

Financial crisis and inequality in Hungary

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Motivation

- The global financial crisis of 2008-2009 was a major shock to the Hungarian economy
- Households (and firms) had to undergo a large balance sheet adjustment
- The impact of the crisis, however, hit different households differently
 - Heterogeneity in income
 - Heterogeneity in wealth
- Does taking into account this heterogeneity change the macroeconomic picture?

Methodology

- I use a heterogenous agent Aiyagari (1995) model
 - Households are subject to idiosyncratic productivity (income) shocks
 - There is no aggregate (predictable) uncertainty
- The financial crisis is a one-time, unforeseen, permanent shock
 - A tightening of borrowing conditions
- Model parameters and processes are calibrated to Hungarian data
- Two alternative policy options to manage the transition

Literature

- Classic heterogenous agent models: Aiyagari (1994), Huggett (1997), Marcet, Obiols-Homs and Weil (2007), Kaplan-Violante (2018)
- Recent related work: de Ferra, Mitman and Romei (2020), Öztunali-Torul (2018)
- The impact of the crisis on Hungary: Baksa-Kónya (2019), Baksa-Kónya (2021)
- Micro evidence for Hungary: Boldizsár, Kékesi, Kóczián and Sisak (2016), Tóth (2013), MNB (2012)

The model - households

- Heterogenous households with idiosyncratic Markov income shock $z_{i,t}$

$$v(a, z) = \max_{a' \geq 0} \left\{ \log [zw + (1 + r)a - a'] + \beta \mathbb{E}_{z'|z} v(a', z') \right\}$$

- The are two individual states, a and z
 - There is one aggregate state, r
- There is a competitive, representative firm maximizing profits

$$\max \pi_t = AK_t^\alpha N_t^{1-\alpha} - w_t N_t - (r_t + \delta) K_t$$

The stationary competitive equilibrium

- ① Given the interest rate, households and firms optimize
- ② Markets clear. In particular, total capital supply from HHs equals capital demand from firms

$$K_t = \sum_a \sum_z a_t \mu_t(a_t, z_t)$$

- ③ Aggregate labor supply is constant

$$N_t = N\mathbb{E}z = N\bar{z}$$

- ④ Household heterogeneity is given by the *ergodic distribution*

$$\mu(a_{t+1}, z_{t+1}) = \sum_a \sum_z \Pr[g(a_t, z_t), z_{t+1} | z_t, a_t] \mu(a_t, z_t)$$

Numerical implementation

- Basic parameters

$$\alpha = 0.4$$

$$\beta = 0.95$$

$$\delta = 0.08$$

- Productivity values from Hungarian income deciles in 2007

$$z = [0.35, 0.51, 0.64, 0.74, 0.84, 0.94, 1.04, 1.18, 1.41, 2.3]$$

- Transition probabilities from Eurostat
- Asset grid: 1000 points, denser around 0

The crisis experiment

- Assume that the borrowing constraint increases from $a^{\text{pre}} = 0$ to $a^{\text{post}} = 0.88$
 - I calibrate this value to match a default rate of 16% post-crisis (MNB, 2012)
- Calculate the new ergodic distributions for wealth and income
- Calculate the transition path to the new steady state

Long-run changes

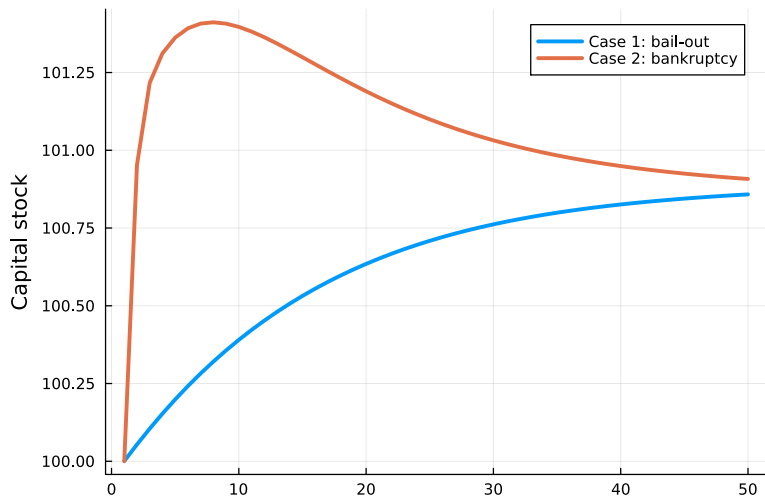
- The interest rate is lower
- The capital stock is higher
 - “Investment boom”
- Directions make sense, but small
 - Heterogeneity a small, but non-negligible addition to aggregate changes (in the long-run)

Adjustment on impact

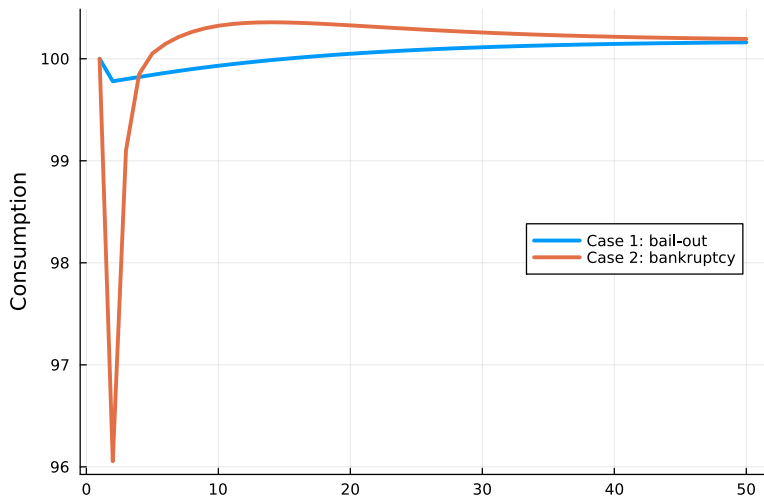
What happens to those who have initial assets below the new minimum?

- ① Case 1: assume that the government bails them out, using a capital tax on all assets
 - ① a policy that bails out the heavily indebted at the expense of the “rich”
- ② Case 2: assume they go bankrupt, and only consume a minimal amount until assets reach $\underline{a}^{post}$
 - ① a policy that puts the burden of adjustment on the poor

Capital stock paths



Consumption paths



Transition results

- The bail-out policy results in a much smoother transition, and on impact
 - a small drop in aggregate consumption
 - a small increase in investment and the capital stock
- The bankruptcy policy leads to a much more abrupt change
 - bigger drop of aggregate consumption
 - bigger and overshooting increase of the capital stock
- The difference is driven by the response of the low-income, low-asset households