savings. To isolate the relation between cash-on-hand and MPC, we can control directly for indicators of access to credit available from the SHIW. We consider three indicators: (1) whether people have been turned down for credit in the past, or have been discouraged from borrowing (the wording of the question is reported in the Appendix); (2) whether they have access to an overdraft facility; (3) whether they have a credit card.

While the effect of current credit constraints is to increase the MPC, the effect of our proxy (being turned down for credit) is less clear-cut. On the one hand, being turned down when applying for credit may be correlated with the presence of current constraints, and therefore may be associated with a high MPC. On the other hand, having been turned down for credit in the past signals a high probability of being credit constrained in the future, which increases the expected variability of consumption growth, and therefore induces a low MPC due to a combination of borrowing constraints and precautionary saving.

The results are reported in Table 5. The first regression adds to the baseline the indicator for being turned down. The estimated coefficient suggests that the MPC is lower among those who

report having been turned down for credit or discouraged from borrowing. Since this variable signals also a high probability of being credit constrained in the future, the negative coefficient is consistent with fear of future borrowing constraints in combination with a precautionary motive for saving. Indeed, using the panel section of the SHIW we find evidence that being turned down for/discouraged from applying for credit is persistent over time, providing support for the explanation that people who were unable to access credit in the previous year might fear being excluded from credit in the future.[20]

The coefficients of the other indicators for access to credit (credit line and credit card) are not statistically different from zero (Table 5 column 2). The coefficient of the turned down question is higher in absolute value (-0.17) if we exclude the elderly (columns 3 and 4) from the sample.

4.4. Robustness

One concern with subjective expectations and hypothetical questions similar to the one exploited in this paper is people's understanding of the survey question. Our question on MPC requires the respondent to understand that the reimbursement is an amount equal to their monthly income (not an absolute amount), and to be able to compute a percentage (planned consumption relative to reimbursement).

To address this, Table 6 reports three robustness checks. In the first experiment, we check whether understanding of the financial questions is correlated to the MPC. We rely on an indicator of financial literacy constructed by summing correct answers to three questions on interest compounding, risk diversification, and mortgage contracts (the indicator ranges from 0 to 3). The wording of the literacy questions, proposed in Lusardi and Mitchell (2011), is set out in the Appendix. The regression coefficient of financial literacy is close to zero, supporting the idea that people with relatively low financial literacy do not exhibit a tendency to under-report or over-report MPC.

We check also for whether particular values of MPC are associated with lower literacy (results not reported here for reasons of space, but available on request). We define dummy variables for each of three modes of the MPC distribution (0; 0.5; 1) and run probit regressions using the specification in Table 6, column 1. We find no evidence that lower level of literacy is associated with a higher likelihood of any of the three responses. The result for the probit regression which models the probability of responding MPC=0.5, is particularly interesting in light of the fact that

[20] SHIW contains indicators for access to credit between 1991 and 2010. We calculate the coefficient of correlation between contemporaneous and lagged access to credit in the panel section of the survey. We find that being turned down for credit in year *t* increases the likelihood of being turned down in year *t*+1 by about 10 percentage points.

when asked to pick a number between 0 and 1, some people choose 0.5 because they are uncertain about the meaning of the question. Our evidence, however, shows rather that the choice MPC=0.5 reflects a genuine response.

As a further robustness check we focus on the sample of individuals with relatively high literacy, that is, those responding correctly to at least two literacy questions. The pattern of results in column 2 is unchanged with respect to the baseline estimates.

As a final check, we focus on a sub-sample of individuals with high quality responses. At the end of each interview, SHIW interviewers evaluate the quality of the answers provided by respondents. The evaluation is performed on a 0-10 scale, representing the respondents' general understanding of the survey questions. In column (3) of Table 6 we focus on a sample of 5,479 high-quality interviewees, i.e. respondents who received a score of at least 8 from the interviewer.[21] The results are again confirmed: there is strong correlation between MPC and cash-on-hand, a relatively flat age profile of MPC until retirement, a positive but not always significant correlation with unemployment, and a negative effect of previous credit constraints on the MPC.

5. Fiscal policy with heterogeneous MPC

How important is MPC heterogeneity for assessing the effect of transitory income changes (such as tax rebates or stimulus packages) on the aggregate economy? In this final section we show that our data can be used to calculate the effect on aggregate consumption of a series of fiscal policies. In evaluating the consumption effects of these policies, for simplicity, we use the MPC sample distribution. Results using predicted MPC from our regressions (which control for a large set of variables) are qualitatively similar, and not reported here for reasons of space.

We consider several experiments. In the first experiment, we assume that government enacts a transfer policy financed by issuing debt (no taxes are levied).[22] In particular, we study a policy in which government transfers 1 percent of national disposable income equally among all individuals in the bottom 10 percent of the income distribution. This policy is equivalent to a transfer of €3,308, or 120 percent of average monthly income. We next consider two scenarios: in one MPC=0.48 for

[21] Results focusing on respondents who received a score of at least 9 or exactly 10 are also similar.

[22] In all experiments, we abstract from any general equilibrium effects arising from changes in asset prices and distortions induced by taxes and transfers on labor supply. However, it is worth noting that labor supply distortions of taxes are reduced by the lump sum nature of the tax (absent the targeting, there would be no distortions). We also neglect network effects on aggregate consumption arising from interdependent preferences, which might induce changes in consumption in partial equilibrium even among individuals not directly targeted by the policy (De Giorgi, Frederikssen and Pistaferri, 2012). Note however that we do not need to assume that consumers are non-Ricardian (as long as the answers to the reimbursement question incorporate anticipation of future tax increases required to pay for current transfers).

all individuals (the sample average), and in the other, the MPC is heterogeneous across the sample distribution. The results of these two experiments are reported in Table 7 (cases (a) and (b)), where we show the aggregate MPC (in column (1)) and the aggregate consumption growth resulting from the experiment (column (2)). In the homogeneous case (a), the aggregate MPC is obviously equal to 0.48, and aggregate consumption increases by 0.62 percent. If the MPC is heterogeneous, targeting transfers at the bottom 10 percent of the population results in a higher aggregate MPC (0.62) and higher aggregate consumption growth (0.82 percent). The difference between the two cases is due to the higher MPC prevailing in the bottom part of the cash-on-hand distribution (shown clearly in Figure 2). Note that if government were to implement a pro-rich transfer to the top 10 percent of the income distribution (case (c) in Table 7), the aggregate MPC and consumption growth would be significantly lower (0.36 and 0.47%, respectively).

Another experiment we consider is to transfer 1 percent of national disposable income equally among all households with at least one unemployed member (14% of the sample), see case (d) in Table 7. This is equivalent to an unemployment bonus of €2,400 (about 87% of average monthly income), roughly equal to three months of the unemployment insurance received by blue-collar workers. The quantitative impact of this policy will be to boost aggregate consumption by 0.76 percent, with an estimated aggregate MPC of 0.58. The reason for the similar effect relative to a transfer to the bottom 10 percent of the income distribution is that households with unemployed members are mostly concentrated among the poor. [23]

A different type of experiment is a balanced-budget redistributive policy whereby the government finances a transfer to the bottom x percent of the income or cash-on-hand distribution (where $1 \leq x \leq 89$) by taxing the top 10 percent of the income distribution. In all experiments, tax revenues equal 1 percent of the income earned by the top income decile. We assume that this amount is obtained by imposing a lump sum equal-sized tax on the top income decile, and that the government transfers this amount equally among targeted households.

Figure 5 plots the aggregate consumption growth generated by the policy. Of course, with a homogeneous MPC, a pure redistributive policy has no effect on aggregate consumption. However, with a heterogeneous MPC, the effect is positive and highest if the program targets the very poor. For instance, a transfer to the bottom 10 percent of the income distribution would raise aggregate consumption by 0.08 percent; if the same program targets people with below-median income, the boost in consumption would be around 0.05 percent.

[23] We performed similar experiments giving the transfer to the lowest decile of the income (instead of the cash-on-hand) distribution, and obtain similar results, that is, a larger consumption effect for transfers to the bottom decile of the cash-on-hand distribution.

We also consider a case where transfers are "means-tested" rather than being income-based. This case captures an income support program for the lowest x percent of the cash-on-hand distribution. The shape of the curve in Figure 5 is similar to the income-based case, but the overall consumption effect is stronger. The larger effect for programs based on cash-on-hand transfers depends on the stronger negative correlation of MPC with financial assets (which of course are part of cash-on-hand) rather than income (as illustrated by the regression results in Table 4).

One might wonder how much of these aggregate consumption effects are due to a correlation between the MPC and the income (or cash-on-hand) distributions as opposed to a correlation with other characteristics that vary across the income distribution, such as age, education, family size, etc. To control for these confounding factors, we expand the baseline regression in column 3 of Table 2, replacing the cash-on-hand quintiles with a set of percentile dummies (D_k). Thus, we run the regression:

$$MPC_i = X_i\beta + \sum_{k=1}^{100} \gamma_k D_{ik} + \varepsilon_i$$

We then use the predicted value $\hat{MPC}_i = \sum_{k=1}^{100} \hat{\gamma}_k D_{ik}$ to compute the consumption effect of the means-tested program that can be attributed solely to the MPC heterogeneity across the cash-on-hand distribution, controlling for demographic characteristics. The triangle scatter in Figure 5 ("means tested-based transfer, conditional MPC") shows that around 75% of aggregate consumption growth should be attributed to MPC heterogeneity across the income distribution, and about one quarter to correlation between MPC and other variables. To illustrate, consider the case of a redistributive policy targeted at the bottom 10 percent of the population. The figures shows that aggregate consumption would increase by 0.091 percent. Of this increase, 0.069 per cent can be attributed to income distribution, and 0.022 percent to other characteristics.

6. Conclusions

We draw on survey questions in the 2010 Italian Survey of Household Income and Wealth that ask consumers how much they would consume of an unexpected transitory income change. We find that the marginal propensity to consume (MPC) is 48 percent on average, substantially higher than predicted by the standard intertemporal consumption choice model. This average masks very substantial MPC heterogeneity across households. Indeed, regression analysis uncovers four main

facts: (1) a strong negative correlation between MPC and cash-on-hand, (2) a relatively flat age profile of MPC until retirement, (3) a positive but often imprecisely measured correlation with unemployment, and (4) a negative association between being turned down for credit and the MPC. Our interpretation of the evidence is that the MPC distribution reflects the importance of income risk and expectations of future constraints in shaping consumption decisions. The results have important implications for evaluations of fiscal policy, and in particular predicting responses to tax reforms and redistributive policies. In particular, we find that a debt-financed increase in transfers of 1 percent of national disposable income targeted to the bottom decile of the cash-on-hand distribution would increase aggregate consumption by 0.82 percent. Furthermore, redistributing income from the top decile to the bottom decile of the income distribution would boost aggregate consumption by about 0.1 percent. One important caveat is that our calculations of the aggregate effects of fiscal policy are performed assuming no general equilibrium effects, and in particular that fiscal policy does not impact asset prices and that tax changes have no effect on labor supply. Hence, our calculations are likely to be an upper bound to the true effects of fiscal policy.

Appendix
Survey Questions

Propensity to spend

Imagine you unexpectedly receive a reimbursement equal to the amount your household earns in a month. How much of it would you save and how much would you spend? Please give the percentage you would save and the percentage you would spend.

Access to credit

1. Did the household contact a bank or financial company in 2010 with a view to obtaining a loan or mortgage?
2. Was the request granted in full, granted in part or refused?
3. Did your household later succeed in obtaining the amount needed, either from the same or from another financial intermediary?
4. During 2010 did you or a member of the household consider applying for a mortgage or a loan from a bank or financial company but later change your mind because you thought the request would be refused?

Financial literacy

1. Imagine leaving 1,000 euro in a current account that pays 1% interest and has no charges. Imagine that inflation is running at 2%. Do you think that if you withdraw the money in a year's time you will be able to buy the same amount of goods as if you spent the 1,000 euro today? The question is coded as: (1) Yes; (2) No, I will be able to buy less; (3) No, I will be able to buy more.

2. Which of the following investment strategies do you think entails the greatest risk of losing your capital? The question is coded as: (1) Investing in the shares of a single company; (2) Investing in the shares of more than one company; (3)

3. Which of the following types of mortgage do you think would allow you from the very start to fix the maximum amount and number of installments to be paid before the debt is extinguished? The question is coded as (1) Floating-rate mortgage; (2) Fixed-rate mortgage; (3) Floating-rate mortgage with fixed installments.

General understanding of the survey questions

At the end of the interview, interviewers are asked to evaluate the overall quality of the interview. The question we used was: “On a scale between 0 and 10, where 0 is the minimum and 10 the maximum, how would you evaluate the respondent’s level of understanding of the survey questions? “

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Figure 1. Self-reported MPC from transitory income shock

Figure 2. Average MPC by cash-on-hand percentiles

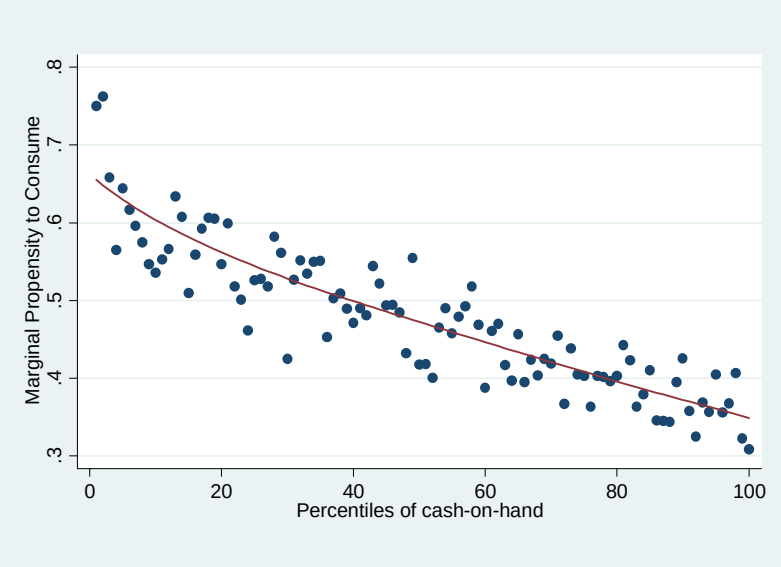

Figure 3. Fraction with MPC=0 by cash-on-hand percentiles

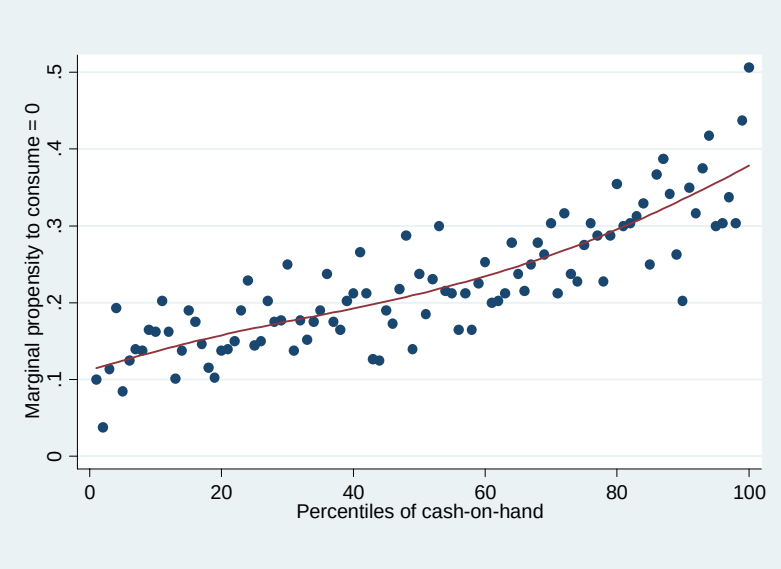

Figure 4. Fraction with MPC=1 by cash-on-hand percentiles

Figure 5: The effect of a redistributive transfer program

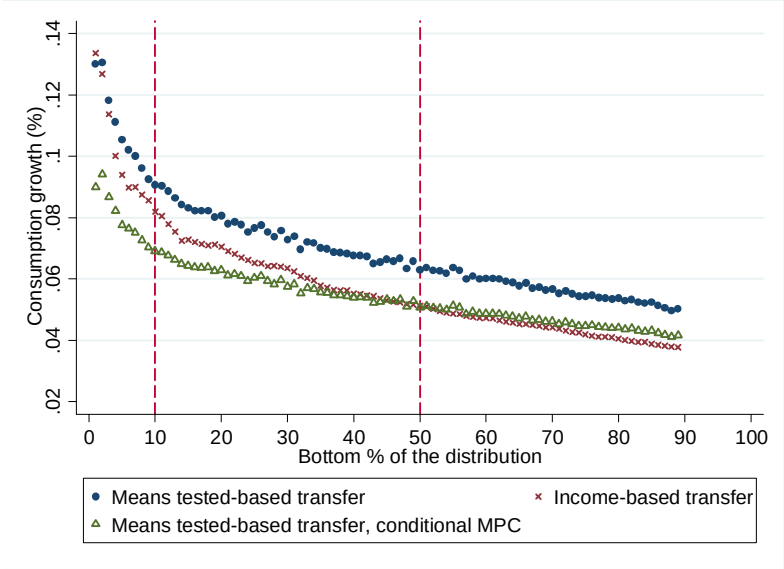

Table 1. Descriptive statistics

	Mean	*Standard deviation*	*Minimum*	*Maximum*
Marginal propensity to consume (MPC)	0.476	0.357	0.000	1.000
Age	58.374	15.761	18.000	99.000
Male	0.545	0.498	0.000	1.000
Married	0.623	0.485	0.000	1.000
Years of education	9.576	4.595	0.000	20.000
Resident in the South	0.324	0.468	0.000	1.000
Family size	2.495	1.257	1.000	12.000
City size less then 20,000	0.256	0.437	0.000	1.000
City size 20,000-40,000	0.182	0.386	0.000	1.000
City size 40,000-500,000	0.470	0.499	0.000	1.000
City size over 500,000	0.091	0.288	0.000	1.000
Cash (‘000 euro)	62.482	111.871	0.000	4381.469
Disposable income (‘000 euro)	33.089	24.530	0.000	587.784
Financial wealth (‘000 euro)	29.393	98.324	0.000	4154.771
Unemployed	0.035	0.185	0.000	1.000
Liquidity constrained	0.047	0.212	0.000	1.000
Overdraft	0.269	0.444	0.000	1.000
Credit card	0.320	0.467	0.000	1.000
Late payment	0.010	0.102	0.000	1.000

Note. Data are drawn from the 2010 SHIW. Total number of observations is 7,950.

Table 2. Baseline estimates

	(1)	(2)	(3)
Age 18-30	0.111	0.023	
	(0.034)***	(0.035)	
Age 31-45	0.106	0.042	0.040
	(0.018)***	(0.019)**	(0.019)**
Age 46-60	0.076	0.051	0.048
	(0.016)***	(0.016)***	(0.016)***
Male	-0.028	-0.016	-0.017
	(0.013)**	(0.013)	(0.013)
Married	-0.041	-0.013	-0.012
	(0.016)**	(0.016)	(0.016)
Years of education	-0.005	0.005	0.005
	(0.001)***	(0.002)***	(0.002)***
Family size	0.009	0.023	0.022
	(0.007)	(0.007)***	(0.007)***
Resident in the South	0.339	0.276	0.276
	(0.013)***	(0.014)***	(0.014)***
City size less than 20,000	-0.208	-0.193	-0.193
	(0.023)***	(0.023)***	(0.023)***
City size 20.000-40,000	-0.185	-0.174	-0.174
	(0.024)***	(0.024)***	(0.024)***
City size 40,000-500,000	-0.125	-0.120	-0.120
	(0.022)***	(0.021)***	(0.021)***
I cash-on-hand quintile		0.293	0.287
		(0.024)***	(0.024)***
II cash-on-hand quintile		0.186	0.184
		(0.021)***	(0.021)***
III cash-on-hand quintile		0.133	0.132
		(0.020)***	(0.020)***
IV cash-on-hand quintile		0.063	0.062
		(0.019)***	(0.019)***
Unemployed			0.070
			(0.034)**
N	7,950	7,950	7,950

Note. Estimation performed using Tobit. Standard errors are reported in parentheses. *indicates significance at the 10% level, ** significance at 5%, *** significance at 1%.

Table 3. Determinants of MPC: Age less than 60

	(1)	(2)	(3)
Age 18-30	0.036	-0.033	-0.035
	(0.034)	(0.034)	(0.034)
Age 31-45	0.032	-0.008	-0.008
	(0.017)*	(0.017)	(0.017)
Male	-0.045	-0.032	-0.032
	(0.016)***	(0.016)**	(0.016)**
Married	-0.050	-0.020	-0.018
	(0.022)**	(0.022)	(0.022)
Years of education	-0.010	0.001	0.001
	(0.002)***	(0.002)	(0.002)
Family size	0.005	0.019	0.019
	(0.008)	(0.008)**	(0.008)**
Resident in the South	0.338	0.269	0.269
	(0.018)***	(0.019)***	(0.019)***
City size less than 20,000	-0.176	-0.158	-0.158
	(0.030)***	(0.030)***	(0.030)***
City size 20.000-40,000	-0.178	-0.166	-0.166
	(0.031)***	(0.031)***	(0.031)***
City size 40,000-500,000	-0.099	-0.095	-0.095
	(0.028)***	(0.027)***	(0.027)***
I cash-on-hand quintile		0.321	0.315
		(0.031)***	(0.031)***
II cash-on-hand quintile		0.199	0.197
		(0.028)***	(0.028)***
III cash-on-hand quintile		0.123	0.122
		(0.026)***	(0.026)***
IV cash-on-hand quintile		0.070	0.070
		(0.025)***	(0.025)***
Unemployed			0.039
			(0.034)
N	4,315	4,315	4,315

Note. Estimation performed using Tobit. Standard errors are reported in parentheses. *indicates significance at the 10% level, ** significance at 5%, *** significance at 1%.

Table 4. Determinants of MPC: The role of disposable income and financial assets

	(1)	(2)	(3)
Age 18-30	0.038	0.033	-0.019
	(0.035)	(0.035)	(0.034)
Age 31-45	0.057	0.055	0.005
	(0.019)***	(0.019)***	(0.017)
Age 46-60	0.060	0.058	
	(0.016)***	(0.016)***	
Male	-0.013	-0.013	-0.026
	(0.013)	(0.013)	(0.016)
Married	-0.012	-0.011	-0.016
	(0.016)	(0.016)	(0.022)
Years of education	0.006	0.006	0.001
	(0.002)***	(0.002)***	(0.002)
Family size	0.022	0.021	0.019
	(0.007)***	(0.007)***	(0.008)**
I income quintile	0.115	0.110	0.115
	(0.028)***	(0.028)***	(0.036)***
II income quintile	0.058	0.055	0.050
	(0.024)**	(0.024)**	(0.031)
III income quintile	0.057	0.055	0.055
	(0.021)***	(0.021)**	(0.027)**
IV income quintile	0.032	0.031	-0.001
	(0.020)	(0.020)	(0.024)
I financial asset quintile	0.258	0.257	0.275
	(0.024)***	(0.024)***	(0.032)***
II financial asset quintile	0.146	0.146	0.149
	(0.022)***	(0.022)***	(0.029)***
III financial asset quintile	0.098	0.098	0.087
	(0.020)***	(0.020)***	(0.027)***
IV financial asset quintile	0.045	0.046	0.060
	(0.020)**	(0.020)**	(0.027)**
Homeowner	-0.003	-0.003	0.017
	(0.015)	(0.015)	(0.019)
Positive debt	-0.090	-0.090	-0.128
	(0.015)***	(0.015)***	(0.017)***
Unemployed		0.056	0.023
		(0.034)*	(0.034)
N	7,950	7,950	4,315

Note. Regressions include dummies for South and City Size (less than 20,000 inhabitants, 20-40,000, and 40,000-500,000. Estimation performed using Tobit. Standard errors are reported in parentheses. *indicates significance at the 10% level, ** significance at 5%, *** significance at 1%.

Table 5. Determinants of MPC: The role of liquidity constraints

	(1)	(2)	(3)	(4)
Age 18-30	0.023	0.024	-0.033	-0.033
	(0.035)	(0.035)	(0.034)	(0.034)
Age 31-45	0.047	0.048	-0.003	-0.003
	(0.019)**	(0.019)**	(0.017)	(0.017)
Age 46-60	0.052	0.053		
	(0.016)***	(0.016)***		
Male	-0.015	-0.015	-0.030	-0.030
	(0.013)	(0.013)	(0.016)*	(0.016)*
Married	-0.014	-0.014	-0.023	-0.022
	(0.016)	(0.016)	(0.022)	(0.022)
Years of education	0.005	0.005	0.000	0.001
	(0.002)***	(0.002)***	(0.002)	(0.002)
Family size	0.022	0.022	0.019	0.019
	(0.007)***	(0.007)***	(0.008)**	(0.008)**
I cash-on-hand quintile	0.293	0.292	0.326	0.322
	(0.024)***	(0.025)***	(0.031)***	(0.033)***
II cash-on-hand quintile	0.185	0.184	0.200	0.198
	(0.021)***	(0.022)***	(0.028)***	(0.029)***
III cash-on-hand quintile	0.133	0.132	0.125	0.123
	(0.020)***	(0.021)***	(0.026)***	(0.027)***
IV cash-on-hand quintile	0.062	0.062	0.070	0.069
	(0.019)***	(0.019)***	(0.025)***	(0.025)***
Unemployed	0.075	0.075	0.044	0.044
	(0.034)**	(0.034)**	(0.034)	(0.034)
Turned down for credit or discouraged	-0.125	-0.126	-0.176	-0.176
	(0.029)***	(0.029)***	(0.032)***	(0.032)***
Overdraft		0.013		0.000
		(0.014)		(0.018)
Credit card		-0.011		-0.007
		(0.015)		(0.019)
N	7,950	7,950	4,315	4,315

Note. Regressions include dummies for South and City Size (less than 20,000 inhabitants, 20-40,000, and 40,000-500,000. Estimation performed using Tobit. Standard errors are reported in parentheses. *indicates significance at the 10% level, ** significance at 5%, *** significance at 1%.

Table 6. Determinants of MPC: Measurement error

	Total sample	Excluding financial literacy <2	Excluding quality of interview less than 8
	(1)	(2)	(3)
Age 18-30	0.029	-0.006	-0.008
	(0.035)	(0.042)	(0.043)
Age 31-45	0.055	0.036	0.038
	(0.019)***	(0.022)	(0.023)*
Age 46-60	0.059	0.034	0.047
	(0.016)***	(0.019)*	(0.020)**
Male	-0.012	-0.027	-0.020
	(0.013)	(0.015)*	(0.016)
Married	-0.010	0.004	-0.018
	(0.016)	(0.020)	(0.021)
Years of education	0.007	0.002	0.005
	(0.002)***	(0.002)	(0.002)**
Family size	0.021	0.010	0.011
	(0.007)***	(0.008)	(0.008)
I cash-on-hand quintile	0.258	0.296	0.307
	(0.024)***	(0.030)***	(0.031)***
II cash-on-hand quintile	0.165	0.143	0.167
	(0.021)***	(0.025)***	(0.026)***
III cash-on-hand quintile	0.120	0.121	0.119
	(0.020)***	(0.023)***	(0.023)***
IV cash-on-hand quintile	0.054	0.047	0.056
	(0.019)***	(0.021)**	(0.022)**
Unemployed	0.075	0.066	0.093
	(0.033)**	(0.040)*	(0.047)**
Turned down for credit or discouraged	-0.131	-0.067	-0.145
	(0.029)***	(0.036)*	(0.038)***
Financial literacy	-0.009		
	(0.006)		
N	7,950	5,292	5,479

Note. Regressions include dummies for South and City Size (less than 20,000 inhabitants, 20-40,000, and 40,000-500,000. Estimation performed using Tobit. Standard errors are reported in parentheses. *indicates significance at the 10% level, ** significance at 5%, *** significance at 1%.

Table 7. Effect of transfer policy financed by debt

Policy: Transfer equivalent to 1% of national disposable income	***M = C/ Y*** ***(1)***	***Aggregate consumption growth*** ***(2)***
Homogeneous MPC		
(a) Transfer goes to bottom 10%	0.48	0.62%
Heterogeneous MPC		
(b) Transfer to bottom 10%	0.62	0.82%
(c) Transfer to top 10%	0.36	0.47%
(d) Transfer to households with unemployed members	0.58	0.76%

Note: National income is defined as □, where yi is disposable income of household i. In column (1), we report the aggregate MPC, computed as: □, where β_j is the individual MPC, gj is the transfer received by household j, and the subscript j indicates a transfer recipient. In column (2), we report aggregate consumption growth, defined as □, where c*i* denotes household consumption. In experiments (a) and (b), transfers are distributed equally among members of the first decile of the cash-on-hand distribution; in experiment (c), transfers are distributed equally among members of the top decile of the cash-on-hand distribution; finally, in experiment (d) transfers are distributed equally among households with at least one unemployed member.