Down-payment requirements and consumption responses to income shocks

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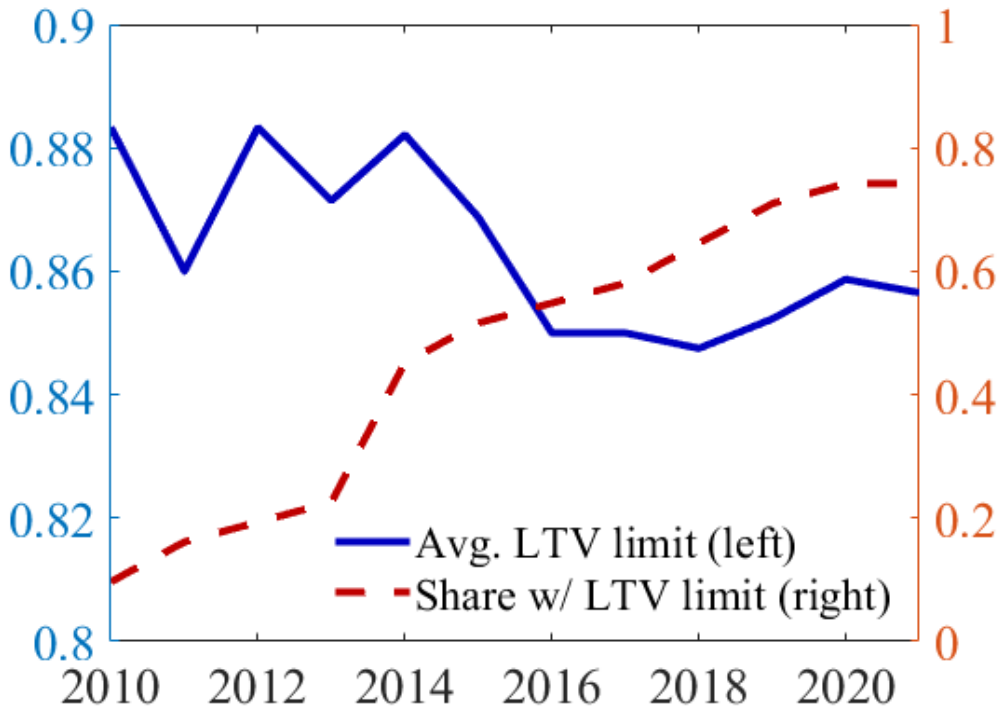
Background

After the Great Recession, the use of down-payment requirements has increased substantially



This paper

We analyze how down-payment requirements affect

- Different households' marginal propensity to consume (MPC)
- Aggregate demand responses to income shocks and macroeconomic policies

Method

- Simple theoretical framework
- Quantitative heterogeneous-household life-cycle model of the U.S. economy

Preview of results

We find that

- In contrast to a traditional borrowing constraint, a down-payment constraint causes some households' MPC to increase and others' to decrease
- The mean MPC is U-shaped in the down-payment requirement
- A stricter down-payment constraint reduces the cash-flow channel of monetary policy and alters the effectiveness of fiscal transfers

Literature Review

Conceptual framework

Two-period model

$$\max_{c_1,c_2,b} U(c_1) + U(c_2) \; s.t.$$

$$c_1 = y_1 - b$$

$$c_2 = y_2 + b$$

$$b \geq \underline{b}$$

Two-period model

$$\max_{c_1,c_2,b} U(c_1) + U(c_2) + \mathbb{I}\Psi \; s.t.$$

$$c_1 = y_1 - b$$

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$$\mathbb{I} = \begin{cases} 1 \text{ if } b \geq b^* \\ 0 \text{ else.} \end{cases}$$

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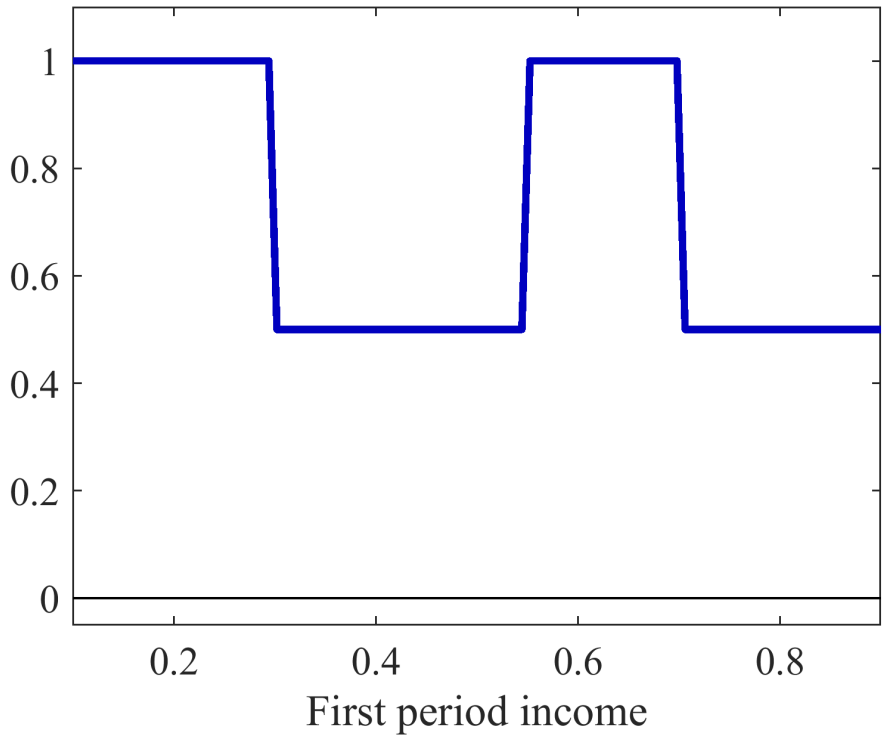
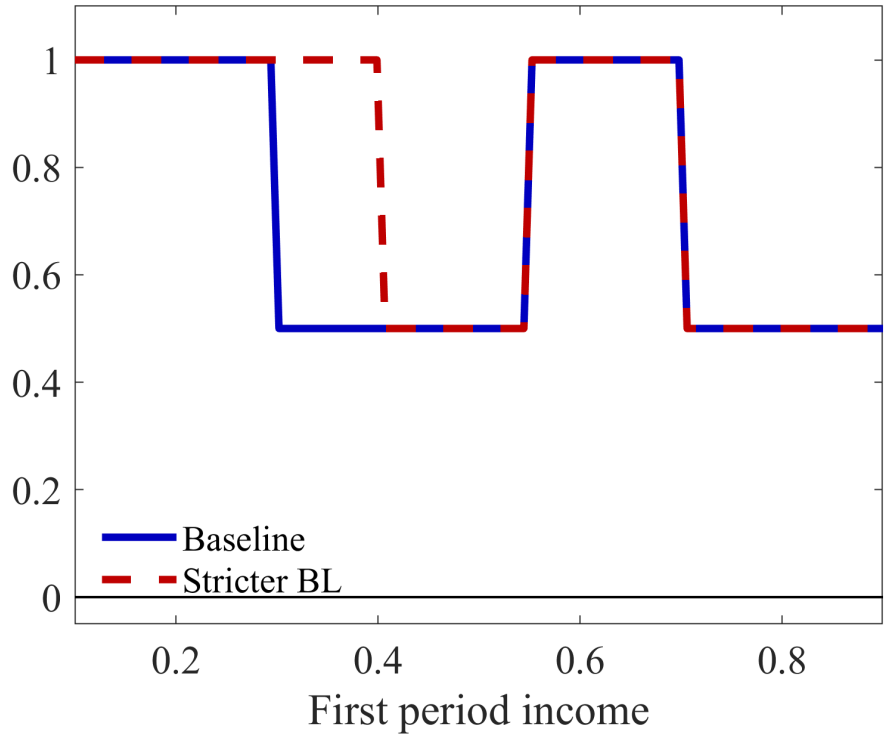
$$y_1 + y_2 = 1$$

Households' MPC



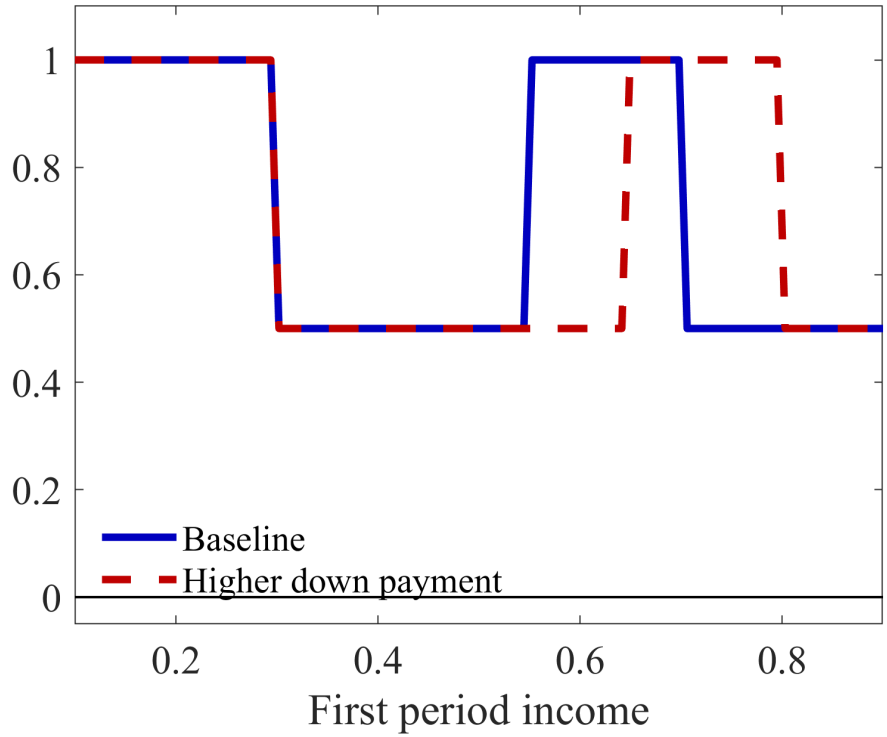
Households' MPC

Making it more difficult to borrow against future income



Households' MPC

Increasing the down-payment requirement



Households' MPC

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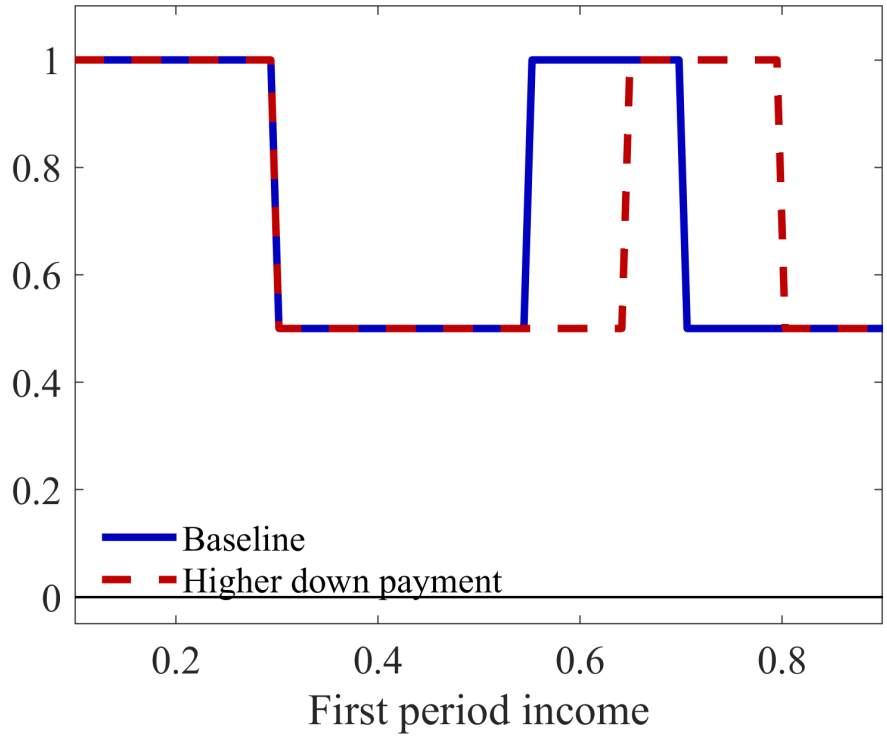

- A down-payment requirements is not just a borrowing constraint
  - A stricter down-payment requirement increases some households' MPC whereas it decreases others'

The timing of house purchases

Introduce a full life cycle

- Age 23 - 82, retire at age 65
- Upward-sloping earnings profile until retirement
- One representative household at each age

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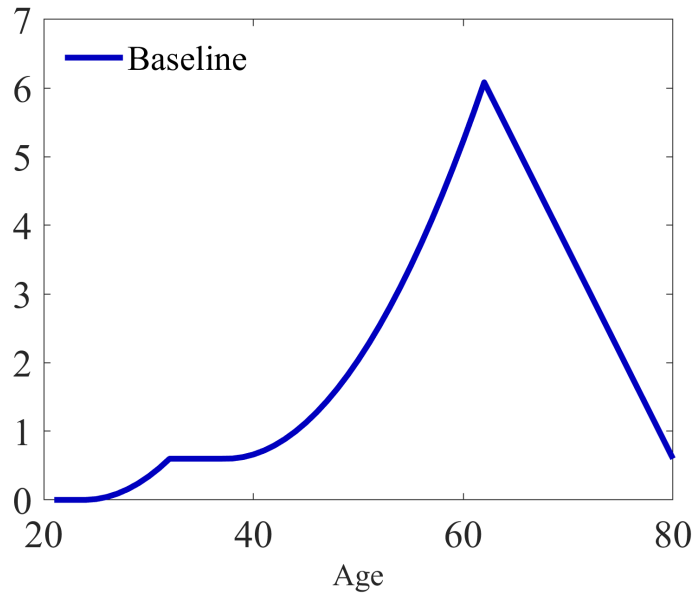
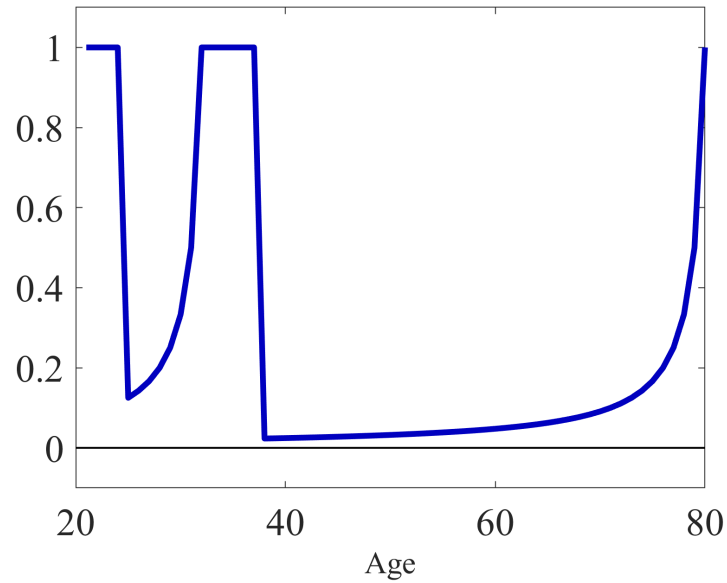
(a) Savings

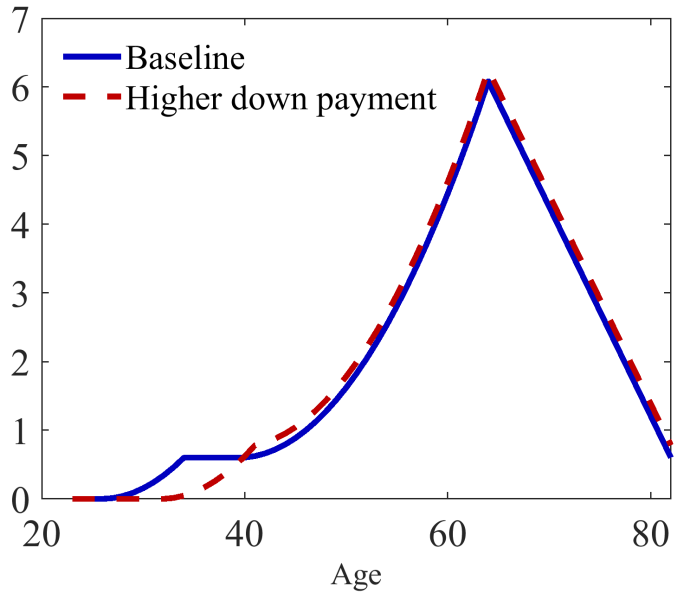


(b) MPC

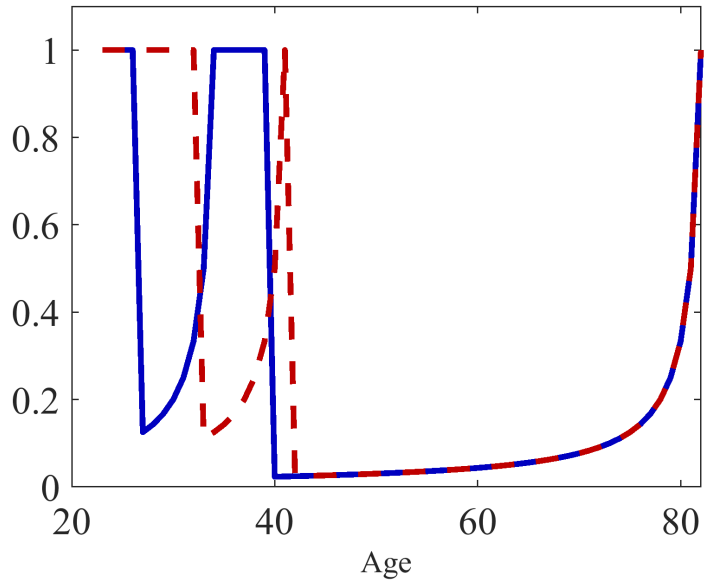


Stricter down-payment requirement

(a) Savings



(b) MPC



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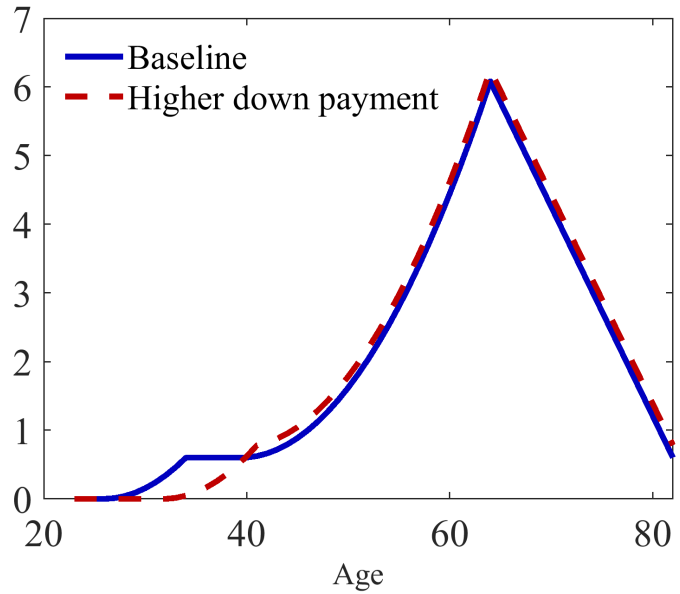
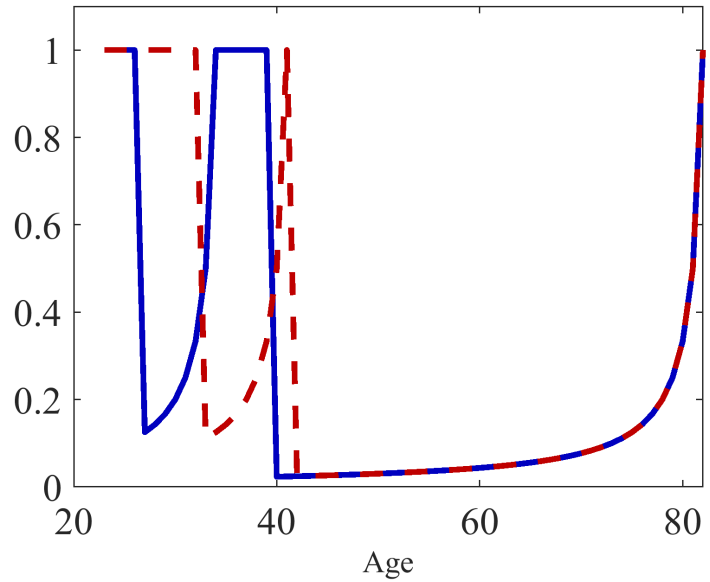
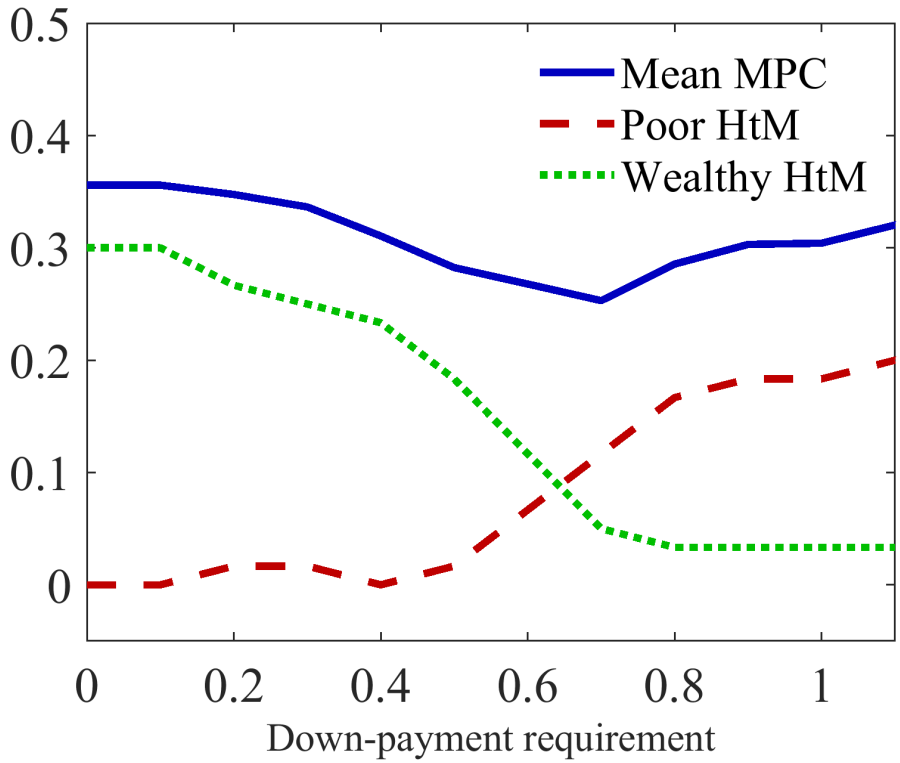


(b) MPC



- Households postpone house purchases
  - More poor hand-to-mouth
  - Fewer wealthy hand-to-mouth

Mean MPC & shares of Hand-to-Mouth



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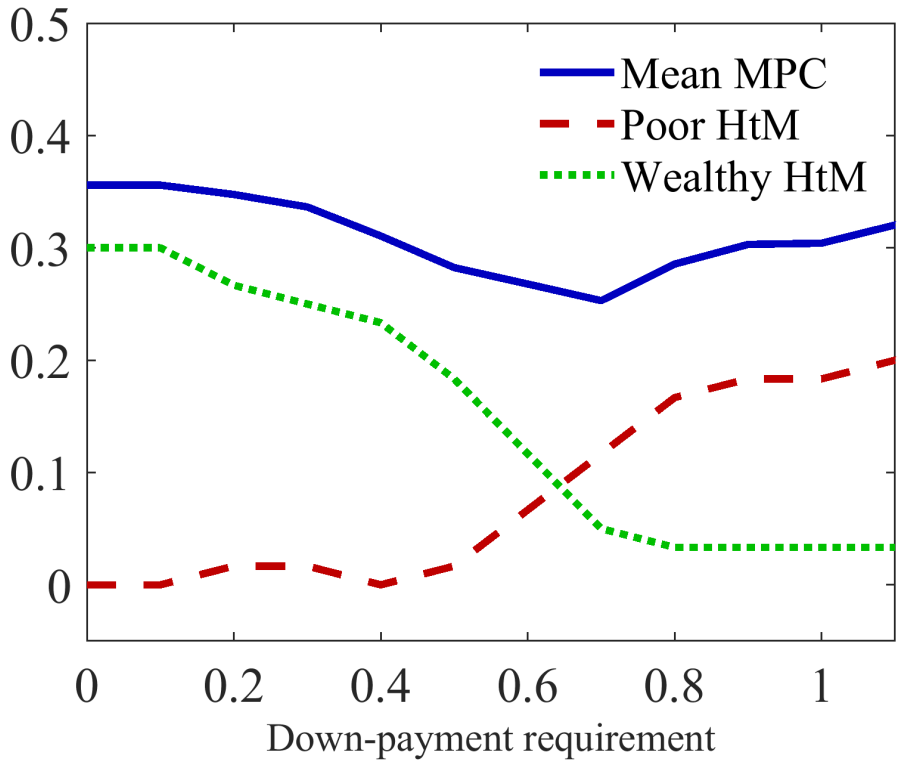


- A stricter down-payment constraint increases the share of poor HtM, if there is an occasionally-binding traditional borrowing limit
- Mean MPC is U-shaped

Quantitative analysis

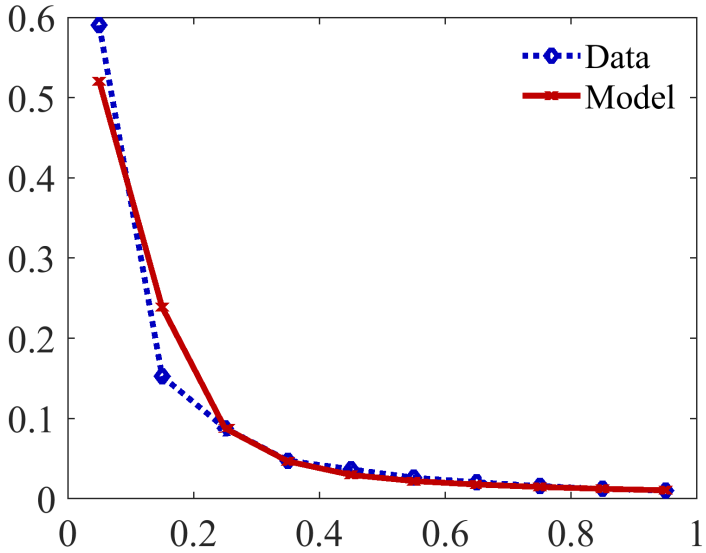
Model overview

- Life-cycle model with overlapping generations and incomplete markets
- Utility from consumption and housing services and a warm-glow bequest motive
- Permanent and transitory income shocks
- Three assets: houses h, liquid bonds b, and long-term mortgages m
- Competitive rental housing market
- Include main features of U.S. tax code w.r.t. housing and mortgages
- Explicit payment-to-income and down-payment requirements

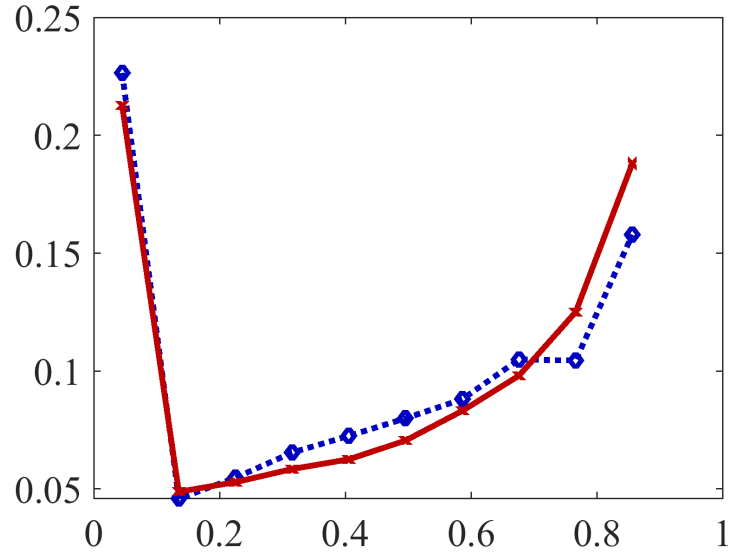
Households' dynamic problem | Calibration

Model vs data distributions

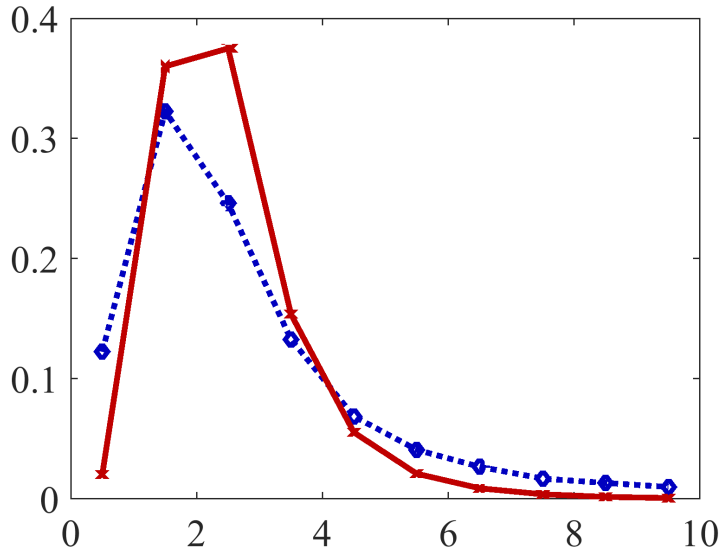
(A) Liquid savings-to-earnings



(B) Loan-to-value

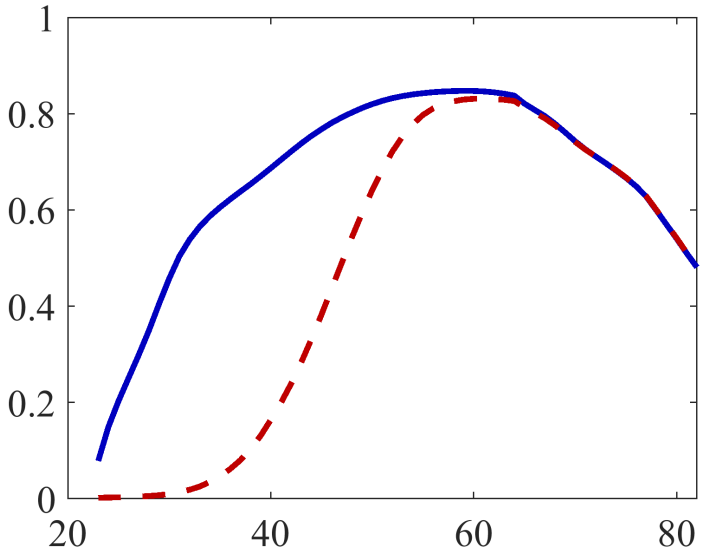


(C) House value-to-earnings

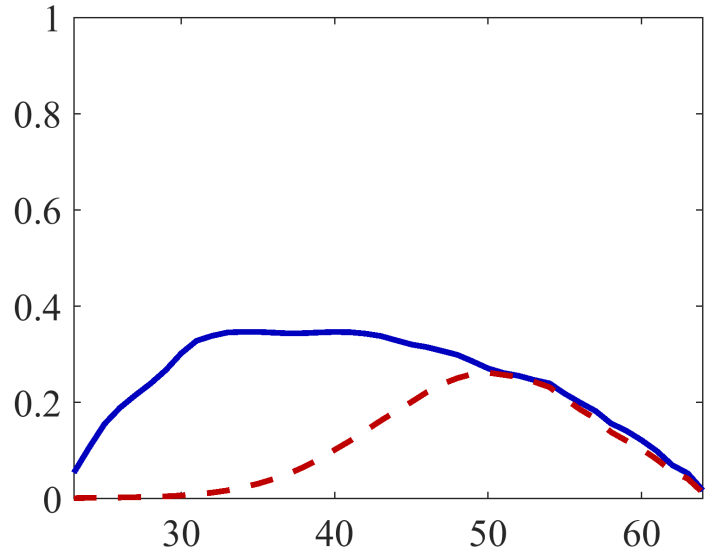


Results: life-cycle effects

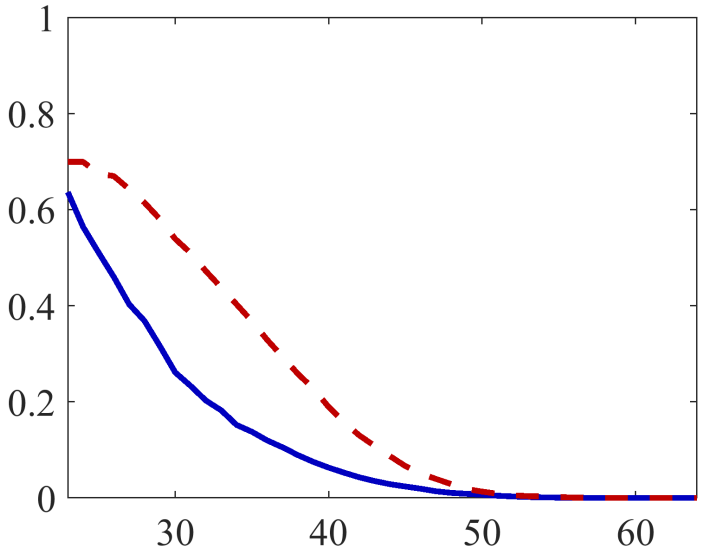
(A) Homeownership rate



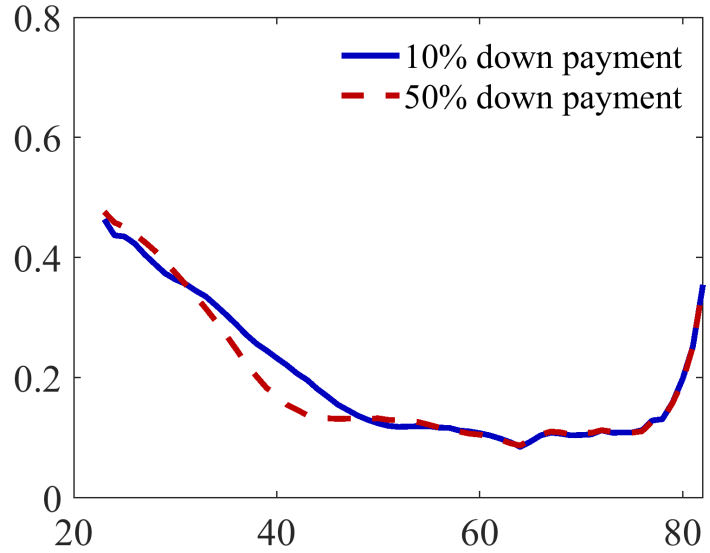
(B) Share wealthy HtM



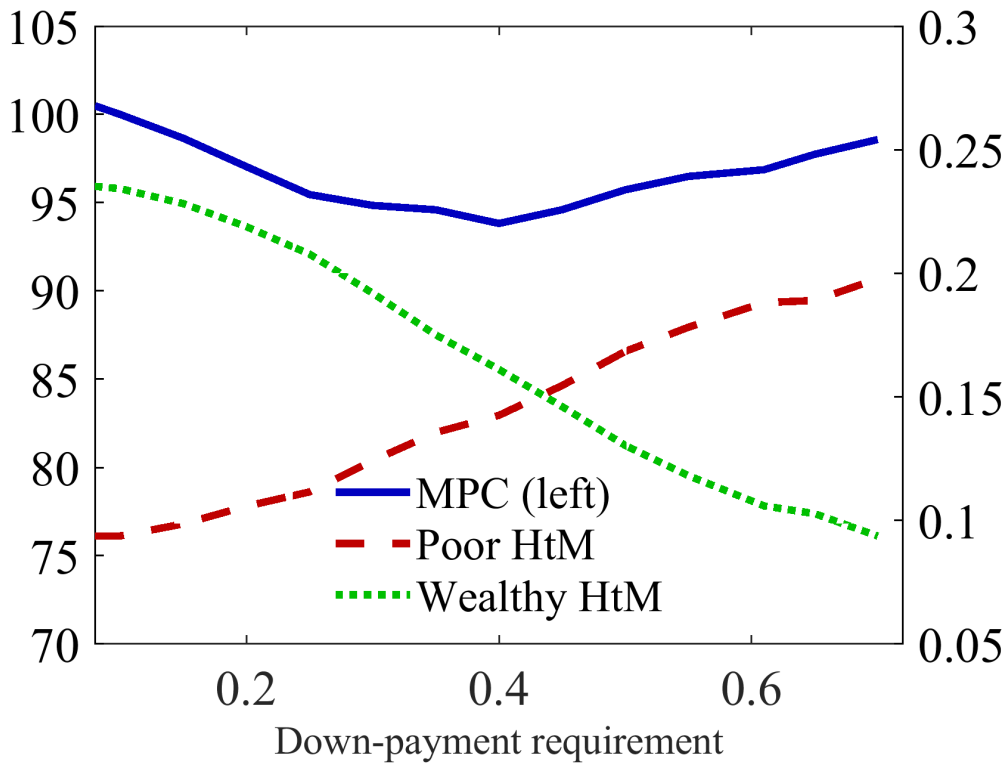
(C) Share poor HtM



(D) Mean MPC



Results: Mean MPC & shares of HtM



Implications for Monetary policy Fiscal policy

Conclusions

Using a simple conceptual framework we show that

- A down-payment constraint is very different from a traditional borrowing constraint: some households' MPC increases and others' decreases
- Mean MPC is U-shaped in the down-payment requirement

Conclusions

Using a simple conceptual framework we show that

- A down-payment constraint is very different from a traditional borrowing constraint: some households' MPC increases and others' decreases
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In a quantitative analysis we find that

- The minimum mean MPC (5% lower than today) is achieved when the down-payment constraint is approximately 40 percent
- A down-payment requirement has implications for both monetary and fiscal policy

Extra slides

Literature Review

- Empirical studies on macroprudential policies in the mortgage market
  Aastveit et al. (2020); Acharya et al. (2020); Lim et al. (2011); Peydro et al. (2020); **Van Bekkum et al. (2019)**

- Households' MPCs
  Agarwal and Qian (2014); Fagereng et al. (2021); Parker et al. (2013)

- Theoretical investigations of importance of illiquid assets and constraints
  Boar et al. (2020); Greenwald (2018); Kaplan and Violante (2014)

- Monetary policy and debt
  Angelini et al. (2012); Calza et al. (2013); Cloyne et al. (2019); Di Maggio et al. (2017); Ferrero et al. (2018); Flodén et al. (2020); Guren et al. (2021); Holm et al. (2021); Kinnerud (2022); Verner and Gyöngyösi (2020)

Back to Preview of results

Households' dynamic problem

For each $k \in \{R, B, S, RF\}$:

$$V_j^k(z, x, h, m) = \max_{c,s,h',m',b'} U_j(c, s) + \beta \mathbb{E}\left[\phi_j V_{j+1}(z', x', h', m') + (1 - \phi_j) U^B(q')\right]$$

s.t.

$$\underbrace{c + b' + \mathbb{I}^R p_r s + \mathbb{I}^B (1 + \varsigma^b) p_h h' + \mathbb{I}^{RF,S} (1 - \varsigma^s) p_h h + \mathbb{I}^{RF} \varsigma^r}_{\text{“Expenditures”}} \leq \underbrace{x + m'}_{\text{“Money to spend”}}$$

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$$\mathbb{I}^{B,RF} m' \leq (1 - \theta) p_h h' \qquad \text{LTV constraint}$$

$$\mathbb{I}^{B,RF} \left(\frac{\chi_{j+1} m' + (\tau^h + \varsigma^I) p_h h'}{z} \right) \leq \psi \qquad \text{PTI constraint}$$

$$\mathbb{I}^S m' \leq (1 + r_m) m - \chi_j m \qquad \text{Min payment}$$

$$s = h' \qquad \text{if } h' > 0$$

$$m' \geq 0 \qquad \text{if } h' > 0$$

$$m' = 0 \qquad \text{if } h' = 0$$

$$c > 0, s \in S, h' \in H, b' \geq 0.$$

Back to Model

Calibration

- Parameters that can be directly calibrated from data are set in that way

  Independently calibrated parameters

- That leaves 7 parameters that are calibrated internally to match cross-sectional and life-cycle moments

  Internally calibrated parameters

Back to Model

Independently calibrated parameters

Parameter	Description	Value
σ	Coefficient of relative risk aversion	2
τ^{ss}	Social security tax	0.153
τ^{h}	Property tax	0.01
r	Interest rate, bonds	0
r^{m}	Interest rate, mortgages	0.036
θ	Down-payment requirement	0.10
ψ	Payment-to-income requirement	0.177
δ^{h}	Depreciation, owner-occupied housing	0.03
ς^{I}	Home insurance	0.005
ς^{b}	Transaction cost if buying house	0.025
ς^{s}	Transaction cost if selling house	0.07
R	Replacement rate for retirees	0.5
B^{max}	Maximum benefit during retirement	60.4

Back to Calibration

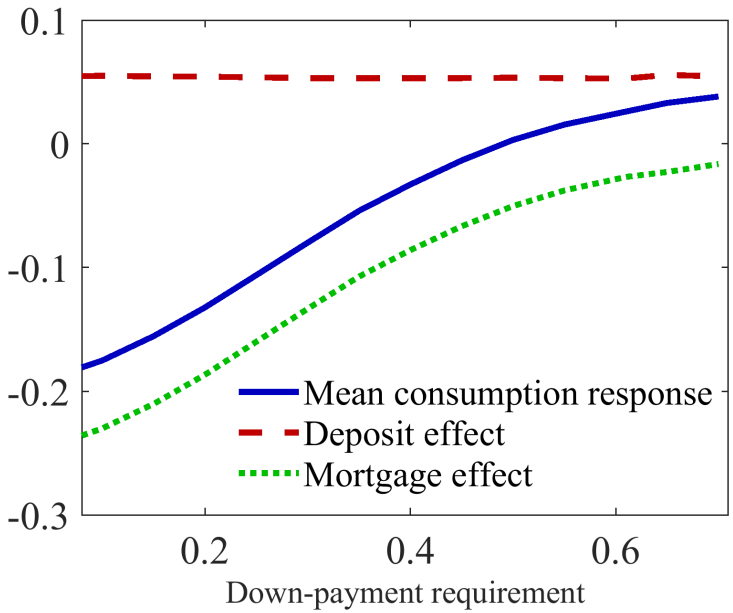
Internally calibrated parameters

Parameter	Description	Value	Target moment	Data	Model
α	Consumption weight in utility	0.778	Median house value-to-earnings, age 23–64	2.26	2.26
β	Discount factor	0.953	Mean net worth, over mean earnings age 23–64	1.38	1.38
υ	Strength of bequest motive	4.20	Mean net worth age 75 over mean net worth age 50	1.64	1.64
Ψ	Utility bonus of owning	0.3	Mean own-to-rent size	1.80	1.94
δ^r	Depreciation rate, rentals	0.055	Homeownership rate, age 23–35	0.44	0.37
$\underline{\mathrm{h}}$	Minimum owned house size	181	Homeownership rate, all ages	0.67	0.67
ς^r	Refinancing cost	2.524	Refinancing share, homeowners	0.08	0.08
λ	Level parameter, tax system	1.695	Average marginal tax rates	0.13	0.13
τ^p	Progressivity parameter	0.142	Distribution of marginal tax rates	N.A.	N.A.

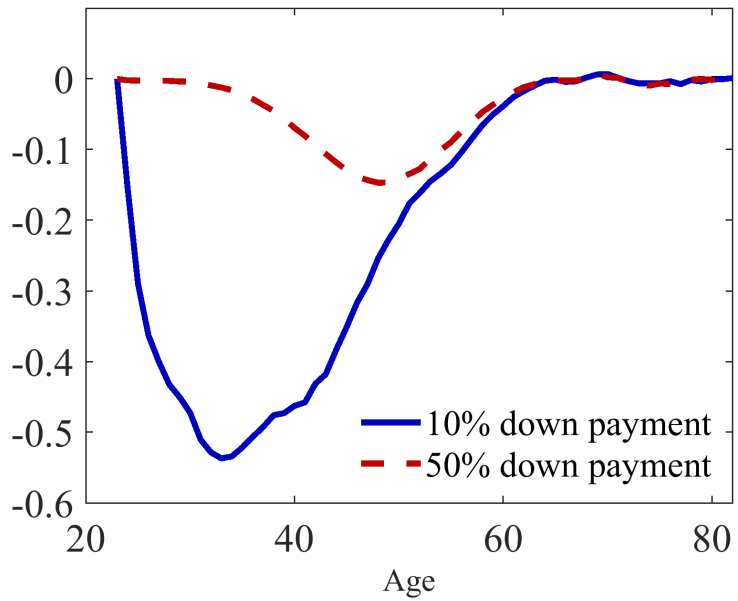
Back to Calibration

Monetary policy: cash-flow effects

(A) Consumption response (%) 1 ppt hike



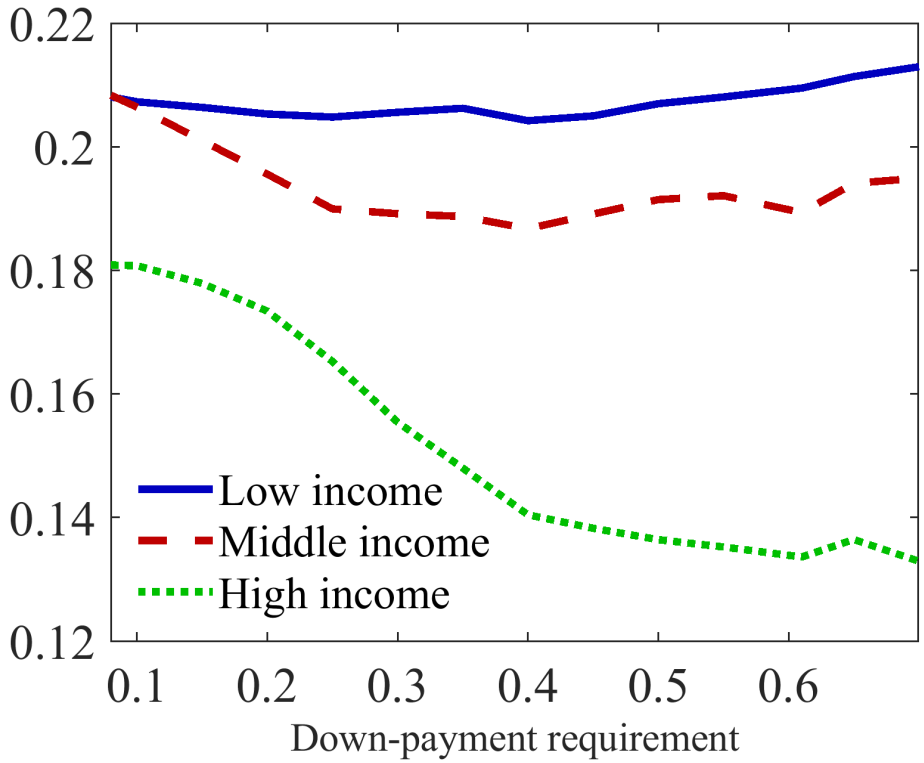
(B) Consumption response, mortgage effect



Back to Results

Fiscal transfers

Mean MPC for different income groups



Back to Results