Consumption and public transfers: Evidence from natural disasters

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"Aggregate Fluctuations: Causes and Consequences"
Siracusa - June 13/14, 2014

Organised by CIM, CFM, UCL, and CSEF

The question

- Does consumption respond to fiscal transfers?
- Received wisdom: transfers most effective when targeted to credit-constrained households.
- New contributions (e.g., Kaplan and Violante, 2014) focus on the response of the "wealthy hand to mouth", better-off households with a large fraction of illiquid wealth.
- => key: housing wealth.

This paper

- We study the consumption of homeowners around a quake.
- Earthquakes as quasi-experiments has key advantages:

  ⋆ Not only: random event of disaster causes unexpected (housing) wealth losses and rising illiquidity.

  ⋆ Most crucially: cash transfers accrue to homeowners, wealthy but not necessarily liquid, against the cost of repairing their house — i.e. against anticipated expenditures
- Effect of transfers on consumption (if any) likely to reflect liquidity considerations — homeowners can delay or downscale repair work, effectively "extracting cash from their housing wealth."

This paper (cont.)

- We exploit three natural disasters:

  (a) the 1980 earthquake in Campania and Basilicata

  (b) the 2012 quake in Emilia

  (c) the 2009 quake in Abruzzo (L'Aquila)

- each with key feature:

  ⋆ in (a) one region (Basilicata) is included in the transfer programme with a delay

  ⋆ in (b) and (c) we have measures of households' liquid-wealth-to-income

  ⋆ with (c) we can contrast transfer in kind (housing repair services) vs cash transfers (to finance repair work)

Main results

- Result 1: Homeowners increase their consumption in the year they have access to transfers (Campania and Basilicata quake).
- Result 2: Homeowners consumption response is higher, the lower the ratio of liquid wealth to income, and/or if they have bank debt (mortgage) (Emilia quake).
- Result 3: Homeowners consumption does not rise if housing repair services are provided in kind, instead of being financed by cash transfers (Abruzzo quake).

Literature

- Kaplan and Violante (2014)
- Agarwal-Liu-Souleles (2007), Johnson-Parker-Souleles (2006,2009), Parker-Souleles-Johnson-McClelland (2013), Shapiro-Slemrod (2009).

  ⋆ Evidence from the US stimulus suggests that households spend around 25% of transfers on non-durable consumption in the quarter they receive it.
- Broda-Parker (2012), Souleles (2009) Misra-Surico (2013)

  ⋆ Evidence that households with a low ratio of liquid assets to income spend at least twice as much as the average household; mortgagors exhibit the largest and most significant response.

Data

From the Bank of Italy Surveys of Household Income and Wealth (SHIW) in the years 1980-1984, and 2006-2012.

- 1980-1984: Repeated cross-sectional data for sample representative of Italian population (about 3,000 households, representative of the Italian population).
- 2006-2012: Includes a panel, and better detailed information on households portfolios and mortgages.
- Surveys contain microeconomic data (annual frequency) on consumption, after-tax income, as well as information on the households region of residence, the residential status, the number of components, age, education, and employment.

The 1980 earthquake in South of Italy

- Major earthquake hitting a large area over two regions, Campania and Basilicata, with 5 million inhabitants.
- About 3500 fatalities and 9500 injured.
- 120,000 buildings either collapsed or were seriously damaged.

Some evidence on the effects of the quake on consumption

$$c_{i,t} = \alpha + \alpha_r + \lambda_t + \beta \times Quake + \delta Y_{i,t} + \gamma X_{i,t} + e_{i,t}$$

- $c_{i,t}$ is non-durable consumption expenditures by household i in year t;
- *Quake* is a dummy that is equal to one in 1981 for the regions hit by the quake.
- $X_{i,t}$ denotes a vector of further control variables (characteristics of the head of the household).

Some evidence on the effects of the quake on consumption (cont.)

Non-owner occupiers in Campania *vs* the rest of Italy

	(1) 1980-81	(2) 1980-81	(3) Age<65	(4) 1981-83
Quake	-0.10**	-0.10**	-0.12**	-0.12***
	(-2.92)	(-3.12)	(-3.02)	(-3.81)
X	NO	YES	YES	YES
Observations	963	963	809	1508

Control regions are Abruzzo, Molise, Apulia and Calabria.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Some evidence on the effects of the quake on income uncertainty

Ex-post variability in income as a proxy for ex-ante uncertainty (Dardanoni, 1991):

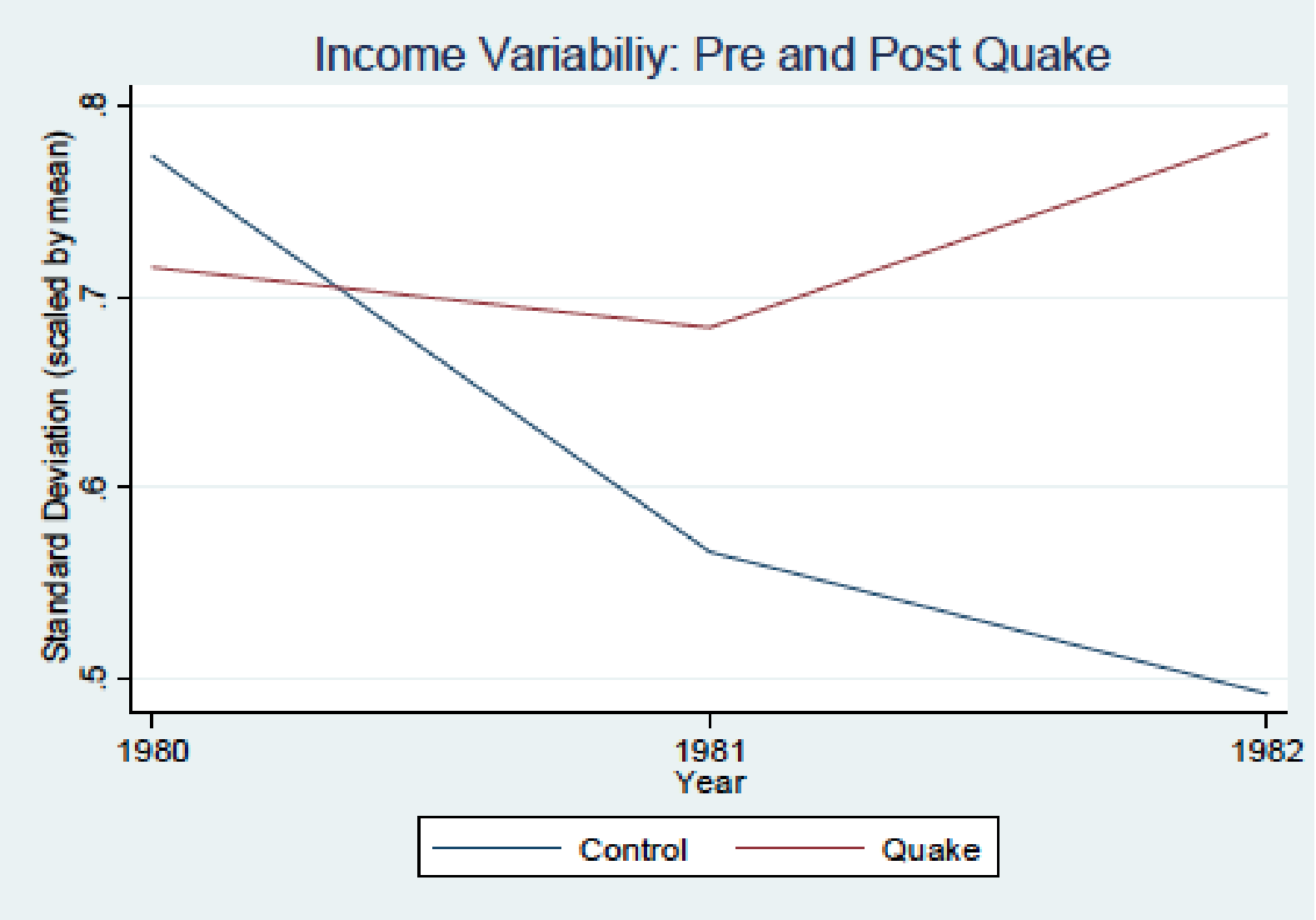
- Variability of income or variability of the residuals from regressing income on controls for the occupation of the head of household (among others).

Some evidence on the effects of the quake on income uncertainty (cont.)

	Quake Area	Control Area	Quake Area	Control Area
F	3.19	0.33	4.02	0.50
	(0.000)	(0.000)	(0.000)	(0.000)
W0	15.74	30.18	15.67	1.98
	(0.000)	(0.000)	(0.00)	(0.159)
W50	13.48	16.77	12.32	1.55
	(0.000)	(0.000)	(0.000)	(0.216)
Controls	No	No	Yes	Yes

Note: The table shows results of tests on equality of variability of income, comparing 1981, the year just after the earthquake, with 1980. Columns under the headings Control are based on OLS residuals of the regression of income on a number of controls for households characteristics.

Some evidence on the effects of the quake on income uncertainty (cont.)



The effect of transfers on consumption: the transfer programme

- In January 1981, owner-occupiers of damaged housing units were entitled to receive up to 10 million liras (26,000 euros in 2014) to 'restore habitability' (Act n. 80 by Special Representative of the Government).
- Between 1981-1983, Italian government mobilizes resources for about the 3% of the 1981 GDP of Campania:

  ⋆ 75% of this financial support was targeted to rebuild private dwellings (Commissione Parlamentare).

The effect of transfers on consumption: the transfer programme (cont.)

- Transfers targeted to owner occupiers, in relation to the cost of repairing quake-related damages of housing units.
- Due to randomness in political process, delay in the timing of the payment across two regions:

1. municipalities in Campania immediately included in the programme: 337 initially, 542 out of 549 by May 22, 1981.
2. municipalities in Basilicata included in the transfer program only in November (Nov 13 1981).

The effect of transfers on consumption: econometric model

- The empirical model is as follows:

$$c_{i,t} = \alpha + \lambda_t + \beta_1 HS_s + \beta_2 TR_{r,t} + \beta_3 \left(HS_s \cdot TR_{r,t}\right) + \gamma X_{i,t} + u_{i,t},$$

- $c_{i,t}$ is the log of non-durable consumption expenditures by household i in year t;
- λ_t is a year fixed effect;
- HS_s (Housing Status) is a dummy equal to one if owner occupier;
- $TR_{r,t}$ (Transfer Region) is a dummy equal to one in the year t when the region of residence r is included in the programme;
- $X_{i,t}$ denotes a vector of further control variables (head of household characteristics).

The effect of transfers on consumption: econometric model (cont.)

- The variable *HS* controls for differences in wealth and life-cycle effects between tenants and homeowners.
- The variable *TR* controls for region-specific shocks that may conflate with the effects of liquidity transfers.

- The interaction HS*TR:
  1. Under the (realistic) assumption that housing wealth is illiquid,
  2. In light of the fact that cash transfers is made accessible as compensation for the cost of repairing housing damages

  allows us to capture the effect on consumption of an increase of the degree of liquidity of wealth.

The effect of transfers on consumption: econometric model (cont.)

- If tenants were dropped from our sample, our empirical specification would be similar to Johnson et al. (2006, 2009), Parker et al. (2013).
- If we focused on each of the two regions in isolation, the empirical model would boild down to a standard diff-in-diff.

The effect of transfers on consumption: evidence

	(1)	(2)	(3)
$HS \times TR$	0.18**	0.12*	0.12*
	(2.68)	(2.23)	(2.50)
HS	0.03	-0.15***	-0.10***
	(0.74)	(-4.86)	(-3.48)
TR	-0.08*	-0.09**	-0.08
	(-2.02)	(-2.72)	(-1.96)
Income		0.57***	0.34***
		(21.04)	(10.69)
X	NO	NO	YES
Observations	971	971	971

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Other quakes

- In our first quasi-experiment, we find that the subsample of owner occupiers entitled to transfers significantly increase their consumption *on average*. But in principle there could be differences within this group.
- In 1980, the Bank of Italy surveys are not detailed enough on the households' financial positions.
- In two other quasi-experiments (2012 Emilia and 2009 Abruzzo), the new, richer surveys by the Bank of Italy allow us to focus sharply on the differential consumption response to stimulus by:

1. Wealthy hand-to-mouth households;
2. Mortgagors.

The 2012 quake in Emilia

- Strong quake hit an extensive area of the Emilia region (small areas in Lombardia and Veneto) on May 20 and 29, 2012.
- 27 fatalities; 11,000 damaged houses.
- Central government channeled 2.4 billion of euros to support house repairing activities.
- Main instruments:
  bank loans guaranteed by the state to cover the damages of the house; tax credit against yearly cost of bank debt;
  suspension of mortgage payments.

The 2012 quake in Emilia (cont.)

- Focus on the 'panel' in the SHIW for the years 2008-2010-2012 (so to control for unobserved household-specific features).
- Run the estimation model twice:
  1. low vs. high ratio of holdings of liquid wealth to income;
  2. with/without mortgage (bank debt)
- Run a placebo (replacing Emilia with Tuscany).

Empirical model

$$\Delta c_{i,t} = \alpha + \beta_1 \Delta c_{i,t-1} + \beta_2 \Delta y_{i,t} + \beta_3 QR + \gamma X_{i,t} + u_{i,t}$$

- $\Delta c_{i,t}$ is the growth rate of non-durable consumption expenditures by household i in year t;
- $\Delta y_{i,t}$ is the growth rate of the income of household i in year t;
- $X_{i,t}$ denotes a vector of further control variables (characteristics of the head of the household).
- QR (Quake Region) is a dummy equal to one in 2012 for Emilia, or 2012 Tuscany for the placebo; or 2009 Abruzzo for the third case study).

The 2012 Quake in Emilia.
Homeowners' Consumption by Degree of Wealth Liquidity

$$\Delta c_{i,t} = \alpha + \beta_1 \Delta c_{i,t-1} + \beta_2 \Delta y_{i,t} + \beta_3 Emilia + \gamma X_{i,t} + u_{i,t}$$

	(1) Liquid	(2) Illiquid	(3) No-Mortage	(4) Mortgage	(5) Ill.+Mort
EMILIA	0.08	0.17^{*}	0.06	0.33^{*}	0.30^{*}
	(0.99)	(2.17)	(1.00)	(2.61)	(2.14)
gy	0.38^{***}	0.28^{***}	0.34^{***}	0.38^{***}	0.45^{***}
	(5.89)	(3.88)	(6.07)	(5.00)	(4.46)
Observations	451	326	592	185	106

Control regions are Liguria, Tuscany and Umbria.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

The 2012 Quake in Emilia. A Placebo Using Tuscany

$$\Delta c_{i,t} = \alpha + \beta_1 \Delta c_{i,t-1} + \beta_2 \Delta y_{i,t} + \beta_3 \mathit{Tuscany} + \gamma X_{i,t} + u_{i,t}$$

	(1) Liquid	(2) Illiquid	(3) No-Mortage	(4) Mortgage	(5) Ill.+Mort
TOSCANA	-0.01	0.07	0.03	0.09	0.01
	(-0.10)	(1.07)	(0.48)	(0.72)	(0.05)
gy	0.33^{***}	0.22^{**}	0.29^{***}	0.32^{**}	0.25
	(4.28)	(2.60)	(4.41)	(3.29)	(1.36)
Observations	288	240	395	133	55

Control regions are Liguria and Umbria.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Tuscany is a dummy that is equal to one in 2012 for Tuscany (a region at the boarder of Emilia).

The 2008 quake in Abruzzo (L'Aquila)

- The 2009 L'Aquila earthquake occurred in the region of Abruzzo on 6 April 2009.
- 309 fatalities. 10,000 damaged houses.
- The reconstruction cost were reimbursed directly to the construction company.
- Same econometric model as before.

The 2009 Quake in Abruzzo. Homeowners' Consumption by Degree of Wealth 'Liquidity'.

$$\Delta c_{i,t} = \alpha + \beta_1 \Delta c_{i,t-1} + \beta_2 \Delta y_{i,t} + \beta_3 Abruzzo + \gamma X_{i,t} + u_{i,t}$$

	(1) Liquid	(2) Illiquid	(3) No-Mortage	(4) Mortgage	(5) Illiq+Mort.
ABRUZZO	0.05	0.05	0.09	-0.03	0.26
	(0.47)	(0.77)	(1.72)	(-0.19)	(1.34)
gy	0.27^{***}	0.13^{**}	0.19^{***}	0.14	0.16
	(5.09)	(3.08)	(4.42)	(1.97)	(0.88)
Observations	341	522	670	193	76

Control regions are the ones in the Center-South Italy.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Conclusions

- We exploit natural disasters as quasi-experiments to provide empirical evidence on the consumption response to cash transfers by (illiquid) homeowners.
- While causing a rise in the illiquidity of housing wealth, quakes triggers programmes of public transfers in favor of homeowners commensurate to the costs of repairing housing damages.
- Using the households excluded from the programme as a control group, we show the homeowners respond to these transfers in an economically significant way.

Conclusions (cont.)

- Many effects of a quake are similar to those of large crisis, in terms of destruction of wealth and illiquidity.
- In response to a quake shock, it is plausible that a combination of rising illiquidity and income uncertainty motivates households to raise their buffer stocks in a precautionary manner.
- Cash transfers or tax cuts reduce the need to cut consumption towards this goal.