Credit Supply Shocks and Household Defaults

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This paper: Households and banks in U.S.

- **Question**: Do positive credit supply shocks lead to higher default rates on household credit in the medium run at the *household* level?
  1. *Step 1*: Identify credit supply shocks at the U.S. state level via VARs with sign restrictions, Gambetti & Musso 2017 JAE
  2. *Step 2*: Regress household defaults from the PSID database on the estimated shocks with distributed lags
- **Results**: We find a non-monotone transmission of credit supply shocks over the business cycle:
  1. positive credit supply shocks have negative or zero effect on household defaults in the short run (1-2 years) but significant positive effects in the medium run (3-6 years);
  2. this is true for both household bankruptcies in 1980s–1990s and mortgage delinquencies and restructurings in 2000s–2010s.
- **Implications**: Changes in credit conditions matter for boom-bust episodes Mian and Sufi (2009), Mian et al. (2013; 2017)

Empirical strategy

- **Step 1: Identification of credit supply shocks**

  1. For each U.S. state $r = 1...51$ and $t = 1977...2017$ specify 5-variables VAR (GDP, CPI, Risk-free rate, Lending rate, Volume of loans, Gambetti & Musso 2017 JAE)

$$A(L)\, y_{r,t} = u_{r,t} \tag{1}$$

  2. Bayesian estimation
  3. Isolate credit supply shocks with the standard sign restrictions on IRFs:
     - ⋆ Sign restrictions: credit supply shocks and the other 4 shocks
     - ⋆ Find a candidate solution w^* s.t.:

$$u = P\eta = PQw^* \tag{2}$$

     - ⋆ Store it if the sign restrictions are satisfied (distribution of shocks)
     - ⋆ Obtain time series of $\tilde{w}_{r,t}^{*cred}$ — median credit supply shocks

Empirical strategy

- **Step 2: Logit regressions of household defaults**

  1. The direct specification: diff-in-diff with continuous treatment effect:

$$\Pr\Big[Default_{i,r,t}\Big] = \Lambda\Big(\alpha_i + \beta_r + \gamma_t + \sum_{k=1}^{K} \delta_k \tilde{w}^{*cred,+}_{r,t-k} + \boldsymbol{X}_{i,r,t}\Theta + \epsilon_{i,r,t}\Big) \quad (3)$$

  2. The indirect specification: *IV-2SLS* style

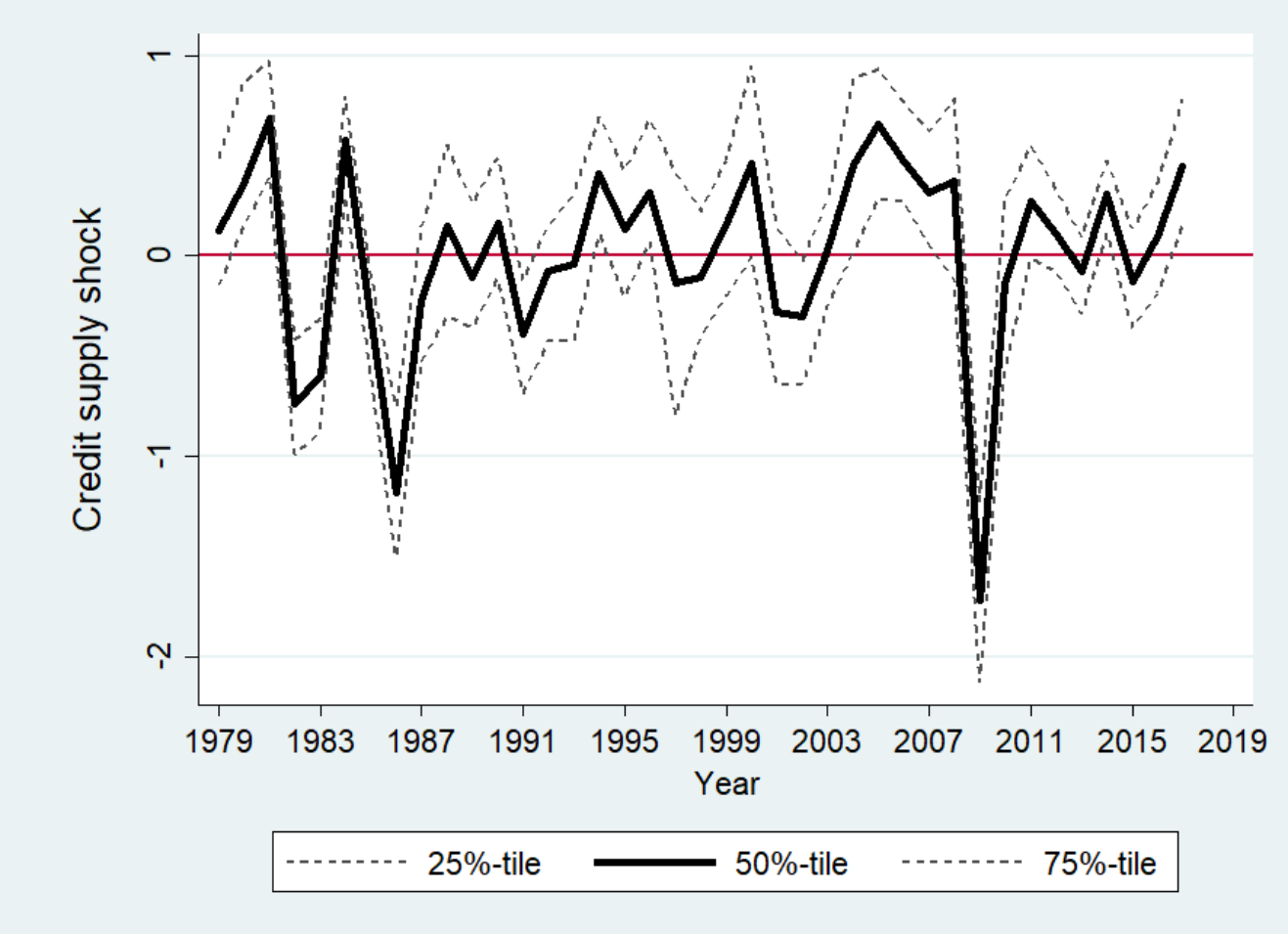
$$Debt_{i,r,t} = \alpha_{1,i} + \beta_{1,r} + \gamma_{2,t} + \sum_{k=1}^{K} \delta_{1,k} \tilde{w}^{*cred,+}_{r,t-k} + \boldsymbol{X}_{i,r,t}\Theta_1 + \epsilon_{1,i,r,t} \quad (4)$$

$$\Pr\Big[Default_{i,r,t}\Big] = \Lambda\Big(\alpha_{2,i} + \beta_{2,r} + \gamma_{2,t} + \delta_2 \widehat{Debt}_{i,r,t} + \boldsymbol{X}_{i,r,t}\Theta_2 + \epsilon_{2,i,r,t}\Big) \quad (5)$$

Data for the logit analysis: Household level

- **Panel Study of Income Dynamics (PSID) data**
- Given data scarcity, we consider **two subsamples** with **two different dependent variables**:
  1. one covers the data prior 1996: defaults on household debt, 1970–1996 (annually)
  2. the second spans post-2000 period: 1- and 3-months delinquencies on mortgages and mortgage restructuring (biennially, 2001–2017)
- **Control variables include**:
  1. employment status, race, home ownership status, education, house value conditional on being home owner, debt to income, industry classification of main job (as in Mian & Sufi 2010);
  2. In addition, age of a reference individual, sex, and a family status.

Estimated credit supply shock across states



Dependent variable: 3-months delinquencies

- 2001–2017 subsample (biennially), Diff-in-Diff

1 unit = 2 years	(1)	(2)	(3)	(4)	(5)	(6)
The main explanatory variable: Positive credit supply shock						
Lag = 1 unit	–0.399*	–0.342	–0.530*	–0.575*	–0.163	–0.675*
	(0.216)	(0.317)	(0.307)	(0.319)	(0.337)	(0.389)
Lag = 2 units	0.004	0.082	–0.003	–0.053	0.310	–0.349
	(0.139)	(0.236)	(0.231)	(0.227)	(0.286)	(0.389)
Lag = 3 units	0.360***	0.653***	0.526**	0.494**	0.840***	0.098
	(0.131)	(0.240)	(0.229)	(0.233)	(0.280)	(0.383)
Lag = 4 units	0.285**	0.593**	0.492**	0.214	0.541*	–0.320
	(0.124)	(0.238)	(0.221)	(0.233)	(0.289)	(0.387)
Sum of the four lags	0.249	0.985	0.485	0.081	1.528*	–1.246
	(0.359)	(0.674)	(0.631)	(0.877)	(0.637)	(1.239)
Household Controls	No	No	Yes	Yes	Yes	Yes
Household FEs	No	Yes	Yes	Yes	Yes	Yes
Industry classification FEs	No	No	No	Yes	Yes	Yes
U.S. state FEs	No	No	No	No	Yes	Yes
Year FEs	No	No	No	No	No	Yes
Constant	–4.031***	–8.227***	–1.951	–3.023	–0.488	0.754
	(0.135)	(0.669)	(2.246)	(2.162)	(2.399)	(2.461)
No. obs.	11,594	11,594	10,885	9,271	8,635	8,635
No. households		3,760	3,604	3,220	2,998	2,998
log Likelihood	–1,145.6	–1,023.9	–926.3	–781.4	–740.1	–728.8

Conclusion

- We perform:
  1. SVAR-analysis of credit supply shocks at the U.S. state level
  2. Logit-analysis of U.S. household defaults with the estimated shocks
- **Main empirical outcome**: **positive credit supply shocks** *saw the seeds* **of future credit crises**
  1. Positive credit supply shocks have negative or zero effect on household defaults in the short run (1-2 years) but significant positive effects in the medium run (3-6 years);
  2. This is true for both household bankruptcies in 1980s–1990s (not shown here, see full text) and mortgage delinquencies and restructurings in 2000s–2010s. The effect works both in direct and indirect (2SLS-IV, not shown here, see full text) specifications
- An empirical support to the credit-driven business cycles (Mian et al.) and endogenous business cycle theories (Beaudry et al., 2020 AER)