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Abstract

Exploiting three earthquakes as quasi-experiments, we analyze the response of homeowners' consumption to public programs financing the costs of housing reconstruction, which increase households' liquidity significantly in the short run. Although over a multi-year horizon consumption is unaffected, upfront disbursement of funds has a sizable impact on the nondurable consumption of households with low liquidity and bank debt ('wealthy-handto-mouth'); it makes no difference for liquid households. The consumption of both groups of households is instead insensitive to funds paid directly to firms for reconstruction work, rather than channeled trough households.

Keywords: Consumption, Liquidity, Mortgage, Quasi-experiment

JEL Classification: E21, E62.

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1 Introduction

In this paper we contribute empirical evidence on the role of liquidity in determining households' consumption in the short run. A number of studies offer theoretical and empirical support to the view that consumption demand is highly sensitive to changes in the availability of cash-on-hand, not only among relatively poor, presumably credit-constrained households, but also among relatively wealthy households. At the theoretical level, leading contributions such as Kaplan and Violante (2014) have modelled the way in which cash-on-hand affects the scope for and the extent of consumption smoothing by households that may (optimally) keep a large proportion of their wealth in illiquid assets. Empirically, strong evidence is provided by at least two strands of the literature. One documents that transfers (taxes) significantly affect consumption demand at the time of disbursement (payment), far more than would be the case under the permanent income hypothesis (see, among others, Broda and Parker, 2014; Parker et al., 2013; Surico and Trezzi, 2016). Another strand shows that consumption responds strongly to changes in borrowing limits, in particular of credit card caps (Gross and Souleles, 2002). In this paper, we complement this literature with evidence that liquidity affects the consumption of relatively wealthy households, independently of changes in net income, as also independently of prior access to credit (such as credit cards). Most importantly, we document a strong response of consumption to liquidity variation that are not marginal but substantial relative to yearly income of the households.

Our analysis covers a sample of three major Italian earthquakes in whose wake government programs gave homeowners access to large amounts of public funds to finance reconstruction and repair work. The key point is that in all three cases, an earthquake (a random event) at one and the same time requires household expenditure for repairs or rebuilding and entitles households to public financial assistance, covering the outlay. In two case studies, by design, the reconstruction funds accrue to households. Everything else equal, these funds do not increase households' net income relative to the pre-earthquake level. However, crucially for our purposes, a large share (or in same cases all) the cash is transfered to eligible households up front, i.e. before the reconstruction. Effectively, the funds are akin to loans: the initial amount is paid out to households against the 'liability' of a flow of pre-committed disbursements over time. Given that the amounts credited are at the best equal to the reconstruction expenditure, their main effect is to raise households' liquidity in the short run. In our third case study, liquidity effect is ruled out altogether, as the funds are paid directly to firms.

Our sample comprises the earthquake in the Campania and Basilicata regions at the end of 1980, the Emilia Romagna region in 2012, and the Abruzzo region in 2009. In the first case, the reconstruction program was initially targeted to residents in virtually the entire Campania region but, for reasons explained in the text, only a small part of the quake-damaged zones in Basilicata. It was extended to this entire area with a year's delay, in 1982. We exploit this delay to contrast the consumption behavior of homeowners with and without access to public funds across different regions in the earthquake area in 1981. In the other two case studies, there was no delay in extending the program to different groups of homeowners. However, in these cases

we can exploit information on household portfolio composition that was not available at the time of the first case study. We can thus refine our treatment and control groups depending on whether homeowners have a high or low ratio of liquid wealth to income or have bank debt. In addition, we also control for lagged values of consumption to allay the concern that non-parallel trends could produce substantial bias in the results. The main reason for examining the 2009 earthquake in Abruzzo is that in this case the government did not transfer funds to households with which to pay rebuilding contractors, but paid the firms directly. So we can investigate whether household consumption responds to reconstruction funds with a change in one key dimension, namely whether they finance cash-on-hand as well as reconstruction services or only the latter, with no effect on short-run liquidity. For quake and reconstruction years we have detailed data on consumption, income, demographic and residential status at household level collected by the Bank of Italy. While the Bank of Italy surveys do not specify the amount of reconstruction funds going to single households, we can use the region of residence and residential status to identify eligible households.

We find that reconstruction funds do not change households' consumption over the multi-year reconstruction horizon, but do have they have a significant impact on consumption at the time when homeowners receive the cash. Specifically, in our first quasi-experiment, we find that nondurable consumption by eligible homeowners rises by a full 15 percent, compared with those resident in the disaster area but not (yet) having access to the funds. This is in relation to funding that we can estimate at about one third of the average yearly household income in the region. In the Emilia Romagna study the pattern is the same. Here, thanks to more detailed data, we also show that consumption rises significantly, by 22 percent, but only among homeowners with mortgage debt and low liquid assets—the wealthy-hand-to-mouth households. In the third case study on the Abruzzo quake, we find that when reconstruction funds go directly to firms, homeowners' consumption is unaffected, independently of their portfolio liquidity and mortgage debt. These results lend support to our hypothesis, that the consumption response is driven not by changes in net income but by variations in liquidity.

Key features of our case studies qualify them a suitable quasi-experiments. First, in the earthquake regions, the stock of housing consisted mainly of old buildings not up to anti-seismic specifications, such that luxury and ordinary housing was comparably vulnerable. The amount of public assistance to individual households was based on a technical and economic assessment of the work required to repair the damage to their primary home—regulated according to common standards and capped. Second, eligibility for funding was not related to households income, liquidity or wealth; nor did it was depend on the homeowner's credit history. As is explained further on, the initial exclusion of Basilicata homeowners outside the epicenter was due to interacting technical and political factors, with no systematic relation to the socio-economic profiles of the households. Together, these points suggest, for our purposes, that the fund assignment mechanism can be taken as effectively random. In addition, as already noted, the amount of funds granted was large in relation to average income in the disaster areas. Finally, as regards the data, while the Bank of Italy survey do not specify the reconstruction funds going

to single households, we can use the region of residence and residential status to identify eligible households.

In our empirical framework, we can address the problems raised by the fact that earthquakes certainly have direct or indirect effects on consumption beyond those of the rebuilding funds. One issue is that incomes and employment prospects may actually increase with the demand for goods and services connected with reconstruction activities. Our case study allows us to compare eligible homeowners (the treatment group) with control groups made up of other residents in the earthquake areas, who arguably face a similar economic environment. Most important, our first case study includes homeowners who resided in the disaster area but were yet initially excluded from the program (plus resident tenants). In all our case studies, we can run difference-in-differences models including homeowners and tenants outside the disaster area. Another issue is that in the aftermath of the disaster, household expenditures may also be driven by the replacement of essential household goods. To minimize the risk of confusing households' consumption/saving with this kind of expenditure, we take nondurable consumption as our dependent variable.

Relation with the literature Our work naturally relates to studies of the consumption effect of relaxing liquidity and credit constraints. Gross and Souleles (2002) show that the response to an increase in the supply of credit—i.e. a rise in credit card limits—is greater for households close to their credit utilization rate limits. Baker (2017) studies the response to income shock of indebted households, finding that it is stronger, the more the household is credit constrained.[1] Conversely, Aydin (2015) finds that credit availability has a large and significant effect on spending and that the effect is not necessarily limited to credit constrained consumers.[2] Further, Surico and Trezzi (2016) show that an increase in housing taxes led to a significant reduction in expenditure by owner-occupiers with mortgages—that is, households with a substantial illiquid assets but a low ratio of liquid assets to income. Gorea and Midrigan (2017) show that liquidity constrained households increase consumption in response to an unanticipated credit shock that loosens constraints on home equity borrowing. In our quasi-experiments, by contrast, access to funds is determined by the random occurrence of an earthquake: this produces a negative cash flow shock (the cost of repairing one's home) vis-à-vis which all owner-occupiers get funds, independently of their borrowing history and whether they are initially credit-constrained or unconstrained.

[1] In general, robust evidence on the consumption impact of changes in credit conditions is hard to produce, given the well-known difficulty of identifying supply and demand conditions: lenders may increase supply because they anticipate strong demand; conversely, households may demand more credit in anticipation of large purchases. In our quasi-experiments entitlement to funds is driven by the random occurrence of a natural disaster, which attenuates these endogeneity concerns.

[2] 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 house prices strongly affects the consumption of low-income households, who aggressively borrow against housing equity, but has virtually no effect on high-income households. Using the methodology proposed by Blundell et al. (2008), Kaplan et al. (2014) find that wealthy hand-to-mouth households have a high marginal propensity to consume out of transitory changes in income—a finding that is corroborated by Cloyne and Surico (2016) on a UK sample, using a "narrative approach".

In two critical dimensions, our main finding—that the consumption of illiquid households rises significantly in the year the public funds are received—also resonates with many works on U.S. stimulus programs during recessions. Studies relating to the U.S. fiscal stimulus in 2001 and 2008 recessions suggest that (i) overall, households spend a non-negligible share of cash transfers (on nondurable goods) and (ii) there is significant heterogeneity in consumption responses, owing to differences in homeowners' relative liquidity and indebtedness. These studies include Agarwal et al. (2007), who show that the strongest response comes from households who are initially most likely to be liquidity constrained; and Broda and Parker (2014), and Parker et al. (2013) concluding that a the 2008 stimulus had a substantial effect only in the quarter when households received their rebates.[3] In these studies, like ours, consumption varies far more than the permanent income hypothesis would suggest.

Finally, an earlier work (Sawada and Shimizutani, 2008), like ours, exploits natural disasters as quasi-experiments in consumption behavior; using survey evidence, these authors find that consumption is not smoothed by those households that considered themselves (ex post) to have been credit-constrained at the time of the disaster.

The rest of the paper is organized as follows. Section 2 is devoted to the 1980 earthquake case study, with an account of facts, institutional features, study design, econometric methodology and results. Following the same outline, Section 3 covers the 2012 earthquake in Emilia Romagna and the 2009 earthquake in Abruzzo. Section 4 concludes. An appendix documents the process by which reconstruction funds were allocated in Campania and Basilicata.

2 The response of consumption to reconstruction funds: Southern Italian earthquake of 1980

Our first case study bears on the major earthquake in the South of Italy on November 23, 1980. It affected two Italian regions, Campania and Basilicata, with a combined population of about 6 million (11 percent of the national population). About 350,000 houses collapsed or were seriously damaged and a much greater number suffered less serious damage (*Commissione Parlamentare di Inchiesta*, 1991).[4]

At the time, Italy disaster response capability the capacity was very limited—the Civil Protection Agency, the institution in charge of coordinating and organizing disaster relief, was not instituted until 1992. For instance it took days for the emergency relief teams just to reach some of the municipalities. Indeed, a few days from the quake, the President of the Republic, Sandro Pertini, in a TV address, vigorously denounced the failures and shortcomings of public institutions in assisting the quake victims.[5]

[3] Evidence on financing constraints at household level is also provided by Jappelli (1990), Jappelli et al. (1998) and Misra and Surico (2014)among others.

[4] The earthquake caused 2,743 casualties.

[5] For instance: "In 1970 the Italian Parliament enacted laws regulating emergency interventions in case of natural disasters. I now realize that these laws were never translated into practice, as no implementing regulations have ever been issued. I ask myself: if the emergency centers created by these laws were there, why didn't they work? How is it possible that 48 hours after the earthquake there is no sign of their presence in the area?"—

These institutional failings had two major consequences that are relevant to our studies. First, to circumvent the problem of inadequate capacity for direct public reconstruction activities, the government decided to speed up reconstruction by involving households and private firms in decentralized fashion.[6] From 1981 to 1984 (the period covered by our empirical investigation), the Italian government budgeted the equivalent of 28.5 percent of the earthquake area GDP in 1981 (8 trillion of Italian lire) for 'reconstruction.' Nearly half went to support households, financing private contractors to repair and build housing units (see *Commissione Parlamentare di Inchiesta* 1991). Second, while in order to release the funds the government laid down strict technical requirements, specialize personnel able to verify these requirements was in short supply. This general lack of resources for these technical surveys in an extensive and relative inaccessible territory translated into a severe underestimation of the time needed to complete the process. It took many months to survey the whole earthquake area and compile the full list of municipalities covered by the earthquake law—it was not completed until twelve months later. This in turn interacted with political factors. The regional government in Campania was more closely politically aligned with the central and this helped to determine the timing of the surveys in the two regions and the early inclusion of the municipalities in Campania under the earthquake law, already at the start of 1981 or by summer at the latest. The appendix provides some details on the lengthy process of revising the list of eligible municipalities.

2.1 Institutional setting and study design

The key to our empirical study design is the modalities of reconstruction. Let us start by describing the public program in some detail. The reconstruction law (Law 219/81) made owner-occupiers in precisely identified areas eligible for public funding for the work required to 'restore habitability' of their homes. The program was strictly targeted to primary residences; second and vacation homes qualified only for a small subsidy. The funds covered up to 110 square meters of repair work; more extensive repair work and any improvement or enlargement relative to the pre-quake state of the house were to be at the expense of the homeowner. The amount of funding was set according to certified estimates of the costs of repairing the damage. These estimates were produced by technical personnel employed by the municipalities working in coordination with both local and central authorities, and based on preset engineering and economic standards. There was limited freedom in selecting firms and there was a government list of prequalified (usually local) firms. The work had to be done according to preset standards and had to be documented.

It is worth stressing that, according to the parliamentary committee of inquiry into criminal infiltration and corruption in the reconstruction period, the initial phase (1981-1984) was relatively free of the problems that plagued the area later (Commissione Parlamentare di Inchiesta, 1991). The committee emphasized that in the early 1980s public funds were actually allocated

televised message to the nation by Sandro Pertini, November 27, 1980 (own translation).

[6]The overall response deployed a variety of instruments, such as immediate emergency assistance, temporary tax relief for residents, and exemption of young people from compulsory military service (see Cipollone and Rosolia, 2007).

accordingly to the rules and costs assessed according to technical parameters.[7]

One important characteristic of the quake area is that the stock of housing consisted of almost exclusively old if not historic structures, not built according to anti-seismic standards: so luxury and ordinary housing were similarly vulnerable to earthquakes. This is crucial to one of our assumptions, namely that the distribution of damage by wealth and income is random, and that receipt of public funds is therefore not systematically related to these household characteristics.

Housing units included in the programmes were classified into three categories by scale of damage: (i) collapsed, (ii) seriously damaged, and (iii) mildly damaged. The owners of category (iii) houses were paid the entire amount of reconstruction funds up front. Those in the first two categories received one fourth of the total upfront, upon application, and the rest over time as expenditures were documented and detailed progress reports presented (Law 219/81). Importantly for our purposes, the funds were disbursed by local banks, which opened specific credit lines.

2.1.1 Treatment and control groups

The intensity of the quake and the level of destruction were comparable in the Campania and Basilicata regions—the epicenter in fact was on the border. Yet as noted, by mid-1981, virtually all the municipalities in Campania were included in the program. Of the region's 549 municipalities, 337 were included already by January and another 205 by the end of May. In Basilicata region, only the municipalities right at the the epicenter were included in the list compiled in the first half of 1981. The law extending the program to all Basilicata municipalities affected was not passed until November 13, 1981. As a result, given the timing required to implement the law, actual disbursements began in different calendar years in the two regions. Since both the earthquake and the program extension twelve months later occurred near the end of the calendar year, the data for 1980, 1981, and 1982 can be treated as defining the pre-earthquake situation, an interim period when only Campania homeowners were entitled to funding, and a final period in which Basilicata homeowners too were eligible.

One concern is that earthquakes might have direct or indirect effects on consumption, possibly confounding the effects of the reconstruction funds. In particular, to the extent that an earthquake destroys furniture and appliances, households may have to replace them considerably earlier than usual. Such material damage may result in increased private expenditure, irrespective of reconstruction funds. And while this argument applies mainly to durable goods, it could possibly also extend to some nondurable items (e.g. clothing).[8]

[7] In the late 1980s the government initiated an extensive inquiry into corruption and criminal activities around the management of public funds for reconstruction (*Commissione Parlamentare di Inchiesta*, 1991). The parliamentary committee of inquiry fund that, in general, illegal practices were quite limited in the first phase of reconstruction activities, before 1984, when most of the funds were targeted to individual households with very restrictive criteria. But, became widespread in the second phase, when the funds were targeted to public works.

[8] Our survey data document a rise in durable consumption in the earthquake area. 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, i.e. 1977-80 and 1981-84. In the regions adjacent to the earthquake

Another concern is that private incomes also change in the aftermath of an earthquake. The sign of the change is a priori ambiguous. On the one hand, earthquakes typically produce a negative supply shock, namely the destruction of physical/infrastructure capital, correlated with firm exits and a drop in production. On the other hand, reconstruction itself generates new jobs and earning opportunities, increasing the demand for local workers and for locally produced goods and services.[9] In fact, several studies have found that earthquakes have a non-negative impact on average economic activity and growth (see Cavallo and Noy, 2009; Hochrainer, 2009; Noy, 2009). In line with this literature, in our sample disposable income rose relative to the control group of adjacent regions for three years, and returned to the historical trend only in 1984.[10] To illustrate how this may pose problems for our estimation, let us suppose —realistically— that incomes rise in tandem with reconstruction activities, and that the bulk of these activities start in Basilicata with a lag compared to Campania (accidentally duplicating the timing of the private reconstruction program). In this case a rise in consumption in Campania one year before Basilicata could be driven by variations in disposable income and not the disbursement of reconstruction funds.

In light of these considerations, we perform a difference-in-differences analysis using two complementary specifications of the model. First, we run a model exploiting the variability within the earthquake area. That is, considering only the earthquake, we compare the consumption of owner-occupiers when they become eligible for funds with that of all other residents—who may be exposed to similar shocks and who in any case face a similar economic environment. Second, we compare the consumption of home owners in the quake area with that of home owners outside the area.

Two comments are in order, concerning the interpretation of our results when home owners in Basilicata are included in the control group. As we have seen, Basilicata residents accessed funds only in 1982, but the political debate in the aftermath of the quake suggests that the extension of the official disaster area was largely anticipated already in 1981, at least from the summer on. If this is so, then changes in the consumption of Basilicata residents between 1981 and 1982 should mainly reflect variations in liquidity.

Second, the results of our second case study suggest that the response of home owners vary systematically with portfolio liquidity and mortgage debt. Although the household survey did not collect portfolio information in the early 1980s (and we lack independent evidence from other sources), it is plausible that the share of illiquid households among homeowners was not very different in the two regions—an important characteristic if Basilicata homeowners are to be taken as a suitable control group.[11]

All our regressions also include controls for the households disposable income and a vari-

area, this percentage falls from 10.24 to 7.66 percent, in the quake area rises from 8.66 to 12.55 percent. Hence, relative to the control group, the earthquake area records a 50 percent increase. In our data the rise is sharper for owner-occupiers than tenants.

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

[10] Results available upon request.

[11] For evidence on the incidence of credit market imperfections in Italy, see Guiso et al. (1994).

ety of indicators to absorb household-specific differences in consumption expenditure—such as household size, and age, education and employment status of the householder. These controls leave our results unaffected.

2.1.2 The Data

Our study relies on the Bank of Italy's Surveys of Households' Income and Wealth (SHIW), which provides detailed information on disposable income, consumption, residential status, as well as the employment status, education and age of the householder and the number of members. For the years of our first case study, the Survey provides repeated cross-sectional data for about 4,000 households (about 50 percent are owner occupiers), representative of the Italian population. For the years of the other earthquake episodes studied here, the surveys also include a panel of households, as well as detailed portfolio information.

The Surveys do not collect household-level information on earthquake related damage or public support. However, since the reconstruction funds were targeted to owner-occupiers, and initially restricted to only part of the quake area, we can use households' status (owner-occupier) and residence/year (Campania from 1981 on, Basilicata from 1982 on) to identify those with access to the funding program.

2.2 Empirical models and results

We now discuss our empirical findings on the initial impact of reconstruction funds and their effects over the multi-year horizon (embracing the bulk of private reconstruction). We close with an estimate of the marginal propensity to consume.

2.2.1 The impact effect

To study the impact response of consumption to the reconstruction funds, we compare the treatment group with our various control groups, carrying out three different exercises. In the first, we pool data of the two regions and compare homeowners at the time when they received funds, with the control group of excluded or not yet included households. In the second, we look at the evolution of homeowners' consumption from 1980 to 1982 relative to that of tenants, region by region. And third we analyze the changes in the consumption of owner-occupiers inside and outside in the disaster area, relative to owner-occupiers residing outside it.

In its general form, the empirical model estimated in 1981-82 can be written as follows:

$$C_{i,t} = \alpha + \lambda_1 D_t + \lambda_2 D_r + \beta_1 HS_s + \beta_2 RF_{r,t} + \beta_3 \left(HS_s \cdot RF_{r,t}\right) + \gamma X_{i,t} + u_{i,t}, \qquad (1)$$

where $C_{i,t}$ is nondurable consumption expenditure by household i in year t or its logarithm; HS_s (standing for "Housing Status") is a dummy equals to 1 for owner-occupier; $RF_{r,t}$ ("Reconstruction Funds" Region) is a dummy indicating the year when the region r is included—equal to 1 for households residing in Campania in 1981 and in Basilicata in 1982, and zero otherwise; D_r is a binary variable for region of residence (Campania or Basilicata)and D_t is a binary indicator

equal to 0 in 1981 and 1 in 1982; $X_{i,t}$ is the vector of controls, including household disposable income, key main characteristics of the householder (age, education, employment status, sector, and an index of the size of the municipality of residence).[12] The binary variable D_r controls for time-invariant differences in consumption between regions. Most importantly, D_t takes care of national policies, cyclical factors, and changes in household expenditures that are side-effects of the earthquake and unrelated to reconstruction funds program.

The coefficient we are interested in is β_3, attached to the interaction between housing status and regional access to funds, namely $HS_s \cdot RF_{r,t}$. This coefficient measures how consumption differs between the households first gaining access to the funds and other residents, including tenants (who are not entitled), and owner-occupiers who are entitled, but do not gain access in the same year.[13] Given that the funds represent compensation for prospective costs of repairs, we interpret β_3 as accounting for the effect of short-run liquidity on consumption.

Baseline results The main results of the estimation of equation (1) are presented in Table 1. In Panel A the dependent variable is the level of consumption, in Panel B its logarithm. In columns (1)-(2), the control group consists of homeowners in Basilicata in 1981 (who access the funds only in 1982), homeowners in Campania in 1982 (the year after they gain access), and tenants in the earthquake area in both years. Column (3) drops the tenants from the sample, and hence HS_s and $RF_{r,t}$ from the regression model.

The specification of column (1) includes only the region and year dummies; that in column (2) and (3), the full set of controls. The specification in column (3), without tenants, also includes the full set of controls.

Column (1) shows that in the year when homeowners gain access to the funds, on average, they spend on nondurable goods 1,000,000 of Italian lire (equivalent to about 2000 euros in 2016) more than the control group. This corresponds to 15 percent increase in consumption demand (see column 1, Panel B). Significantly, the estimates are *not* sensitive to adding controls: in column (2), with the full specification, the coefficients are similar in magnitude.[14]

Since tenants are never eligible for reconstruction funds, in our model they serve as a control for potential confounding effects. The tenants face a series of quake-related shocks that are faced by homeowners as well, but they do not have to pay for housing reconstruction. Thus considering the consumption of non-homeowners offers an additional control for the effects of public resources deployed in the general area over and above the reconstruction program for homeowners. In column 2, the variable HS specifically allows the average consumption of

[12] Unlike from later surveys, 1980-84 surveys do not have information on the composition of household portfolios, so we cannot exploit information on assets and debt to build indicators of wealth liquidity.

[13] Observe that if the variables D_r, HS_s and $RF_{r,t}$ 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, tenants (and the variable $RF_{r,t}$ and HS_s) are dropped then our specification becomes similar to that in Broda and Parker (2014) and in 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 in Basilicata's inclusion.

[14] The relative increase in nondurable expenditure is not associated with a reduction in durable expenditure. As noted earlier, also the latter rises on average in the earthquake area, possibly reflecting an earthquake-related shock to expenditure.

eligible homeowners to differ from that of the not eligible. The last column suggests that our main conclusion does not depend on the inclusion of tenants. In fact, the coefficient estimated remains quite stable when they are dropped from the sample (and the variables HS and RF from the set of controls).

Robustness One robustness check is related to the timing of the consumption change in different regions. So far we have pooled observations from the two regions,ignoring the possibility that one of them might exert a disproportionate influence on the results. We address this issue by re-estimating the model for each region separately by the following difference-in-differences model

$$C_{i,t} = \alpha_0 + \alpha_1 YEAR_t + \alpha_2 HS_s + \alpha_3 (HS_s \cdot YEAR_t) + \gamma X_{i,t} + u_{i,t}, \tag{2}$$

where $YEAR_t$ is the time fixed effect, HS_s identifies the owner-occupier and $X_{i,t}$ is the vector of control variables defined above. For each region we estimate the model for the period 1980-81 ($YEAR_t$ is 1 for the 1981) and 1981-82 ($YEAR_t$ is 1 for 1982). The coefficient α_3 gauges the effects of the program in a region, estimating the change in the mean difference in consumption between homeowners and tenants in the first year of funding—1981 in Campania (relative to 1980) and 1982 in Basilicata (relative to 1981).

The estimates shown in Table 2 are consistent with our previous results, and provide a sharper picture of the timing of the consumption response. In each region the consumption increase appears to be concentrated in the first year of funding. In 1981, in the almost immediate aftermath of the quake, only Campania homeowners raise consumption, while those in Basilicata actually reduce their consumption more than tenants (statistically significant at the 10 percent level only in the level specification). They rise their expenditure a year later, in 1982, when the program is extended to their region—note that the point estimate is larger than in Campania.[15]

The point estimates of the initial decline and subsequent increase in consumption in Basilicata are large compared to Campania. To the extent that owner-occupiers started to repair the damage using cash out of their own pockets, at first they presumably reduced nondurable consumption. But the interpretation of this result hinges crucially on the degree of confidence that households had, already in 1981, that the public program would be extended to their region. The greater this confidence, the greater the role of liquidity in their consumption choices. If they were certain anticipating reconstruction funds in 1982, the entire effect would be attributed to liquidity.

In the most general specification of the model, we control for the size of the municipality of residence. Campania has two coastal cities, Naples and Salerno, that are much larger than any other city in the earthquake area. In principle, the behavior of residents and/or the modalities of the reconstruction process areas in these metropolitan areas may be qualitatively different from smaller towns and rural areas. It is accordingly useful to verify that the results are not excessively influenced by these two cities. We therefore re-estimate the empirical models of Table 1 and Table 2 for Campania dropping Naples and Salerno. As the two cities are roughly the

[15]Results (not reported) are similar if we run the model with the log of consumption as dependent variable.

same distance from the epicenter—further away than all the other municipalities in the sample—our check restricts the treatment area to municipalities that are both more homogeneous in size and closer to the epicenter. Regardless of the specifications, the point estimates are very close to those obtained for the full sample. For instance, the rise in consumption (column 3 of Table 1) is still 13 percent even when we exclude residents of the two large cities; it comes down somewhat for the specification in level of Table 2, from 1,114,000 to 888,000 Italian lira. Overall, our main conclusions are thus unaffected.

2.2.2 Homeowners' consumption over a multi-year horizon

By design, in our analysis reconstruction funds are granted as compensation for a loss (the cost of repair or rebuilding), and so are caused by the random event of the earthquake. Thus in the logic of our quasi-experiment, we should expect the impact response of consumption to fade away over a multi-year horizon, as reconstruction proceeds and households sustain the costs. To investigate this issue, we now compare the change in the consumption of homeowners in the disaster area with that of homeowners outside it over different time horizons. Specifically drawing on the reports on reconstruction activities in the "first phase"(1981-84), we distinguish two sub-periods: the first two years (1981-82), when households apply for and start to receive the funds, and the next two years period of reconstruction work (1983-84). As control areas we use both the rest of Italy and the regions adjacent to the disaster area, so as to obtain a relatively more homogeneous sample. Since our conclusion does not depend on the definition of the control group, for brevity we only report the comparison with adjacent regions.

We adopt the following difference-in-differences regression model

$$C_{i,t} = \alpha + \eta_t + \delta A_i + \mu QUAKE_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t} \tag{3}$$

where $C_{i,t}$ is either nondurable consumption expenditure or its log; $QUAKE_{i,t}$ identifies owner-occupiers residing in the disaster area in different periods, as detailed below; η_t is the time fixed effect, A_i is a dummy taking value 1 in the disaster area and 0 elsewhere, and $X_{i,t}$ is the vector of controls defined in the previous subsection, after (1).

Based on the this model, we run three exercises. In the first, we analyze the change in consumption between 1980 and the post-earthquake adjustment period 1981-1984 ($QUAKE_{i,t}$ equals 1 for 1981-84). In the second, we compare consumption in 1980 with 1981-82, the years when the program was implemented and households gained access to the funds ($QUAKE_{i,t}$ equals 1 for 1981-82). In the last exercise we compare owner-occupiers consumption in 1981-82 and 1983-84, the core period of reconstruction work ($QUAKE_{i,t}$ equals 1 for 1983-84, and 1981-82 is the base period). Table 3 shows results for each exercise twice: in Panel A, the dependent variable is the level of consumption; in Panel B, its logarithm.

Our key finding is twofold. First, homeowners in the disaster area do not increase their consumption over the four-year reconstruction horizon relative to the control group. Averaged over 1981-1984, the nondurable consumption of homeowners in the disaster area does not differ significantly from 1980. It is worth pointing out that this finding helps to allay one potential

concern, namely that these funds constituted a sort of gift, i.e. were over-generous relative to the actual cost of repair or rebuilding.

Second, there are remarkable differences by subperiod: relative to households outside the earthquake area, the expansion of area residents consumption in 1981-82 is followed by a sharp contraction in 1983-84. Compared to 1980, nondurable consumption in the quake area rises significantly in 1981-82, when the program is implemented and households gain access to funds —by around 9 percent (column 2). The initial increment in nondurable spending is followed by a pronounced contraction in 1983-84, consistent with the result in column 1.[16]

2.2.3 Amount of funding and marginal propensity to consume

We conclude by summarizing our main result in terms of the marginal propensity to consume (MPC). Since the surveys do not have data on reconstruction fund receipts, we rely on official sources to calculate total and average amounts paid out by in 1981-82. No single source offers a consolidated estimate, especially for the sums paid in the first years after the quake. We combine data on applications for funds with estimates of the costs of repair and reconstruction by category of housing. Based on the official documentation (*Commissione Parlamentare di Inchiesta*, 1991), the number of collapsed or severely damaged housing units was $352,000$—a bit less than half the number of homeowners in the disaster area. On average their proprietors were eligible for 29 million lire, about one fourth of which (7 million) was paid up front. Hence, we can estimate that, in the aftermath of the earthquake (1981-82) these owner-occupiers as a group received up to 2.5 trillion lire. In addition, some funds went to the owners of the units that suffered only mild damage (about one trillion lire). This brings our estimate of the total funds paid out to eligible households in 1981-82 to 3.5 trillion lire. The Italian census of 1981 puts the number of homeowners' in the earthquake area at about 800,000, which gives an average disbursement of 4.5 million lire per household—roughly one third of average household income at the time —equivalent to $9,000$ euros in 2016.

The empirical analysis indicates that, relative to the control group, homeowner average expenditure on nondurable consumption in the year when they gained access to the program was about 1 million lire greater. Combining these figures: 1 million lire of additional consumption out of the average transfer of 4.5 million lire yields an average impact MPC out of liquidity of 22 percent.

[16] For comparison, we have also estimated an equation similar to equation (3) for the subgroup of tenants during the 1980-81 period and found some evidence of a contraction in consumption. We investigate whether this fall in tenants' consumption could reflect a possible worsening of the housing rental market. As the stock of housing is damaged by the earthquake, one may expect market forces to put pressures on rents. This explanation turns out to be weak in our case study. First, after the earthquake, the government provided free or subsidized housing to the displaced households; second, and more importantly, the Law ("Equo Canone") regulated and capped rents in the 1980s.

3 Heterogeneity in the consumption response: evidence from the earthquakes in Emilia Romagna (2012) and Abruzzo (2009)

In our first quasi-experiment, owner-occupiers as a group respond significantly to receiving funds for home repair work which supports the hypothesis that consumption rises in response to measures that increase liquidity, even when households are relatively wealthy (homeowners). In this section, we now use other episodes to inquire into two specific dimensions of this hypothesis. The first is whether higher average consumption overall may not conceal divergent responses within the group of homeowners. Reconstruction funds can be expected to have a smaller impact on households that are not liquidity-constrained by comparison with those that are, i.e. whose wealth is concentrated on a non-liquid asset (housing).

The second issue is whether consumption responds differently to funds transfered to the households themselves for purchasing reconstruction services, as opposed to funds channeled directly to the rebuilding firms, giving householders no access to cash.

3.1 The earthquake in Emilia Romagna of 2012

Compared with Irpinia earthquake , that in Emilia-Romagna earthquake, though strong, was less destructive and more concentrated geographically. It struck an area comprising 15 percent of the region's municipalities, damaging 30,000 houses.[17]

In response to the earthquake, the central government supported housing repair activities in 53 municipalities, with interventions initially regulated by the Decree Law 74/2012. Article 3.1 (a) funded grants for damage repairs by homeowners. Households were given a tax credit against repair costs, plus a government guarantee on bank loans (Decree Law 95/2012). Specifically, Article 3-bis entitled homeowners with a damaged unit to bank loans guaranteed by the State and hence at low interest rates, and offered a tax credit for the principal and interest paid over the years. In practice, households could borrow at low interest rate and finance the cost of the loan by tax savings over a number of 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. According to official sources—see Law D.L. 95/2012 3-bis—the funds transferred via this channel amounted to 6 billion euros, largely devoted to residential reconstruction.

3.1.1 Study design and econometric model

Recent household finance surveys (SHIW) have much richer information than those SHIWs used in our first experiment. First, the recent surveys follow a panel of households, so we can estimate our model in growth rates, as well as in levels. Second, they include a wide range of questions on household portfolios, so we can refine the treatment group distinguishing households according to indicators of liquidity.

The Emilia Romagna earthquake occurred in the first half of 2012—which was a survey year. Hence, we can study the consumption behavior of owner-occupiers in Emilia Romagna

[17] The fatalities amounted to 27.

just after the earthquake. Our empirical model consists of the following difference-in-differences regression:

$$C_i = \alpha + \beta_1 HS_i + \beta_2 EMILIA_i + \beta_3 (HS_i \cdot EMILIA_i) + \gamma X_i + u_i, \tag{4}$$

where C is the log of the household's nondurable consumption expenditure, HS ("Housing Status") is a dummy equal to 1 for homeowners, and *EMILIA* is a dummy equal to 1 for residents in Emilia Romagna in 2012. The vector X contains the same controls as in our analysis of the 1980 earthquake (employment status of the householder, disposable income and number of household members). As previously, the parameter of interest is β_3: a significant positive estimate would indicate a change in the consumption behavior of households when they received the reconstruction funds.

As control areas, we used either all the other Italian regions outside the disaster area or four adjacent regions namely, Liguria, Tuscany, Marche and Umbria, in both cases excluding the regions of Lombardy and Veneto, since some parts of these were also affected by the quake. The results are qualitatively identical for the various definitions of the control group.

Exploiting the detailed information provided by recent waves of the SHIW, we divide liquid and illiquid households, defining a dummy variable *ILLIQUID* that identifies wealthy-hand-to-mouth homeowners. These are property owners who, before the earthquake (at the beginning of 2011): (i) held liquid assets (cash and bank deposits) amounting to less than 50 percent of their disposable income and (ii) had bank debt debt, 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 show, in revisiting recent US tax credits, that the consumption of mortgage-holders responds more strongly to the transfers.

We test for the relevance of liquidity in several ways. First, we include the dummy *ILLIQUID* interacted with $HS{\cdot}EMILIA$, in the baseline specification (4). Second, we split the sample according to liquidity and re-estimate the empirical model separately for the two subsamples (after dropping HS and $HS{\cdot}EMILIA$).[18] Third, we exploit the panel data 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 case, we estimate the following specification separately for liquid and illiquid households:

$$\Delta C_i = \alpha + \beta EMILIA_i + \rho Z_i + \varepsilon_i. \tag{5}$$

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

[18] In our sample, all illiquid households but two are homeowners. While we exclude these two cases from the analysis, their inclusion does not affect our results.

3.1.2 The main results

Replicating our discussion of the 1980 earthquake, we now discuss our empirical findings first on the impact effects of reconstruction funds, then on their multi-year effect, and finally on the marginal propensity to consume.

The impact effect Results in level for the whole sample, including all tenants and owner-occupiers, are shown in the first two columns of Table 4. As column (1) reports, after the earthquake the nondurable consumption of all the homeowners (both liquid and illiquid) in Emilia Romagna is not significantly different from that of homeowners in the control area. But this result conceals considerably heterogeneity among different groups of households. The specification in the second column of Table 4 adds the index *ILLIQUID* interacted with $HS{\cdot}EMILIA$ as regressor. The coefficient of this interaction term is positive and significant, the consumption of the illiquid homeowners is about 14 percent higher in Emilia Romagna than in the control area.

In the rest of the table, we restrict the analysis to homeowners, and split this subsample according to the variable *ILLIQUID*. The consumption of illiquid homeowners in the earthquake area is significantly higher than that of their counterparts (column 4) in the control group, while there is no difference for liquid households (column 3). The increase in the consumption of illiquid homeowners in the earthquake region is economically and statistically significant: in our estimate they consume 20 percent more than those residing in the adjacent regions (column 4); our estimates drop to 15 percent (but it is still significant) when the residence of the control group is extended to all Italian regions (not shown).

Without reporting estimation results, it is worth noting that including liquid tenants as a control group in the specification of column (3) has no effect. Running a difference-in-differences regression on the larger sample, the estimate of the key coefficient is virtually the same as for the sample to homeowners only. Again, consumption in the earthquake area differs from the control only for illiquid households (results not reported). As for the level specification, our main estimate drops accordingly (but it is still significant) when the residence of the control group is extended to all of Italy.[19]

In Table 5, we run the model using the growth-rate specification. Our estimated consumption response is virtually the same as in the level specification. Again, we detect no statistically significant difference for liquid households whether or not tenants are included.[20]

Finally, the results are not affected by including lagged consumption growth (see the last two columns of Table 5). The coefficient estimates are basically unchanged indicating that the results are not driven by differential trends in the consumption of illiquid homeowners unrelated to the reconstruction program—that is, the observed change in consumption is specific to the Emilia Romagna region in the aftermath of the earthquake.

[19] Our results are unchanged if we excluding large cities in the region, especially Bologna, from the sample.

[20] The table reports evidence relative to illiquid homeowners, excluding tenants from the sample. The same conclusion holds if we estimate a difference-in-differences regression including tenants.

Overall the results lend support to the hypothesis that wealthy hand-to-mouth households respond significantly to receipt of liquid funds—in line with Broda and Parker (2014) and Misra and Surico (2014)—while liquid households do not, in line with the permanent income theory (see, for instance, Souleles, 1999). Although in this case the amount of funds was smaller than in the souther Italian quake, the magnitude of our estimates is not out of line with the results in this literature. Despite differences inn type of experiments and institutional context, many studies have found a comparably strong response to the payment transfer.[21]

The consumption response over a multi-year horizon. We analyze the nondurable consumption of Emilia Romagna homeowners through 2014, two years after the earthquake, essentially replicating the exercise performed in our previous case study. The results are shown in Table 6. As above, we consider two sub-samples of households divided according to our index of liquidity, and carry out our analysis using the log of consumption (columns 1 and 3) as well as the rate of consumption growth (columns 2 and 4). As inn the 1980 earthquake in the South of Italy, here again we find that, after the initial spike, the consumption of illiquid homeowners reverts to the level of the control group. For 2014, we observe no difference in those consumption expenditure between households in the earthquake area and those in neighboring regions, for either the liquid or the illiquid group. Consistently, the model specified in growth rate shows that the consumption of the illiquid households in Emilia Romagna slows down between 2012 and 2014 (last column).

3.2 The Abruzzo earthquake of 2009

Our third and last quasi-experiment is designed to determine whether households respond differently when they do not receive funds to purchase reconstruction services on their own but get the services directly, without access to cash. The earthquake that hit the Abruzzo region in 2009 affected 57 of the 305 municipalities of the region. The epicenter was close to the city of L'Aquila, which suffered the most severe and pervasive damages. The quake caused serious damage to 10,000 buildings.[22]

Also in this case, there was a massive government reconstruction program.[23] Unlike the other programs examined here, the government funds went directly to the construction companies that did the rebuilding, not to the households themselves.[24] In this case, the survey data available are for 2008 and 2010— the year before and the year after the earthquake.

As in the previous case, we again estimate equation 4, replacing the dummy *EMILIA* with the dummy *ABRUZZO* and grouping households by liquidity. The results are shown in Table

[21] Using the same methodology as for the earthquake in the South of Italy yields estimates of impact MPC out of liquidity in the range 0.5-0.8, depending upon model specification. As a note of caution, we recall that the quake came in a year of deep recession, arguably exacerbating the financial frictions affecting households. This may have been a contributing factor inn the impact effect of liquidity at the high end of the existing estimates.

[22] The fatalities amounted to 309.

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

[24] In sharp contrast with the 1980 earthquake, the Italian institutions—the Civil Protection Agency—had the technical and financial capability to intervene directly.

7. Unlike the previous cases, here there is on evidence of a rise in the nondurable consumption of homeowners in the earthquake region, regardless of liquidity. This suggests that wealth illiquidity is not correlated with faster consumption growth if public support is in kind rather than in fungible cash.

4 Conclusion

This paper sets out empirical evidence on the effects of liquidity—specifically, post-earthquake reconstruction funds—on consumption demand. These funds do not affect households spending over the reconstruction's multi-year horizon. On impact, however, when eligible households gain access to cash, they have a statistically and economically significant up-front effect on nondurable consumption.

The average response to reconstruction funds may mask heterogeneity across groups. In the Emilia Romagna case study, for which we have detailed data on wealth, we find that liquid homeowners in the disaster area who are eligible for rebuilding funds, do not behave any differently from homeowners outside the area. By contrast, illiquid households respond quite markedly—our estimates of the increase in nondurable consumption range from 15 to over 20 percent. And in the case of Abruzzo in 2009, when households did not receive cash but reconstruction services (the funds going directly to builders), we find no evidence of a consumption increase, regardless of liquidity. This result complements our conclusion that the positive consumption response to public funds observed in the other cases is driven by the households' early access to cash.

The sizeable effect of reconstruction funds that we detect raises a number of theoretical issues. One important consideration is that may or most of the households in our dataset may have been credit-constrained to start with—plausible in 1980 in the South of Italy as well as in 2012 in Emilia Romagna. We might think of the reconstruction funds as a universal loan, "forced by the occurrence of the earthquake" on every homeowner. Those with liquid wealth do not alter their consumption expenditure, those with illiquid wealth take advantage of the short-run availability of cash to bring their nondurable consumption forward in time. These would be consistent with the thesis that the reconstruction made their housing wealth, so to speak, more liquid—that is, as if these households benefited from a temporary fall in the cost of extracting liquidity from their portfolios. Our contribution consists in the empirical documentation of the strong demand effects of cash disbursements, which neither change the household's net income nor go to households manifestly at their borrowing limits.

A The evolution of the *Earthquake Law* in favor of the regions struck by the earthquake in the South of Italy in 1980

The process of determining which municipalities would be covered by the 'Earthquake law' began immediately after the disaster, decree Law 776 of 26 November 1980 (converted into Law 874 of 22 December 1980). The lengthy sequence of measures enacted testifies to the complexity of the process.

1. A government report at the end of December 1980 included an initial proposal for the list of municipalities, drawn upon behalf of the government by the Regional Council of Campania. It listed only 339 municipalities, all in Campania.

2. Decree Law 19 of 13 February 1981 contained an article specifying that funds could also be given to granted quake-damaged households in municipalities not on the lists.

3. Law 128 of 15 April 1981 provided that a new list of municipalities would be issued by 31 May and also clarified some issues concerning the contributions for urgent reconstruction of damaged houses as recognized by Decree Law 776.

4. The Ministerial Decree of 30 April 1981 and the Prime Minister's Decree of 22 May 1981 officialized the area affected by earthquake.

5. On 6 November 1981 a document drafted by the Prefecture of the Province of Potenza (Basilicata)—forwarded by the Ministry of the Interior to the Prime Minister's office—endorsed the considerations formulated by the President of the Basilicata concerning the need to complete the process of identifying of the regional municipalities affected by the disaster.

6. The Decree of the Council of Ministers of 13 November, 1981 (following further inspections) added the entire province of Potenza to the list of eligible municipalities.

B List of variables

The full list of variables used in our study comprises Nondurable consumption, Net disposable income, Imputed rents relative to net disposable income, Number of household members, Number of income earners in the household, and Age in years, plus dummies for:

- Whether the head of household is the main income earner;

- Education (none; elementary school; middle school; high school; bachelor's degree; post-graduate qualification);

- Main employment, branch of activity (agriculture; manufacturing, building and construction; wholesale and retail trade, lodging and catering services; transport and communication; services of credit and insurance institutions; general government; real estate and

renting services, other professional, business activities and other private and public services);

- Main employment, occupational status (blue-collar worker or similar; office worker or school teacher; manager; member of the arts or professions; sole proprietor; self-employed worker, including unpaid family workers)
- Secondary employment, work status (the same as employment occupational status, except the last group, which is not secondary employment);
- Irregular inflows of income;
- Population of municipality (up to 5,000; 5,000-20,000; 20,000-50,000; 50,000-200,000; over 200,000 inhabitants).

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Table 1: Consumption and early access to reconstruction funds: Earthquake in the South of Italy, 1980

	(1)	(2)	(3)
Panel A: Nondurable consumption			
HS*RF	1081.82***	1127.77***	1400.23***
	(304.81)	(429.77)	(459.37)
RF (Reconstruction Funds Region)		-255.23	
		(392.77)	
HS (Housing Status)		38.28	
		(362.57)	
Time FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Controls	No	Yes	Yes
Adjusted R^2	0.17	0.45	
Observations	672	672	288
Panel B: Log of nondurable consumption			
HS*RF	0.15***	0.15**	0.13**
	(0.05)	(0.06)	(0.05)
RF (Reconstruction Funds Region)		-0.06	
		(0.04)	
HS (Housing Status)		-0.02	
Time FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Controls	No	Yes	Yes
Adjusted R^2	0.15	0.48	0.50
Observations	672	672	288

Note: The table shows the response of homeowners' nondurable consumption at the time of access to the reconstruction funds. The sample consists of homeowners and tenants in Campania and Basilicata in 1981-82 in the first two columns, whereas it consists of homeowners in the last column. The left-hand side variable is nondurable consumption in Panel A and its logarithm in Panel B. The variable HS (for Housing Status) is a dummy that is equal to 1 for homeowners; RF (for Reconstruction Funds) is a dummy that is equal to 1 if the region is covered by Earthquake law. Controls refer to covariates for disposable income (or its logarithm in Panel B), the number of household members (or its logarithm in Panel B), the number of household earners, the age of the head of household, imputed rent as a share of disposable income, a full set of dummies for whether the head of household is the main income earner, the human capital and occupations of householders; irregular inflows of money, and population of the municipalities. Standard errors (reported in parentheses) are heteroskedasticity-robust. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Consumption and early access to reconstruction funds: further evidence on the earthquake in the South of Italy

	Campania		Basilicata	
	1980-81	1981-82	1980-81	1981-82
Panel A: Nondurable consumption				
HS*YEAR	1114.9***	-607.1	-1988.4*	3704.0**
	(330.4)	(457.5)	(1109.2)	(1704.1)
HS	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.41	0.43	0.77	0.73
Observations	579	599	90	73
Panel B: Log of nondurable consumption				
HS*YEAR	0.14**	-0.10	-0.02	0.40*
	(0.06)	(0.06)	(0.20)	(0.20)
HS	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.50	0.49	0.79	0.77
Observations	579	599	90	73

Note: The table shows results of Difference-in-Differences models—for Campania in the first two columns and Basilicata in the last two—to compare the behavior of homeowners and tenants before and after access to reconstruction funds. Each sample always consists of both homeowners and tenants. The left-hand side variable is nondurable consumption in Panel A and its logarithm in Panel B. YEAR is a dummy which equals 1 in 1981 (first and third columns) or 1982 (second and fourth columns) and 0 otherwise. HS (for Housing Status) is a dummy that is equal to 1 for homeowners, owner-occupier. Controls are the same as in Table 1. Standard errors (reported in parentheses) are heteroskedasticity-robust. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Consumption after the Earthquake in the South of Italy, 1980

	(1)	(2)	(3)
Panel A: Nondurable consumption			
QUAKE	143.43	635.11**	-1044.96***
	(279.91)	(288.43)	(317.68)
Time FE	Yes	Yes	Yes
Quake Area FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Adjusted R^2	0.56	0.56	0.56
Observations	11078	6079	9395
Panel B: Log of nondurable consumption			
QUAKE	0.03	0.06	-0.7**
	(0.03)	(0.04)	(0.03)
Time FE	Yes	Yes	Yes
Quake Area FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Adjusted R^2	0.70	0.68	0.67
Observations	11078	6079	9395

Note: The table shows the results of Difference-in-Differences models, considering homeowners (owner-occupiers) in the disaster area and homeowners who reside in adjacent regions (South of Italy and Lazio). Columns 1 and 2 compare, respectively, nondurable consumption in 1981-84 or 1981-82 with that in 1980. Column 3 compares consumption in 1981-82 with that in 1983-84. QUAKE identifies homeowners in the earthquake area in 1981-84 (first specification), 1981-82 (second specification) or 1983-84 (third specification). All regressions contain a dummy for the earthquake area, year-specific dummies, and the the full set of controls as in Table 1. Standard errors (reported in parentheses) are heteroskedasticity-robust. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Consumption, Liquidity and Reconstruction Funds. Earthquake in Emilia Romagna, 2012

	(1)	(2)	(3)	(4)
HS*EMILIA	0.10*	0.08	0.05*	0.20***
	(0.05)	(0.06)	(0.03)	(0.06)
HS*EMILIA*ILLIQUID		0.14***		
		(0.05)		
EMILIA	-0.03	-0.03		
	(0.05)	(0.05)		
HS	-0.05	-0.05		
	(0.04)	(0.04)		
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.56	0.56	0.51	0.61
Observations	1002	1002	634	164

Note: The first two columns show the results from Difference-in-Differences models, considering homeowners (owner-occupiers) and tenants in Emilia Romagna and adjacent regions (Liguria, Tuscany, Marche and Umbria) in the year of access to the reconstruction funds (2012). The left-hand side variable is the logarithm of nondurable consumption. EMILIA is a dummy identifying households in Emilia Romagna, HS is a dummy identifying homeowners, ILLIQUID is a dummy identifying liquidity-constrained households which equals 1 if household's liquid assets, at the beginning of the year before the earthquake, were less than 50 percent of disposable income and the householder had a mortgage. The last two columns drop tenants and split the resulting sample of homeowners into liquid (column 3) and illiquid (column 4). Controls refer to covariates for the logarithm of disposable income, the logarithm of the number of household members, the number of household earners, the age of the head of household, a full set of dummies for whether the head of household is the main income earner, the human capital and occupations of householders, and population of the municipality. Standard errors (reported in parentheses) are heteroskedasticity-robust. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Consumption, Liquidity and Reconstruction Funds: specification in growth rates. Earthquake in Emilia Romagna, 2012

	Liquid		Illiquid	
	(1)	(2)	(3)	(4)
EMILIA	0.03	0.06*	0.22***	0.24***
	(0.03)	(0.03)	(0.06)	(0.06)
Lag ΔC	No	Yes	No	Yes
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.07	0.26	0.31	0.44
Observations	634	634	164	164

Note: The table compares the two-year growth rate (2010-12) of nondurable consumption of homeowners residing in Emilia Romagna with those in adjacent regions (Liguria, Tuscany, Marche and Umbria). EMILIA is a dummy identifying households residing in Emilia Romagna. The second and fourth columns add the lag of consumption growth rate to the baseline set of controls. The division of household in liquid (columns 1-2) and illiquid (columns 3-4) depends on the dummy ILLIQUID, which equals 1 if, at the beginning of the year before the earthquake, the household's liquid assets were less than 50 percent of disposable income and the householder had a mortgage. Controls refer to covariates for two-year growth rates of disposable income, and number of household members, the age of the head of household, two-year variation in the number of household earners, a full set of dummies for whether the head of household is the main income earner, the human capital and occupations of householders, and [?the division of municipalities by resident population?].Standard errors (reported in parentheses) are heteroskedasticity-robust. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Consumption, Liquidity and Reconstruction Funds: Further Results for the earthquake in Emilia Romagna, 2012

	Liquid		Illiquid	
	2014	2012-14	2014	2012-14
EMILIA	0.06	-0.03	0.01	-0.16*
	(0.04)	(0.04)	(0.08)	(0.09)
Lag ΔC	No	Yes	No	Yes
Controls	Yes	Yes	Yes	Yes
Adjusted R^2	0.49	0.11	0.53	0.30
Observations	397	397	105	105

Note: The table compares nondurable consumption (either log-level at 2014 or growth rate over 2012-14) across homeowners residing in Emilia Romagna and adjacent regions (Liguria, Tuscany, Marche and Umbria). EMILIA is a dummy identifying households residing in Emilia Romagna. In the first and third columns controls refer to covariates for the logarithm of disposable income, the logarithm of the number of household components, the number of household earners, the age of the head of household, a full set of dummies for whether the head of household is the main income earner, the human capital and occupations of householders, and the division of municipalities by resident population. In the second and fourth columns controls refer to covariates for bi-annual growth rate of disposable income, bi-annual growth rate of the number of household components, the age of the head of household, bi-annual variation of the number of household earners, a full set of dummies for whether the head of household is the main income earner, the human capital and occupations of householders, and the division of municipalities by resident population. Standard errors are heteroskedasticity-robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Consumption and in-kind Reconstruction Funds. Earthquake in Abruzzo

	Liquid		Illiquid	
	(1)	(2)	(3)	(4)
ABRUZZO	0.04	0.07	-0.07	0.00
	(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	0.06	0.23
Observations	703	703	158	158

Note: The table compares the bi-annual (2008-10) growth rate of nondurable consumption across homeowners residing in Emilia Romagna and adjacent regions. ABRUZZO is a dummy identifying households residing in Abruzzo. In the second and fourth columns we add the lag of consumption growth rate to the baseline set of controls. The liquid (columns 1-2) and illiquid (columns 3-4) sample is defined according to the dummy ILLIQUID which equals one if the level of household's liquid asset, at the beginning of the year before the earthquake, was lower than 50 percent of disposable income and the householder had a mortgage. Controls refer to covariates for bi-annual growth rate of disposable income, bi-annual growth rate of the number of household components, the age of the head of household, bi-annual variation of the number of household earners, a full set of dummies for whether the head of household is the main income earner, the human capital and occupations of householders, and the division of municipalities by resident population. Standard errors are heteroskedasticity-robust and reported in parentheses. Statistical significance is denoted as follows: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.