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THE CONSUMPTION RESPONSE TO LIQUIDITY-ENHANCING TRANSFERS: EVIDENCE FROM ITALIAN EARTHQUAKES

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Exploiting three earthquakes in Italy as quasi-experiments, we analyse the response of homeowners' consumption to transfers targeted to finance housing repair and reconstruction. To the extent that funds are made available up-front, these transfers are akin to loans, mainly affecting the liquidity of households' wealth. We show that these transfers have little effect over a multi-year horizon—they are not a windfall. Yet, access to reconstruction transfers has a strong and significant effect on non-durable consumption on impact, especially for households with a low level of liquid wealth and bank debt. In contrast, we find no significant consumption change in response to the in-kind equivalent of cash transfers. Our study contributes to the recent literature on the dynamics of the consumption demand by the wealthy hand-to-mouth, providing micro-evidence in line with the main predictions of the theory.

The Consumption Response to Liquidity-Enhancing Transfers: Evidence from Italian Earthquakes*

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Abstract

Exploiting three Italian earthquakes as quasi-experiments, we analyze the response of homeowners' consumption to transfers targeted to finance housing reconstruction over time—which, like loans, mainly affect the liquidity of households' wealth in the short run. We show that transfers that have no effect on consumption over a multi-year horizon, can have significant heterogeneous effects on impact. The access to reconstruction funds strongly raises non-durable consumption by households with low liquidity and bank debt, but makes no difference for liquid households, or when cash accrues directly to firms—in line with recent analyses of the consumption dynamics of 'wealthy hand-to-mouth.'

JEL classification: E21, E62

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1 Introduction

Households with a positive net wealth should be in a position to smooth consumption in the face of temporary income and expenditure shocks. Yet, recent theoretical and empirical literature emphasizes that their ability to do so depends on the liquidity of their portfolios—namely, the overall costs of obtaining cash against their assets. By applying the methodology of Blundell et al. (2008) to data of the Panel Study of Income Dynamics, Kaplan et al. (2014) document that the consumption of "wealthy hand-to-mouth" households responds significantly to transitory income shocks. In the theoretical work after Kaplan and Violante (2014), "wealthy hand-to-mouth" are households with a large fraction of their wealth in illiquid assets (such as housing). Evidence consistent with the predictions of the theory is also provided, among others, by Misra and Surico (2014), who find a large propensity to consume out of the U.S. tax rebates among homeowners with high mortgage debt.[1]

In this paper, we contribute empirical micro-evidence to this literature by examining the impact of transfers that raise the liquidity of portfolios owned by the relatively wealthy, but not necessarily liquid, households. Using public transfer programs in the aftermath of three earthquakes in Italy as quasi-experiments, we analyze the consumption response of homeowners residing in a disaster area, who suffer damages to their housing units, and receive public money to finance repair and reconstruction work.

Our case studies qualify as suitable quasi-experiments on four grounds. The first is the randomness of the event that defines our treatment group. In the aftermath of an earthquake, homeowners both suffer from a random expenditure shock, due to the need of fixing damages to their housing, and benefit from the entitlement to reconstruction transfers. Moreover, the stock of housing in the disaster regions consists of historical buildings not conforming to anti-seismic norms—luxury and ordinary units are similarly vulnerable to damages from earthquakes. By this feature of the sample, the distribution of damages and thus of public transfers is unlikely to be systematically related to the households' wealth and liquidity levels. The second is the fact that the transfers considered in our analysis are strictly targeted to finance reconstruction work. Their amount is determined based on a technical assessment of the damages, and homeowners are required to carry out the work according to preset standards and document its costs—they cannot redirect funds at their discretion. However, in the short run, the cash accruing to households allows them to finance current consumption expenditure against lower consumption in the future. In this respect, the transfers in our analysis are akin to short-term loans. The third is that funds exclusively accrue to owner-occupiers, households who own real estate but may have a mortage and/or a low level of liquid assets. Finally, the amount of the transfers is large relative to households' current income.

The three case studies we focus on are (i) the 1980 earthquake in the South

[1] See Section 2 for a discussion of the recent contributions.

of Italy, a strong seismic event hitting a large geographical area including the regions of Campania and Basilicata; (ii) the 2012 earthquake in the Emilia region, which was less damaging and more concentrated geographically; and (iii) the 2009 earthquake which destroyed the city of L'Aquila and significantly damaged the area around this city. The selection of our three case studies is dictated by the availability of micro data, drawn from the Bank of Italy Survey of Households' Income and Wealth (SHIW).

In the case of the 1980 earthquake in the South of Italy, the transfer program was initially restricted to the residents in Campania and a small area in Basilicata; it was extended with a delay to cover the whole earthquake area in the Basilicata region. Exploiting the institutional features of government interventions, we can thus study the consumption behavior of homeowners with access to transfers in the earthquake area—our treatment group—against multiple control groups. Households in our sample are differentiated by (i) residence inside or outside the earthquake region, (ii) entitlement to transfers in the first or the second year after the disaster (which determines the timing of cash payments to homeowners). In the other two case studies, there was no delay in extending transfers to different groups of homeowners. Yet, we can exploit accurate information about the households' portfolio compositions (not available for the years of our first case study), so to refine our treatment and control groups depending on whether homeowners (with or without access to transfers) have a high/low liquid-wealth-to-income ratio and bank debt. Finally, the 2009 earthquake in Abruzzo differs from the other cases, in that the government directly paid the firms carrying out the reconstruction work, rather than providing homeowners with reconstruction funds. Hence we can analyze whether household consumption responds to transfers when these are in kind rather than in cash. In conducting our econometric analysis, we follow the literature and focus on nondurable consumption as the main variable of interest. In the case of earthquake, this choice helps us to minimize the risk of confusing consumption/saving choices with expenditures on replacing essential household items damaged in the earthquake.

Our main results are as follows. Using the 1980 case study we show that, over the 1980-1984 period as a whole, nondurable consumption by homeowners in the earthquake area eligible to receive the transfers is not significantly different from the consumption of homeowners residing outside the earthquake area—consistent with the fact that the transfers are targeted to finance reconstruction work on housing units. However, the consumption of the former group is significantly higher in the sub-period 1981-82, at the time when the programme is implemented and households gain access to funds—in our estimate, the impact marginal propensity to consume out of the transfers is 22 percent. This initial peak in consumption is then offset by a marked contraction in the following two years, 1983-84.

We are especially interested in verifying whether the consumption response is heterogenous across households with different wealth liquidity—detailed information on wealth is only available for the years of the earthquakes in Emilia and Abruzzo. In these two case studies, we can identify illiquid households, i.e. households with a relatively low liquidity-to-wealth ratio and bank debt. We can then

compare liquid and illiquid owner-occupiers residing in the earthquake region, with control groups defined by households with similar characteristics residing either in the neighboring Italian regions, or in the rest of the country. We obtain two complementary but distinct results. In our 2012 Emilia case study, where cash transfers are made to households, nondurable consumption by owner-occupiers rises significantly relative to the control group. Including all homeowners (liquid and illiquid) in the sample, our estimate of the marginal propensity to consume is not far from the average estimate for the South of Italy—27 vs. 22 percent. However, splitting the sample, we show that the significant response of the homeowners' nondurable consumption to transfers is driven exclusively by the behavior of illiquid households—liquid owner-occupiers in the earthquake area behave exactly like those in the rest of Italy. For the group of illiquid owner-occupiers, the marginal propensity to consume out of transfer is 57 percent, twice as high as our average estimate for the whole sample.

In our 2009 Abruzzo case study, where cash was paid out not to households, but directly to firms conducting reconstruction work, we detect no significant heterogeneity in households' consumption, whether they are liquid or illiquid. Together, these results provide evidence that the consumption response to cash transfers is systematically different from the response to their in-kind equivalent, in the form of repairing services, and hinges on the initial liquidity position of the household.

A key concern in our study is the possibility that the earthquakes may have direct or indirect effects on the consumption by resident homeowners which may conflate with the effects of the transfers. First, households may face the need to replace items destroyed or lost in the disaster, well in advanced to their natural wear-and-tear process. Second, in line with the literature on the topic, the earthquake may actually raise incomes and employment prospects in the area, driven by the demand for goods and services connected with reconstruction activities. Using the specific features of our first case study, we can address this concern by relying on residents in the earthquake area as a control group. In particular, in one of our exercises we are able to compare the consumption by owner-occupiers when they become eligible to transfers, with that by all the other residents in the earthquake area, who may be exposed to similar shocks and face a similar economic environment. The empirical evidence confirms the strong effects of transfers on the nondurable consumption of homeowners.

Our econometric exercises rely on microeconomic data drawn from the Bank of Italy Surveys of Household Income and Wealth (SHIW), providing detailed household-level information on disposable income, consumption, residential status, as well as employment status, education and age of the householder and the number of households components. In the years around the 1980 earthquake in the South of Italy, these Surveys mainly report repeated cross-sectional data; for the later earthquake episodes, they include a panel of households, as well as detailed information about households' portfolios. For our institutional analysis, we rely on a variety of public sources, including official documents and newspaper articles.

The rest of the paper is organized as follows. Section 2 maps our study in the literature. Section 3 is devoted to our 1980 earthquake case study, discussing facts, institutional details, study design, econometric methodology and results, in turn. Following a similar scheme, Section 4 is devoted to the 2012 earthquake in Emilia and the 2009 earthquake in Abruzzo. Section 5 concludes.

2 Relation to the literature

The main goal of our study is to investigate whether transfers targeted to finance the costs of fixing the housing damages caused by the random occurrence of an earthquake can have an effect on consumption, arguably through their impact on the liquidity of the households' wealth. Thus our study naturally relates to several strands of the empirical literature testing the role of liquidity constraints in consumption decisions.

To start with, we have already noted that the transfers in our study are akin to loans. Despite its preset destination, the cash made available up-front to households can be used to finance current consumption against future income and/or expenditure adjustment. From this perspective, our study can be brought to bear on the conclusions of empirical work assessing the consumption sensitivity to (variations in) credit availability, such as Gross and Souleles (2002). These authors document that the response to an increase in the supply of credit, i.e. a rise in credit card limits, is stronger for households close to their credit utilization rate limits. They interpret their result as evidence on the key role played by liquidity constraints in consumer behavior. Significant heterogeneity by income and wealth is also found in studies analyzing the impact of variations in housing wealth on spending. According to Mian and Sufi (2014) , for instance, an increase in housing prices has a strong impact on the consumption of low-income households, who aggressively borrow against housing equity to spend, but has virtually no effect on high-income households. Robust evidence on the consumption impact of changes in credit conditions is nonetheless difficult to produce, in light of the well-known issues in identifying supply and demand conditions separately: lenders may increase credit supply because they anticipate a strong credit demand; conversely, households may demand more credit in anticipation of large purchases.[2] The fact that in our quasi-experiments the entitlement to transfers is driven by the random effects of a natural disaster arguably lessens these endogeneity concerns.

Second, in our case studies, the transfers accrue exclusively to owner-occupiers, who on average are not poor, but are not necessarily liquid. A large share of owner-occupiers' wealth is invested in their house, hence, especially in financially repressed economies like the Italian regions in our sample, hardly accessible for consumption smoothing purposes (supporting evidence of deviations from the permanent income hypothesis in our sample is provided in Section 5 below).[3] By the

[2]To alleviate the endogeneity concerns, for instance, Gross and Souleles (2002) use detailed information about issuers' credit supply policy.

[3]Guiso et al. (1994) provide ample evidence that, historically, credit market imperfections in

same token, a significant share of owner-occupiers have a mortgage, requiring them to generate a steady cash flow to service their bank debt. From this perspective, our evidence can be brought to bear on the predictions of recent literature, especially after Kaplan et al. (2014), that transfers affect consumption by raising the liquidity of homeowners' overall portfolios.

While in our work we focus on natural disasters at local level using Italian data, our results—that the consumption of illiquid households significantly rises in the year in which the transfers are paid out—resonate with the findings of many contributions focused on crisis periods using U.S. data. Namely, studies of the U.S. fiscal stimulus payment episodes of 2001 and 2008 suggest that (i) overall, households spend a non negligible share of a cash transfer on nondurable goods, and (ii) there is significant heterogeneity in consumption responses due to differences in wealth liquidity and the degree of indebtedness of the homeowners. Regarding the 2001 stimulus, the cumulative change in expenditures on nondurable goods during the quarter of the tax rebate and the subsequent three-month period is estimated to be roughly 70 percent of the amount rebated (Johnson et al., 2006). Between 20 and 40 percent of the rebate is spent in the quarter when funds are received. This strong consumption response is measured *relative* to the control group of households that do not receive the rebate in that same quarter. For the same episode, Agarwal et al. (2007) show that the highest response is by households who are initially (most likely to be) liquidity constrained.[4] For the 2008 stimulus, Broda and Parker (2014), and Parker et al. (2013) conclude that a significant effect is detectable only in the quarter in which households receive their rebates. However, in that quarter the share of the stimulus payment spent on nondurable goods is large, in line with the estimates for the 2001 stimulus.

Both Shapiro and Slemrod (2009) and Misra and Surico (2014) stress pronounced heterogeneity in the response to the stimulus across recipients. In particular, in both episodes of U.S. tax rebates (2001 and 2008), Misra and Surico (2014) documents that half of the population does not respond to the rebates at all; 20% of households consume more than half of the cash—the response by the rest of the population being somewhere in between.[5] Moreover, these authors find the largest propensity to consume out of the tax rebate among households who own real estate and have a mortgage debt. Consistent with the evidence for the U.S., Jappelli and Pistaferri (2014) find that the MPC out of rebate checks in Italy is 0.65 for the lowest cash-on-hand households, and 0.30 for the highest. Relating this literature to our work, however, we should stress an important difference in studies of national versus local transfer programs. The former raise a number of general-equilibrium issues in the transmission of fiscal policy—ranging from po-

Italy have long been pervasive, limiting households' ability to borrow.

[4]Evidence on financing constraints at the household level is also documented by Jappelli (1990) and Jappelli et al. (1998) among others.

[5]Misra and Surico (2014) emphasizes that heterogeneity is likely to be blurred in analyses that split the sample only according to income groups, because a large marginal propensity to consume tends to be found for both low and high income households. In their findings, the spending propensity of a sizable fraction of high income/high debt households is significantly larger than the spending propensity of low income/non owner occupier households.

tential effects on market interest rates to the anticipation of higher taxation in the future—that are not as relevant in regional analyses. The earthquakes in our case studies had negligible effects on bond prices and policy rates at national level. The transfers accruing to the earthquake areas were not financed at all by local taxes.

Finally, our findings can be interpreted as a refinement of the conclusions from the earlier literature that, like ours, exploits natural disasters as quasi-experiments to study consumption behavior. Most notably, the work by (Sawada and Shimizutani, 2008) relies on retrospective surveys to analyze households' consumption around the 1995 earthquake in Kobe, Japan. These authors conclude that consumption is not smoothed by households who ex post consider themselves to be credit-constrained at the time of the disaster. Our findings further suggests that consumption behavior in the disaster area may have been significantly different depending on liquidity indicators.

3 The consumption response to reconstruction transfers: evidence from the 1980 earthquake in the South of Italy

This section focuses on our first case study, the major earthquake that hit the South of Italy on November 23, 1980. The earthquake affected a large area comprising two regions, Campania and Basilicata, with a combined population of about 6 million inhabitants (approximately 11 percent of the Italian population). Its effects were devastating. About 350,000 houses either collapsed or were seriously damaged and a much larger number suffered less serious damages. Moreover, the earthquake caused 2,734 deaths and left 8,850 people seriously wounded (*Commissione Parlamentare di Inchiesta*, 1991).

3.1 Institutional setting and study design

In response to the 1980 earthquake, the bulk of government interventions consisted of a massive transfer program aimed at speeding up reconstruction.[6] Based on the available official information (*Commissione Parlamentare di Inchiesta*, 1991), between 1981 and 1984 (the period of our interest for the empirical investigation) the Italian government mobilized resources up to 8 trillions of Italian liras, equivalent to about 28.5 percent of the 1981 GDP in the earthquake area. A sizeable part of these funds was targeted to rebuild private dwellings. Specifically, owner-occupiers of damaged housing units were entitled to receive a cash transfer towards expenditure needed to 'restore habitability'. By the end of 1989, the funds budgeted by the Italian government to finance private reconstruction amounted to 32 trillions liras.

[6]The overall response to the earthquake relied on a variety of instruments, ranging from emergency immediate assistance, to relieving young people from military duties (see Cipollone and Rosolia, 2007) and granting residents in the earthquake area a temporary tax relief.

The transfer program was restricted to owner-occupiers, and strictly targeted to finance repair and reconstruction work on the main household residence. The transfers covered repair work up to 110 squared meters; work on any additional squared meters was to be financed privately by the owners, while secondary and vacation residences only qualified for a small subsidy. The amount of funds was set according to technical estimates of the costs of repairing earthquake-related damages. These estimates were produced by technical employees of the municipalities, working in coordination with both local and central authorities, based on preset engineering and economic standards. Reconstruction was regulated by strict rules. Collapsed houses were to be reconstructed in the exact location and with the same characteristics as the pre-existing units. Owners were required to finance on their own any improvement relative to the pre-existing conditions. There was limited freedom in contracting workers: the government provided a list of (usually local) firms the households could contact to carry out the repair work. The 1991 report by the *Commissione Parlamentare di Inchiesta* emphasizes that, in the initial phase of the reconstruction period (1981-1984), public funds were allocated with a strict adherence to the reconstruction rules and technical parameters in the assessment of costs.[7]

Housing units included in the programmes were classified in three categories, ranked by the scale of the damage: (i) collapsed units, (ii) seriously damaged units, and (iii) mildly damaged units. In the case of houses in the third category, owners obtained the entire amount of the transfer up-front. In the case of houses in the first two categories, one fourth of the total transfer was provided up-front, at the time of the application for the transfer, and the rest upon providing documented expenditures and a technical report on the work done (Law 219/81). Importantly, with the official communication of the transfer, the households were open a credit line at a local bank, which provided the initial sum.

It is worth emphasizing that the stock of housing in this earthquake area, as well as in the areas considered in the next sections, consists of historical buildings not conforming to anti-seismic criteria: luxury and ordinary housing are similarly vulnerable to earthquakes. This observation motivates the maintained assumption throughout our empirical study, that in our sample the distribution of damages is random across homeowners with different wealth and liquidity levels, so that the public funds are not systematically related to these key characteristics of the households in our sample. In any case, our regression models include controls for the household disposable income and a variety of indicators such as the number of members of the household, as well as the age, the level of education and the employment status of the householder. These indicators are included to absorb household-specific differences in consumption expenditure.

[7] At the end of the 1980s, an extensive inquiry into corruption and criminal activities around the management of public funds for reconstruction was realized (*Commissione Parlamentare di Inchiesta*, 1991). The *Commissione* documents that, in general, illegal practices were very much contained in the first phase of reconstruction activities, that is before 1984, when most of the funds were targeted to individual households with very restrictive criteria. However, such practices were more prevalent in the second phase, when funds were targeted to public works.

The earthquake hit the Basilicata municipalities with an intensity and level of destruction comparable to Campania municipalities. Yet, the program was extended to the two areas in the earthquake regions at different times, mainly reflecting randomness in the political process. Virtually all municipalities in Campania were included in the program by mid 1981. Out of 549 municipalities in this region, 337 were included already by January, and another 205 by the end of May. In the Basilicata region, only municipalities right at the epicenter of the earthquake were included in the initial list. The law extending the transfer program to all Basilicata municipalities hit by the disaster was passed only later in the year, on November 13, 1981. As a result, accounting for the timing of administrative procedures, the payment of transfers in the two regions started in two different calendar years. The date of the earthquake (end of 1980) and the date of the program extension (end of 1981) allow us to use yearly data for 1980, 1981, and 1982 to distinguish the pre-earthquake year, and the early and late access to transfers.

A key concern in our study is the possibility that the earthquake has direct or indirect effects on homeowners' consumption which may conflate with the effects of transfers. In particular, to the extent that an earthquake results in the destruction of goods such as furniture and appliances, households may face the need to replace them much in advance to their natural wear-and-tear process. These material damages may thus translate into an exogenous earthquake-related shock, causing households in the earthquake area to raise their consumption expenditure irrespective of transfers. While this argument mainly applies to durable expenditures, it could possibly be extended to some nondurable items (e.g. clothing) as well.[8]

By the same token, consumption may respond to changes in incomes specifically driven by the earthquake. As is well understood, the sign of these changes is ambiguous. On the one hand, earthquakes typically result in a negative supply shock, due to the destruction of physical/infrastructure capital, correlated with firm exits or a drop in the level of production. On the other hand, new jobs and earning opportunities arise with the reconstruction activities and public transfers, generating a positive demand shock for goods and services produced in the earthquake area.[9] Indeed, several studies find that earthquakes have a non-negative impact

[8]Using our survey data, we can document evidence of an anomalous rise in durable consumption in the earthquake area, that can be interpreted as an indicator of an earthquake-related shock to expenditures on these goods. Namely, while information on total durable consumption is only available from 1980 on, we obtain a longer record using a subset of durable expenditures from the survey item "consumi reali," which records purchases of furniture, works of art and the like. For this variable, we calculate the percentage of households that report a non-zero expenditure, averaged over the four years before and after the earthquake, that is 1977-80 and 1981-84. In the regions adjacent to the earthquake area, this percentage falls across the two periods, from 10.24 to 7.66 percent. Against this negative trend, in the earthquake area the percentage of households reporting a non-zero expenditure rises from 8.66 to 12.55 percent. Hence, relative to the control group, the earthquake area records a 50 percent increase. In our findings the rise is stronger for owner-occupiers than for tenants.

[9]Work by Porcelli and Trezzi (2014) contrasts the negative supply effects of an earthquake with the positive multiplier effects of public work and tax cuts in the earthquake regions in Italy.

on average economic activity and growth (see Cavallo and Noy, 2009; Hochrainer, 2009; Noy, 2009). In line with this literature, we also find in our sample that the disposable of incomes rose relative to the control group of adjacent regions in Italy for three years, and return to the historical trend only in 1984. To illustrate how this can raise potential issues for our estimation, suppose realistically that incomes rise in tandem with reconstruction activities, and that the bulk of these activities start in Basilicata with some delay compared to Campania (accidentally following the same timing of the transfer program). Then, a hike in consumption in Campania one year before that in Basilicata could be driven by variations in disposable incomes, rather than the disbursement of public transfers.

Because of the possibility of these confounding effects, in our study we carry out Difference-in-Differences analysis using two complementary specifications of the empirical model. First, we will compare the consumption of owner-occupiers in the earthquake area (eligible to transfers) with the consumption of owner-occupiers outside the area. Second, we will run a model exploiting the variability within the earthquake area. Namely, focusing on the residents in the earthquake area only, we will compare the consumption of owner-occupiers when they become eligible to transfers, with that of all the other residents who may be exposed to similar shocks and face a similar economic environment. As already mentioned, in our empirical exercises, we control for a number of household and householder characteristics. Interestingly, these controls turn out not to play any role in our results.

3.2 Evidence on Homeowners' consumption

Our study relies on the Bank of Italy Survey of Households' Income and Wealth (SHIW). For the years around 1980, the SHIWs provide repeated cross-sectional, household-level data for about 4,000 households, representatives of the Italian population. The households in the disaster area amount to about 10 percent of the national sample; of these, about 50 percent are owner-occupiers.

The Surveys do not collect household-level information on earthquake related damages or transfers. However, since the transfer program was targeted to owner-occupiers, and initially restricted to only part of the earthquake area, we can rely on the households' residential status (owner-occupier) and residence/year (Campania from 1981 on, and Basilicata from 1982 on) to identify the households with access to reconstruction transfers.

3.2.1 Non-durable consumption after the earthquake

We start our investigation by analyzing the change over time in the consumption of owner-occupiers residing in the disaster area, relative to owner-occupiers residing outside it. As a control area, we can use either the rest of Italy or, to consider a more homogeneous sample, the regions adjacent to the disaster area. Since our conclusion does not depend on this choice, to save space we only report results for the comprehensive control group.

Our empirical analysis exploits data relative to the first phase of the program, in the period 1981-84, and distinguishes two subsamples: the two years immediately after the earthquake (1981-82), when households applied to and started to receive public transfers, and the period of reconstruction work in the following two years (1983-84). In particular, we adopt the following Difference-in-Differences regression model

$$C_{i,t} = \alpha + \eta_t + \delta A_i + \mu QUAKE_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $C_{i,t}$ is either nondurable consumption expenditure or its log; $QUAKE_{i,t}$ is an identifier of owner-occupiers residing in the disaster area over different periods, as detailed below; η_t is the time fixed effect, A_i is a dummy with value 1 for the disaster area and 0 otherwise, while $X_{i,t}$ is the vector of controls including household disposable income, key characteristics of the householder, such as age, education, employment status, sector where she works, and an index of the size of the municipality where the households live.[10]

Based on the above model, we carry out three distinct exercises, aimed to shed light on the evolution of the consumption responses to the transfers in the 1981-84 phase of the reconstruction programme. In the first exercise, we analyze the change in consumption between 1980 and the post-earthquake adjustment period 1981-1984 ($QUAKE_{i,t}$ is 1 for the period 1981-84). In the second exercise, we compare consumption in 1980 relative to 1981-82, the two years when the transfer program was implemented and households gained access to the funds ($QUAKE_{i,t}$ is 1 for period 1981-82). In the last exercise, we compare owner-occupiers consumption in the years 1981-82 and 1983-84, the core phase of reconstruction ($QUAKE_{i,t}$ is 1 for the period 1983-84 and we take 1981-82 as the base period).

Results Our estimation of (1) is shown in Table 1. In the table, we report results for each exercise twice: in Panel A, the dependent variable is the level of consumption; in Panel B, its logarithm. Results are consistent across the two specifications.

Our key finding is twofold. First, relative to the control group, homeowners in the disaster area do not rise their consumption over the time horizon of reconstruction work. The nondurable consumption by homeowners in the disaster area averaged over the 1981-1984 post-earthquake period, is not significantly different from their consumption in 1980. This result is consistent with the fact that, by design, the transfers in our analysis are not meant to be an income supplement, but specifically compensate for the costs of repairing damages after the random occurrence of the quake. It is worth noting that that this first finding addresses a potential concern, that transfers were generous (hence a gift) relative to the actual cost borne by the households. During the 1980 earthquake, housing repair costs were estimated by employees of technical offices at municipality level. While these

[10]Different from later surveys, the 1980-84 surveys do not report information on the composition of households portfolios, so we cannot exploit information on assets and debt to build indicators of wealth liquidity.

public officers were required to strictly apply technical criteria, and were expected to report to both local and central authorities, it might be possible that their estimates varied across households and locations—depending on the willingness of the technical employee of a municipality to circumvent checks and controls, and inflate estimates in favor of people with whom she/he had political and personal connections.[11]

Second, there are remarkable differences across subperiods: a strong expansion of consumption in 1981-82 is followed by a strong contraction in 1983-4. Compared to the pre-earthquake year 1980, nondurable consumption in the earthquake area rises significantly in 1981-82, when the transfer program was implemented and households gained access to funds—relative to consumption by households residing outside the earthquake area. Column 2 suggests that the difference amounts to about 9 percent. The initial increment in expenditure for nondurable consumption is followed by a pronounced contraction in 1983-84. This contraction is somewhat larger than the expansion in the previous two years, consistent with the result in column 1.

For comparison, we have also estimated equation (1) for the subgroup of tenants in our sample. For non homeowners, we do find no evidence of a consumption response in the earthquake area during the 1981-82 period; if anything, we tend to find a contraction.[12]

3.2.2 Controlling for the effects of the earthquake

In the analysis so far, we have compared owner-occupiers within and outside the earthquake area. As explained above, however, earthquakes may have economic effects that affect consumption independently of the transfer program. To control for these effects, in Table 2, we identify the response of consumption to transfers by comparing treatment and control groups selected from the sample of residents in the earthquake area, i.e. relying exclusively on households exposed to the earthquake shock. We restrict the sample to the period 1981-82.

In its general form, our empirical model can be written as follows:

$$C_{i,t} = \alpha + \lambda_1 D_t + \lambda_2 D_r + \beta_1 HS_s + \beta_2 TR_{r,t} + \beta_3 \left(HS_s \cdot TR_{r,t}\right) + \gamma X_{i,t} + u_{i,t}, \quad (2)$$

where $C_{i,t}$ is either nondurable consumption expenditure by household i in year t or its logarithm; HS_s (standing for 'Housing Status') is a dummy that equals one if the housing status s of the household is owner-occupier; $TR_{r,t}$ (standing for 'Transfer Region') is a dummy indicating when the region r is included in the transfer program—it equals one for households whose region of residence in

[11] By contrast, in later earthquakes, such as the 2012 quake in Emilia, the cost were estimated by the Protezione Civile, the central government agency in charge of homeland security.

[12] In principle, tenants' consumption may reflect a possible worsening of the housing rental market. As the stock of housing is damaged by the earthquake, market forces may put pressures on rents. There are however reasons to believe that this factor was weak in our case study. First, in the emergency the government provided free or subsidized housing to the displaced households (and rents were suspended when the housing units were not usable); second, and more importantly, the Law ("Equo Canone") regulated and capped rents in the 1980s.

1981 and 1982 was, respectively, Campania and Basilicata, and zero otherwise; D_r is a binary variable indicating the household region of residence (Campania or Basilicata) while D_t is a binary indicator that equals 0 in 1981 and 1 in 1982; $X_{i,t}$ denotes a vector of further control variables for household disposable income as well as other household or householder characteristics, as defined above.

The binary variable D_r controls for time-invariant differences in consumption across the two regions. Most importantly, the variable D_t takes care of nation-wide policies and cyclical factors, as well as changes in household expenditures which are side-effect of the earthquake unrelated to transfers.[13] The main coefficient of interest is β_3, attached to the interaction between the housing status and the region's access to the transfer program, namely $HS_s \cdot TR_{r,t}$. This coefficient measures how consumption differ across households in the earthquake area when they first gain access to the transfer programme, relative to other residents who are either not entitled to the program (tenants) or do not gain access to it in the same year.[14] In light of the fact that housing wealth is illiquid, and access to cash transfers is a compensation for prospective costs of repairing material damages, we naturally interpret β_3 as accounting for the liquidity effect of transfers on consumption.

Results The main results from estimating equation (2) are shown in Table 2. As in the previous table, in Panel A the dependent variable is the level of consumption; in Panel B the logarithm of consumption. In either Panel, the effect of transfers on homeowners' consumption is estimated relative to the alternative control groups. In columns (1) through (3) of the table, the control group includes homeowners in Basilicata in 1981 (before receiving cash in 1982), homeowners in Campania in 1982 (the year after they gained access to the transfer), as well as tenants in the earthquake area in both 1981 and 1982. In column (4), we drop the tenants from the sample, and thus HS_s and $TR_{r,t}$ from the regression model. Finally, the model specification of column (1) only includes the region and year dummies; that in column (2) includes the full set of controls but disposable income, which is then added in column (3). The specification in column (4) (without tenants) includes the full set of controls.

The empirical model essentially identifies the effect of transfers on spending by

[13] Together with the anomalous rise in durable consumption, after the earthquake we also note a significant rise in the spread of households' income in Campania and Basilicata. In particular, the variance of disposable income in the earthquake area is about three times higher in 1981 than in 1980. This result is statistically significant at standard confidence levels. No evidence of rising variability emerges when the same test is applied to the control area. Drawing on the argument by Dardanoni (1991), among others, we can interpret these changes in the variability of income as an indicator of a hike in income uncertainty.

[14] Observe that, if the variables D_r, HS_s and $TR_{r,t}$ are dropped our empirical model becomes similar to the baseline specification adopted by Parker et al. (2013), when a dummy variable is used to represent the stimulus payment. If, instead, the group of tenants (and the variable $TR_{r,t}$ and HS_s) are dropped than our specification becomes similar to that in Broda and Parker (2014) and also considered by Parker et al. (2013). In this case, the coefficient β_3 would capture differences in consumption only among households that receive the transfers and the identification would only rely on the delay of including Basilicata in the transfer program.

comparing consumption of homeowners in the years when they gain access to the transfer programme (the treatment group), with the consumption of households—including homeowners and tenants—that do not have access to the program during those years (the control group). Looking at the results in the first column: in the year homeowners gain access to the transfer cash, on average, they spend about 1 million of Italian liras more than the control group on nondurable goods. The difference corresponds to 15 percentage points (see column 1, Panel B). Notably, our estimates are *not* sensitive to adding controls: the coefficients are similar in magnitude in columns 2 and 3, where we run the complete specification, without and with the disposable income variable.[15]

Since tenants were not eligible to receive reconstruction transfers in any year, we include them in our regression model as a way to control for potential confounding effects of the earthquake on consumption: tenants face a variety of earthquake-related shocks that are also faced by homeowners, but do not receive cash transfers. In columns 2 and 3 of the Table, the variables HS specifically allows the average consumption of recipients of reconstruction funds to differ from that of non-recipients. Remarkably, the last column of the table suggests that our main conclusion does not hinge on this control. In fact, our estimated coefficient remains stable when we drop the tenants from the sample (and the variables HS and TR from the set of controls).

The estimated impact consumption response to transfers in this second model is consistent with the one obtained from our previous Difference-in-Differences model, for the two-year period 1981-82. A comparison of the two estimates suggest that the hike in consumption concentrated in the first year in which households gained access to the transfer.

3.2.3 Marginal propensity to consume

In our findings, nondurable consumption by owner-occupiers in the earthquake area follows the national trend over the post-earthquake period 1981-84 , yet it displays an economically and statistically significant short-run rise at the time of access to cash transfers. In this subsection, we translate this response in terms of the households' propensity to consume, by drawing on the official documents recording the total and per capita magnitude of transfers in the earthquake area during the 1980s.

Unfortunately, there is no single source providing a consolidated estimate of the transfers. We need to combine data on applications to funds with estimates of the costs of repairing and reconstruction activities by category of housing. Based on the available official documentation (*Commissione Parlamentare di Inchiesta*, 1991), the number of collapsed and strongly damaged housing units was $352,000$—a bit less than half the number of owner-occupiers residing in the disaster area.

[15] We should stress that the relative rise in nondurable expenditure by homeowners is not associated with a reduction in durable expenditure. As said before, the latter is actually rising on average in the earthquake area, possibly reflecting an earthquake-related shock to expenditure, more so for homeowners than for tenants (see the Appendix for details).

Owners of these units were entitled to receive, on average, a total transfer of 29 millions liras, and one fourth of this sum was paid up-front. Hence, we can estimate that overall, in the aftermath of the earthquake (1981-82) owner-occupiers received up to 2.5 trillion liras. To this amount, we need to add the funds provided to owners of housing units with mild damage (the third category of eligible housing units), amounting to about 1 trillion liras. This brings our estimate of the total transfers to eligible households in the period 1981-82 to 3.5 trillions liras. The 1981 Italian census in 1981 sets to about 800,000 the number of owner-occupiers residing in the earthquake area. Dividing through, we obtain an average transfer of 4.5 million liras per household.

The results from our empirical analysis suggest that, during the period 1981-82, the average expenditures on nondurables by owner-occupiers in the earthquake area rose by 1.2 million liras relative to the pre-earthquake year; about 80 percent of the increment occurred when households gained access to the transfer. We can thus provide an estimate of the marginal propensity to consume out of transferred cash at the start of the transfer program equal to 22 percent. Relative to the total transfers accruing to the earthquake region between 1981 and 1989, the increase in consumption in the two years after the earthquake is smaller, still as high as 7 percent.

Reassuringly, we obtain comparable estimates using alternative sources for calculating the per-household transfer, namely, the total disbursements from Law 219/81 and the *"Legge Stralcio."* According to the Law 219.81 (art. 3), over the three-year period between 1981 and 1983 the earthquake area was entitled to a total transfer sum of up to 5.7 trillions of 1981 liras. The "*Legge Stralcio"* instead mandated a total of 2 trillions for reconstruction and repairing work. Based on these figures, the implied marginal propensity to consume at the start of the transfer is very similar to the estimate given above.

4 Heterogeneity in the consumption response to transfers

In our first quasi-experiment, we find that owner-occupiers significantly respond to transfers that cover the costs of housing repair work—lending support to the idea that consumption rises in response to measures enhancing the liquidity of portfolios owned by relatively wealthy households. In this section, we investigate two further issues. The first is whether a higher average consumption by homeowners as a group conceals different responses within the group. We may expect that transfers had minimal impact on the consumption by unconstrained households with liquid wealth, but had very strong impact on the consumption by households with illiquid wealth. Only in recent years the SHIWs started to collect information on portfolio composition and liquidity that would allow us to refine our sample along these lines. Hence we use the 2012 earthquake in the Emilia region as a complementary quasi-experiment to address this issue. The second issue is whether the households' consumption responds differently to cash

transfers than the provision of the same services in kind, as was the case in the aftermath of the earthquake that hit the area around L'Aquila in the Abruzzo region in 2009.

4.1 The 2012 earthquake in Emilia: cash transfers

Relative to our first quasi-experiment, the Emilia earthquake, while strong, was less destructive, and more concentrated geographically. Hitting an area that comprises 15 percent of the municipalities in the region, it resulted in 30,000 damaged houses and a relatively low number of fatalities (27 in total).[16]

In response to the earthquake, the central government channeled 2.4 billions of euros to support housing repairing activities in 53 municipalities. Public interventions were initially regulated by the Law D.L. 74/2012. In this law, the Art. 3 (paragraph 1, letter a) funded grants for repairing housing damages, in favor of homeowners. Households were granted access to a tax credit against housing repair costs, associated with a public guarantee on bank loans (Law D.L. 95/2012). Specifically, Art. 3-bis entitled homeowners with a damaged housing unit to bank loans guaranteed by the State (hence issued at low interest rates). Against the cost of this loan, homeowners could claim a tax credit for the principal and interest paid over the years. In practice, households borrowed from banks at a low interest rate, and financed the cost of the loan by saving on taxes for a few years. According to the press and local sources, the program was implemented quite swiftly, with limited or no delay in setting up the administrative procedure.

4.1.1 Study design and econometric model

Recent SHIWs include a much richer set of information on households, compared to the SHIWs used in our first experiment. In particular, the recent surveys follow a panel of households. Thus, we can also estimate our model in growth rates, as well as in levels. In addition, the surveys include a wide range of questions on household portfolios, which enable us to refine the treatment group by distinguishing households according to indicators of liquidity.

The earthquake in Emilia occurred in the first semester of 2012—which is a survey year. Hence, we can study the consumption behavior of owner-occupiers in Emilia just after the earthquake. Our empirical model consists of the following Difference-in-Differences regression:

$$C_i = \alpha + \beta_1 HS_i + \beta_2 EMILIA_i + \beta_3 \left(HS_i \cdot EMILIA_i\right) + \gamma X_i + u_i, \qquad (3)$$

where C is the logarithm of the household nondurable consumption expenditure, HS (standing for 'Housing Status') is a dummy equal to one if the housing status of the household is owner-occupier, while *EMILIA* is a dummy equal to one for residents in Emilia in the year of the earthquake. The vector X contains the same controls used in our analysis of the 1980 earthquake (employment status of

[16] Unfortunately recent SHIWs no longer contain information that we can use to assess the response of durable expenditure.

the householder, disposable income and number of components of the household). As in the previous section, the parameter of interest is β_3: a significant positive estimate would indicate different consumption behavior for households receiving a transfer after the earthquake.

The control area is defined either by all Italian regions outside the disaster area, or by four regions adjacent to Emilia, namely, Liguria, Toscana, Marche and Umbria—excluding, in either case, the regions of Lombardia and Veneto, since some parts of these regions were also affected by the earthquake. It turns out that results are qualitatively identical across alternative definitions of the control group.

By exploiting the detailed information provided by recent waves of the SHIW, we can distinguish households according to whether they are liquid or illiquid. In particular, we build an index of wealth illiquidity, *ILLIQUID,* identifying the group of wealthy-hand-to-mouth owner-occupiers in our sample. Wealthy but illiquid households correspond to the group of owners of real estate (house and land) who, before the earthquake (at the beginning of 2011): (i) held liquid assets (the sum of cash and bank deposits) amounting to less than 50 percent of their disposable income and (ii) were in debt with a bank, e.g. had a mortgage. This definition draws on recent contributions to the literature on transfers. Specifically, the ratio of liquid wealth to income is in line with the definition proposed by Kaplan et al. (2014) and the work by Misra and Surico (2014), who—in revisiting the recent episodes of tax credit in US—show that the consumption response to transfers is stronger by mortgagors. It is worth stressing that, in our data, the group of owner-occupiers virtually overlaps with the subsample of households with positive wealth.

We test for the relevance of liquidity as follows. First, we add the index *ILLIQUID* interacted with $HS{\cdot}EMILIA$, to the baseline specification (3). Second, we split the sample according to this index and re-estimate our empirical model for the two subsamples (after dropping HS and $HS{\cdot}EMILIA$).[17] Third, we exploit the data panel to control for household characteristics (potentially correlated with the region of residence), by taking the first difference of household consumption with respect to 2010. In this last case, we estimate the following specification twice, for liquid or illiquid households, respectively:

$$\Delta C_i = \alpha + \beta EMILIA_i + \rho Z_i + \varepsilon_i. \tag{4}$$

where Z is the vector of controls, which now includes also the growth rate of disposable income.

4.1.2 Results

Results in level for the whole sample, including all tenants and owner-occupiers, are shown in the first two columns of Table 3. According to column (1), after the

[17] Note that according to our index of illiquidity two households are identified as illiquid tenants. Hence, we drop them from the sample. Results are however unchanged if we treat those households as liquid.

earthquake the nondurable consumption by all (liquid and illiquid) homeowners in Emilia is not significantly different relative to homeowners in the control area. However, this result conceals important heterogeneity in the response of different groups of households. In the specification in the second column of Table 3, we add to our baseline the index *ILLIQUID* interacted with *HS·EMILIA*. The coefficient of this interaction term is positive and significantly different from zero, indicating that the consumption by the illiquid homeowners is about 15 percent higher in Emilia than in the control area.

In the rest of the table, we restrict our analysis to homeowners only, and split this subsample according to the variable *ILLIQUID*. Columns (3) and (4) show that the consumption of homeowners in the earthquake area is significantly different from that of the control group for the illiquid households, but not the liquid ones. For the former group, the difference in consumption across areas is economically and statistically significant: the consumption of illiquid homeowners in Emilia is estimated to be 23 percent higher than that of the illiquid homeowners in the control area.

As regards robustness of our results, we start by noting that including liquid tenants to the specification in column (3) has virtually no effect on our estimates. Running a Difference-in-Differences regression on the larger sample, the estimate of the key coefficient is virtually the same as the one reported in the table (where the sample is restricted to homeowners). In addition, our results are not sensitive to extending the control area to the whole Italy. Once again, consumption in the earthquake area differs from the control only for the illiquid households (results not reported in the table).[18]

By running the model in growth rates, we show that the differential response across groups of households is not due to a possible upward bias in the level specification. As apparent from Table 4, our estimated consumption response become *stronger* when we run the model in the growth-rate specification: the point estimate of the post-earthquake nondurable consumption by illiquid homeowners is 25 percent higher in the earthquake area relative to the control area. As in the previous exercises, we do not detect any statistically significant difference for the liquid households (whether or not tenants are included in the sample).[19]

Finally, our results are not affected by including lagged consumption growth. We do so in the model shown in the last two columns of Table 4. The coefficient estimates are virtually unchanged relative to the other columns, suggesting that our results are not driven by differential trends of the consumption of illiquid homeowners unrelated to the transfers—i.e., the change in consumption we detect is specific to the Emilia region after the earthquake.

[18] In this dimension, our study contributes to a small literature exploiting natural disasters as quasi-experiments. Most notably, earlier work by (Sawada and Shimizutani, 2008) studies households' consumption around the 1995 earthquake in Kobe, Japan, based on retrospective surveys. These authors focus on the different behavior across households, depending on whether they were credit-constrained before the disaster.

[19] The table reports evidence relative to liquid homeowners without tenants. The same conclusion applies if we estimate a Difference-in-Differences regression adding tenants.

4.1.3 Marginal propensity to consume

Following the same methodology as for the earthquake in the South of Italy, we close our analysis by producing a comparable estimate of the marginal propensity to consume out of transfers of the Emilian households. Relative to our previous exercise, however, we are now able to provide an estimate specific to illiquid owner-occupiers.

From institutional sources (Law D.L. 95/2012 3-bis), we obtain an estimate of the total transfers as high as 6 billion euros. Based on the 2010 census, we can estimate the number of owner-occupiers in the Emilia provinces included in the disaster area, equal to 797,245, to derive a per-household transfer equal to 7,526 euros per household.

According to the result shown in column 1 of Table 3, the impact increase in consumption, averaged across liquid and illiquid owner-occupiers, is 2,000 euros. Hence, for the average owner-occupier in the region, the implied average propensity to consume out of the transfer amounts to 26.6 percent. Remarkably, this figure is not far from the corresponding, average, estimate for the earthquake in the South of Italy in 1980.

Focusing on illiquid households only (column 2 of the same table), however, the magnitude of the marginal propensity to consume changes markedly. The impact increase in consumption for this group is 4300 euros, implying a marginal propensity to consume as high as 57 percent, twice as high as the average not distinguishing across groups. This evidence suggests that the average surge in consumption that we detect in the 1980 case study in South of Italy—comparable to that found in Emilia—may also be to a large extent driven by the behavior of illiquid households.

Overall our results lend support to the hypothesis that the wealthy hand-to-mouth households significantly increase their consumption in response to transfers—in line with Broda and Parker (2014) and Misra and Surico (2014)—while households with liquid wealth do not, in line with the permanent income theory (see, for instance, Souleles, 1999). It is worth emphasizing that the magnitude of our estimates is not out of line with the results from the literature reviewed in Section 2 of the paper. Despite differences across type of experiments and institutional context, many studies find a comparably strong response to transfers.

4.2 The 2009 earthquake in Abruzzo: in-kind transfers

Based on our last quasi-experiment, we can shed light on the question of whether the nature of the transfers—whether in cash or in kind—makes a difference for households' consumption. The earthquake that hit the area around the city of L'Aquila in 2009 affected 57 municipalities, out of the 305 municipalities in the Abruzzo region. The epicenter was close to the city of L'Aquila, which suffered the most pervasive damages. The earthquake caused serious damages to 10,000 buildings, and resulted in 309 fatalities. Also in this case, the government implemented

a massive reconstruction program.[20] Unlike the other earthquakes in our study, however, the government paid directly the construction companies carrying out the reconstruction work, rather than financing this work by providing households with targeted funds. For this case study, the available survey data are for 2008 and 2010— the year before and the year after that of the earthquake.

We estimate a similar equation to that specified for the previous case study, replacing the dummy *EMILIA* with the dummy *ABRUZZO* and considering the group of households accordingly. Results are shown in Table 5. Different from the previous cases, we find no evidence of a rise in the non-durable consumption by homeowners residing in the earthquake region, regardless of whether the household is liquid or illiquid.[21] This evidence suggests that wealth illiquidity is not correlated with higher consumption growth in response to a transfer, if such transfer is in kind instead of cash.

5 Liquidity constraints

In the previous sections we have provided evidence that 'wealthy hand-to-mouth' households spend on non-durable goods a non-negligible share of cash transfers that accrue to them in advance of future financial commitments. Interpreting the cash transfers in our experiments as loans, we may think of our evidence as resulting from an ideal experiment in which all homeowners were 'forced' (by the shock) to take on a loan; homeowners with low wealth liquidity and bank debt acted consistent with the presence of binding liquidity constraints. According to this interpretation, if our illiquid households had access to a loan, they would have drawn resources to finance current expenditures on nondurables. We conclude our analysis by providing further (standard) evidence supporting this view.

In particular, we are interested in verifying whether, in our sample of homeowners, we can detect violations of the permanent-income hypothesis (PIH) which can be attributed to the presence of liquidity constraints. This exercise would complement our evidence by stressing the limited extent to which relatively wealthy owner-occupiers can rely on their housing wealth for consumption smoothing purposes in the years of our case studies in Abruzzo and Emilia. We focus on violations of two basic implications of the PIH: (i) changes in consumption should be a good predictor for current and future changes in income (Campbell and Mankiw, 1990); (ii) changes in consumption should not be correlated with past changes in income (Hall, 1978).[22] Results based on merging survey data for 2012 and 2010 are shown in Table 6. With the goal of emphasizing that our results are not driven by the households in the disaster area, the table report evidence for all Italian re-

[20] Public interventions were regulated by the Law D.L. 39/2009 (28 April) for the emergency phase, and by the Laws D.L.195/2009 and D.L. 83/2012 for the post-emergency phase.

[21] This is not to say that transfers were 'ineffective' as regards to demand and economic activity, but their assessment would require a study of firms dynamics operating in the area, and spillovers outside the earthquake area.

[22] See Jappelli and Pistaferri (2010) for a recent survey of tests of the permanent-income hypothesis and Guiso et al. (1994) for historical evidence on liquidity constraints in Italy.

gions but those hit by the two recent earthquakes, that is Emilia and Abruzzo. However, our conclusions are unaffected if we include all regions in the sample, or restrict the sample to the disaster areas only.

In the first two columns of Table 6, we report results about the predictive power of consumption changes for the two subsamples of liquid and illiquid homeowners, split according to our index of wealth liquidity. Note that the right-hand side of our regressions includes the lagged changes of both consumption and income—we test the predictive power of changes in consumption that are orthogonal to contemporaneous changes in income, so to avoid issues potentially raised by their correlation.

The difference across groups is apparent. For homeowners with a high wealth liquidity (column 1), the empirical evidence is consistent with the permanent-income hypothesis: changes in consumption anticipate future changes in income—over a horizon of two years. Conversely, for households with a mortgage and poor liquidity (column 2) changes in consumption do not have predictive power for future income. It is worth stressing that, across groups, there is no asymmetry as regards two important variables. The first is the lagged change in income; the second (not reported in the Table) is the change in the number of household components across the two dates, taken as a proxy for the growth in households' need for food between t and $t+2$ (see Zeldes, 1989). The coefficients on these two variables are basically the same across liquid and illiquid households. The key difference across groups concerns the coefficient capturing the role of liquidity.

Similar conclusions can be drawn from the results shown in column 3 and 4 of Table 6, where we exploit the other basic implication of the permanent-income hypothesis—that changes in consumption should not be correlated with past changes in income. The evidence suggests that changes in income are useful to forecast future changes in consumption for the group of illiquid homeowners, not (or very weakly so) for the liquid ones.

6 Conclusion

In this paper we make an empirical contribution to the body of literature providing micro-econometric evidence that liquidity is a key determinant of effects of transfers on consumption demand. We focus on three quasi-experiments, in which households receive sizable transfers against the costs of repairing housing damages caused by the random shock of an earthquake. The qualifying feature of two of our quasi-experiments is that, while these transfers have a strictly preset destination (financing reconstruction work), a significant share of funds is made available to eligible households up-front, in anticipation of future expenditure. Hence, by the very nature, these transfers are akin to loans: their key effect consists of rising the liquidity of households' portfolios in the short run. In all cases, by design, the transfer programme is targeted to households (homeowners) who are on average not poor but may not be liquid.

In our findings, the transfer programme has no effect on consumption of eligible

households over a multi-year horizon, when reconstruction takes place (a key result for the earthquake in the South of Italy). This evidence confirms the transfers in our studies are not a gift, over and above the cost of housing repair work. Yet, on impact, the access to cash up-front has a statistically and economically significant effect on homeowners' nondurable consumption.

Grouping liquid and illiquid households together, our estimates of the average marginal propensity to consume out the transfer funds are equal to 22 percent (South of Italy) and 27 percent (Emilia). This average estimates, however, mask important heterogeneity across groups. For the Emilia case study for which we have detailed data on wealth, we find that, despite eligibility to transfers, liquid homeowners in the disaster area behave no differently than homeowners residing outside the area. Conversely, the group of illiquid households features a very high marginal propensity to consume out of cash transfers, in our estimates equal to 57 percent. This evidence suggests that the average surge in consumption that we detect in the 1980 case study in South of Italy—comparable to that found in Emilia—may be an average combining the 'no response' by liquid households, with a large response by illiquid ones.

Finally, for our Abruzzo case study, where households receive the equivalent of the cash transfers in reconstruction services, i.e., in kind, we find no evidence of an increase in consumption, independently of the liquidity of a household's wealth. This result is a complementary piece of evidence supporting our conclusion, that the positive consumption response to transfers we detect in the other cases is driven by the homeowners' access to cash.

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Table 1: Consumption after the 1980 Earthquake in the south of italy

	(1)	(2)	(3)
Panel A: Nondurable consumption (level)			
QUAKE	-64.13	600.35**	-1215.70***
	(272.29)	(294.14)	(302.43)
Time FE	Yes	Yes	Yes
Quake Area FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Adjusted R^2	0.50	0.46	0.49
Observations	11078	6079	9395
Panel B: Nondurable consumption (log)			
QUAKE	0.04	0.09**	-0.11***
	(0.03)	(0.04)	(0.03)
Time FE	Yes	Yes	Yes
Quake Area FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Adjusted R^2	0.56	0.50	0.53
Observations	11078	6079	9395

Note: The table shows the results from Difference-in-Differences regression models, comparing owner-occupiers that reside in the disaster area with owner-occupiers in the rest of Italy. The left-hand side variable is the non-durable consumption in panel A and its natural logarithm in panel B. In column 1 and 2 we compare, respectively, nondurable consumption in 1981-84 and 1981-82 with consumption in 1980. In column 3 we compare consumption in 1981-82 with consumption in 1983-84. All regressions contain a dummy identifying the earthquake area, year-specific dummies, and the full set of controls detailed in the text. QUAKE identifies, respectively, owner-occupiers in the earthquake area during 1981-84 (first specification), 1981-82 (second specification) or 1983-84 (third specification). Standard errors are robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Consumption and Liquidity-enhancing Transfers: the 1980 earthquake in south of italy

	(1)	(2)	(3)	(4)
Panel A: Nondurable consumption (level)				
HS*TR	1081.82***	1072.30**	1085.48**	1395.72***
	(304.81)	(441.44)	(425.98)	(459.65)
TR (Transfer Region)		14.26	-233.99	
		(415.66)	(392.10)	
HS (Housing Status)		161.84	100.45	
		(371.78)	(364.14)	
Time FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Adjusted R^2	0.17	0.45	0.48	0.54
Observations	672	672	672	288
Panel B: Nondurable consumption (log)				
HS*TR	0.15***	0.16***	0.17***	0.16***
	(0.05)	(0.06)	(0.06)	(0.06)
TR (Transfer Region)		-0.03	-0.05	
		(0.05)	(0.05)	
HS (Housing Status)		0.01	0.01	
		(0.05)	(0.05)	
Time FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Adjusted R^2	0.15	0.48	0.50	0.52
Observations	672	672	672	288

Note: The table shows the response of nondurable consumption by homeowners at the time of access to the transfer funds. The sample consists of households in Campania and Basilicata during 1981-82. The left-hand side variable is the nondurable consumption in panel A and its natural logarithm in panel B. The variable HS (standing for Housing Status) is a dummy that is equal to one if the housing status of the household is owner-occupier; TR (for Transfer Region) is a dummy that is equal to one in the year t when the region of residence r is included in the transfer programme. In the first column we only control with region and year dummies. In the second column we add controls for the number of household components, the number of household earners and their unexpected earnings, a full set of dummies for human capital and occupations of householders. In the third column we also add disposable income. In the last column we report results excluding tenants from the sample. Standard errors are robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Consumption and Liquidity-enhancing Transfers: the 2012 earthquake in Emilia, Log Specification

	(1)	(2)	(3)	(4)
HS*EMILIA	0.06	0.03	0.05	0.23***
	(0.06)	(0.06)	(0.03)	(0.07)
HS*EMILIA*ILLIQUID		0.15**		
		(0.06)		
EMILIA	0.01	0.01		
	(0.05)	(0.05)		
HS	0.08*	0.08*		
	(0.04)	(0.04)		
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.50	0.50	0.46	0.53
Observations	1002	1002	634	164

Note: The table shows the response of nondurable consumption by homeowners in Emilia at the time of access to the transfer funds. The control area includes the regions of Liguria, Tuscany, Marche and Umbria, which are adjacent to Emilia. The left-hand side variable is the natural logarithm of non-durable consumption in 2012. EMILIA is a dummy identifying households in Emilia, HS is a dummy identifying owner-occupier householders, while ILLIQUID is a dummy identifying liquidity constrained households. It equals one if, at the beginning of the year before the earthquake, the level of household's liquid asset is lower than 50 percent of disposable income and the householder has a mortgage, and 0 otherwise. All equations include controls for the number of the components and the disposable income of the households, as well as for the age, human capital and occupation of householders. The first column reports our baseline specification. The specification in the second column adds the index of liquidity to the set of controls. In the last two columns we restrict our sample to homeowners and we split the sample according to whether homeowners are liquid (column 3) or illiquid (column 4). Standard errors are robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Consumption Growth after Liquidity-Enhancing Transfers in Emilia

	Liquid		Illiquid	
	(1)	(2)	(3)	(4)
EMILIA	0.03	0.06	0.23***	0.25***
	(0.03)	(0.03)	(0.06)	(0.06)
Lag ΔC	No	Yes	No	Yes
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.07	0.27	0.29	0.42
Observations	634	634	164	164

Note: The table compares the growth rate of nondurable consumption across homeowners residing in the Emilia region and the control area, including the regions of Liguria, Tuscany, Marche and Umbria. In the first two columns, the sample is restricted to the liquid households, while in the last two columns the sample is restricted to the illiquid ones (the definition of liquidity is reported in the text). The left-hand side variable is the bi-annual growth rate of non-durable consumption over the 2010-12 period. EMILIA is a dummy identifying households residing in Emilia. The set of controls includes the number of components of the household and the growth rate of its disposable income, as well as the householder's age, human capital and occupation. In the second and fourth columns we add the lag of consumption growth rate to the controls. Standard errors are robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Consumption Growth and in-kind Transfers: the 2009 earthquake in Abruzzo

	Liquid		Illiquid	
	(1)	(2)	(3)	(4)
ABRUZZO	0.04	0.07	-0.04	0.02
	(0.04)	(0.04)	(0.23)	(0.20)
Lag ΔC	No	Yes	No	Yes
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.10	0.23	0.05	0.22
Observations	703	703	158	158

Note: The table shows results from comparing the growth rate of nondurable consumption by homeowners in the Abruzzo region with that by homeowners in the control area. In the first two columns the sample is restricted to the liquid households, while in the last two the sample is restricted to the illiquid ones (the liquidity definition is reported in the text). The left-hand side variable is the bi-annual growth rate of non-durable consumption over the 2008-10 period. ABRUZZO is a dummy identifying households residing in Abruzzo. The set of controls includes the number of components and the growth rate of disposable income of the household, as well as the householder's age, human capital and occupation. In the second and fourth columns we add the lag of consumption growth rate to the controls. Standard errors are robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Forecasting Income or Consumption

	Income Growth		Consumption Growth	
	(1)	(2)	(3)	(4)
Lag ΔC	0.07***	0.03	-0.38***	-0.43***
	(3.75)	(1.24)	(-18.54)	(-12.95)
Lag ΔY	-0.39***	-0.37***	0.04*	0.10***
	(-11.71)	(-7.27)	(1.72)	(2.69)
Observations	3700	908	3700	908

Note: The table reports results from testing the predictive power of (i) consumption changes (ΔC) for future income (columns 1 and 2), and (ii) income changes (ΔY) for future changes in consumption (columns 3 and 4). We distinguish between liquid (columns 1 and 3) and illiquid (column 2 and 4) households according to the same definition of liquidity used in previous exercises and given in the text. As above, the set of controls includes the number of components of the household, as well as the age, education, employment status of the householder, the sector where she works, and an index of the size of the municipality where the household resides. To these controls, we add the lag income growth in columns 1 and 2 , and the lag of consumption growth rate in columns 3 and 4. The sample covers all Italian regions but those hit by the two recent earthquakes (Emilia and Abruzzo) for the years 2010 and 2012. Standard errors are robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.