Consumer Bankruptcy as Aggregate Demand Management

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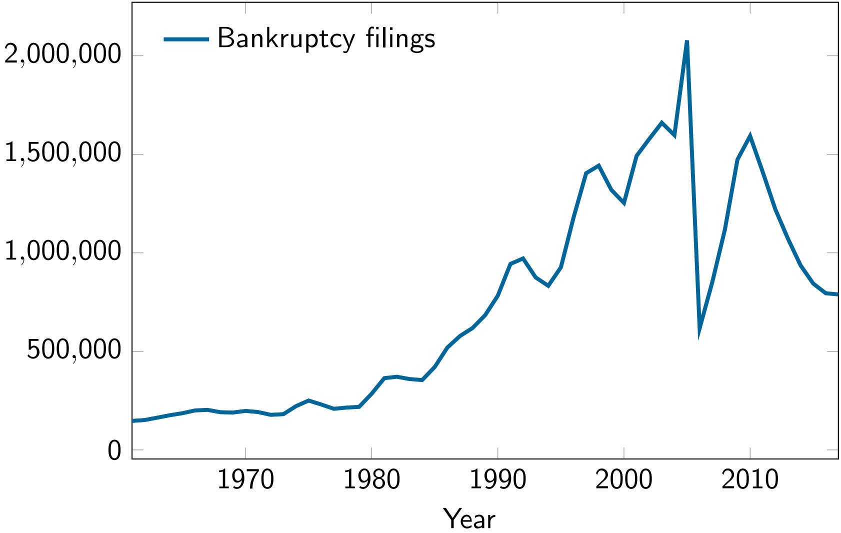
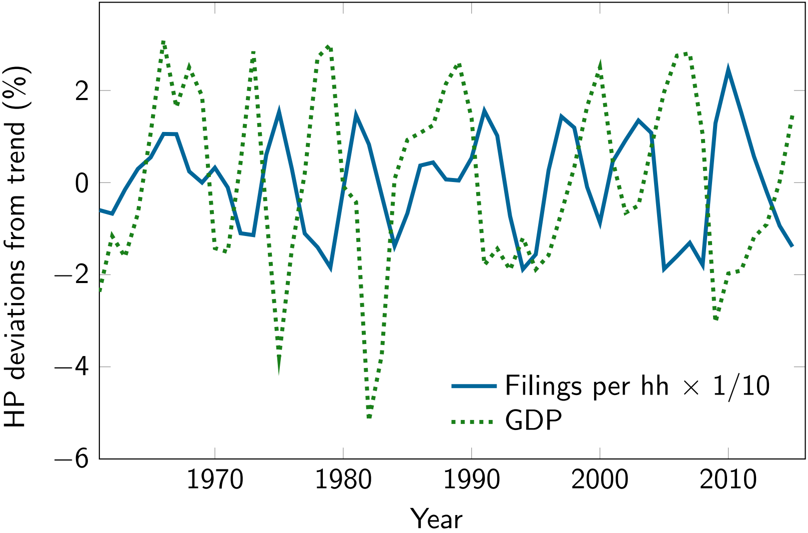
Consumer bankruptcy in the U.S.

- Common phenomenon...



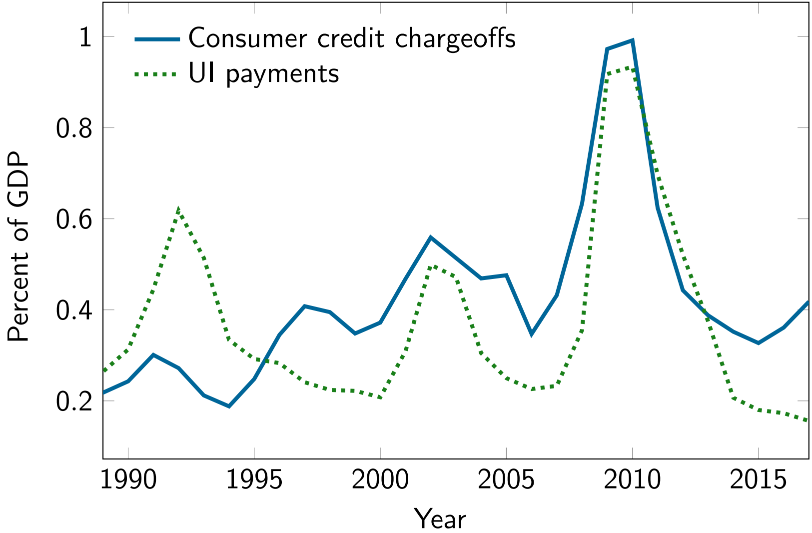
Consumer bankruptcy in the U.S.

- Common phenomenon, and highly countercyclical



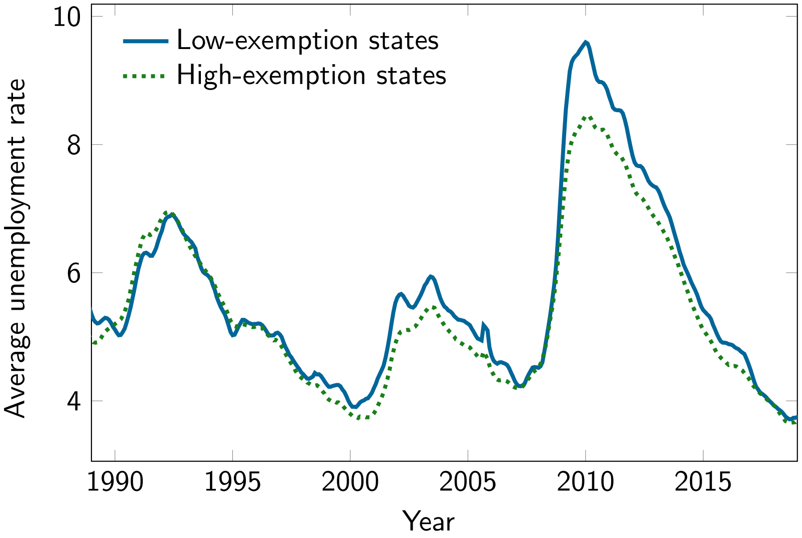
Consumer bankruptcy in the U.S.

- Credit relief comparable to unemployment insurance in magnitude



Consumer bankruptcy in the U.S.

- More generous states less sensitive to the cycle more



Consumer bankruptcy and aggregate stabilization

- In the data:
  a) Consumer bankruptcy is large and countercyclical
  b) Downturns tend to be less severe when there is more debt relief, at least across regions [Verner-Gyongyosi 2019, Auclert et al 2021]

- **Q**: To what extent does bankruptcy act as an *automatic stabilizer*?

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- **Q**: To what extent does bankruptcy act as an *automatic stabilizer*?

- Our paper: a framework + quantitative theory to answer this Q
  1. Define what an automatic stabilizer *is*
  2. Show that consumer bankruptcy has the features of one
  3. Quantitatively evaluate the extent to which bankruptcy reduces the magnitude of output fluctuations, and effect of alternative policy rules

Related literatures

- Automatic stabilizers and the business cycle
  - IS-LM: income tax, govt spending [Musgrave-Miller 1948, Christiano 1984]
  - HANK: income tax [McKay-Reis 2016], UI [McKay-Reis 2020, Kekre 2021]
- Aggregate demand effect of credit-relief policy
  - [recently student loans: Dinerstein-Yannelis-Chen 2023; Katz 2023]
- Quantitative literature on consumer bankruptcy
  - Insurance vs credit access [Zame 93, Livshits et al 07, Chatterjee et al 07, ...]
  - Add business cycle fluctuations [Nakajima Rios-Rull 16, Fieldhouse et al 11]
  - Add nominal rigidities [new!]

Outline

1. Automatic stabilizers in a two period framework
2. Consumer default as an automatic stabilizer
3. Quantitative evaluation

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Overview

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  1. $\epsilon_s \equiv \frac{\partial s}{\partial y}$ be the sensitivity of some aggregate s to output y
  2. $\alpha_s \equiv \frac{\partial AD}{\partial s}$ be the sensitivity of aggregate demand to s

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- Examples of stabilizers:
  - government spending g: $\epsilon_g < 0$, $\alpha_g > 0$
  - income tax t: $\epsilon_t > 0$, $\alpha_t < 0$
  - monetary policy (real interest rate r): $\epsilon_r > 0$, $\alpha_r < 0$

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  - monetary policy (real interest rate r): $\epsilon_r > 0$, $\alpha_r < 0$
- If $\epsilon_s \cdot \alpha_s > 0$, it's an **automatic destabilizer**
  - e.g. Fisher debt deflation (price level P): $\epsilon_P > 0$, $\alpha_P > 0$

Model setup: households

- Two periods $t = 0, 1$ (short and long-run)
  - Production in period 0: $y_0 = A_0 n_0$, flex prices, partially rigid wages
  - Endowment in period 1: $y_1 = 1$

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- I groups of heterogeneous agents, mass μ^i each
  - discount factor β^i, borrowing constraint $\overline{b_1^i}$, inequality e_0^i, risk $e_1^i \sim F^i$
  - proportional taxation: post-tax income $z_{it} = (1 - \tau_t)\, y_{it}$; $z_t \equiv \mathbb{E}\left[z_{it}\right]$
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  - write $\Theta \equiv \left(\beta^i, \overline{b_1^i}, e_0^i, F^i\right)$
- **Consumption function** $c_0(z_0, z_1, \Theta) \equiv \sum_i \mu^i c_0^i(z_0, z_1, \Theta)$, with

$$c_0^i(z_0, z_1, \Theta) = \arg\max_{b_1^i \leq \overline{b_1^i}} u\left(c_0^i\right) + \beta^i \mathbb{E}\left[u\left(c_1^i\right)\right]$$

$$c_0^i = \frac{e_0^i}{\mathbb{E}\left[e_0^i\right]} z_0 + \frac{1}{R} b_1^i; \quad c_1^i = \frac{e_1^i}{\mathbb{E}\left[e_1^i\right]} z_1 - b_1^i$$

Monetary and fiscal policy and equilibrium

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  - Period 1: constant g_1, t_1 is residual to ensure:

$$t_0(y_0) + \frac{t_1}{R} = g_0(y_0) + \frac{g_1}{R} \tag{GIBC}$$

  - (t_0, t_1) levied by changing tax rate τ_0, τ_1
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- **Equilibrium** for given Θ is y_0 that solves:

$$c_0(y_0 - t_0(y_0), 1 - t_1, \Theta) + g_0(y_0) = y_0 \quad \text{s.t.} \quad \text{(GIBC)}$$

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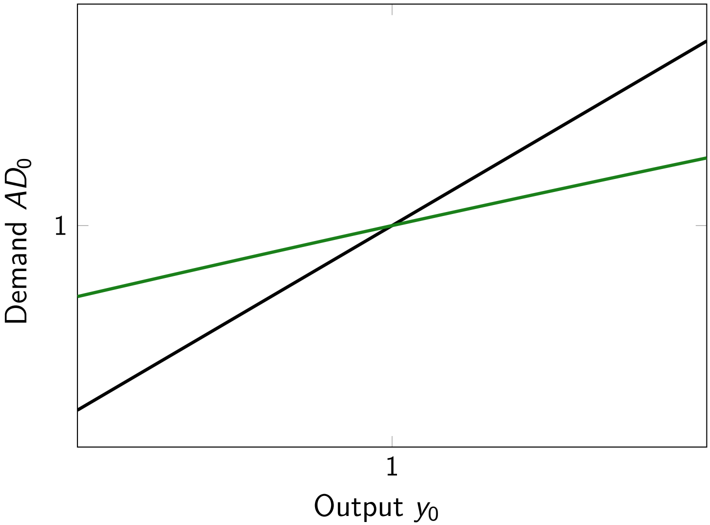
$$AD_0(y_0, t_0(y_0), g_0(y_0), \Theta) = y_0$$

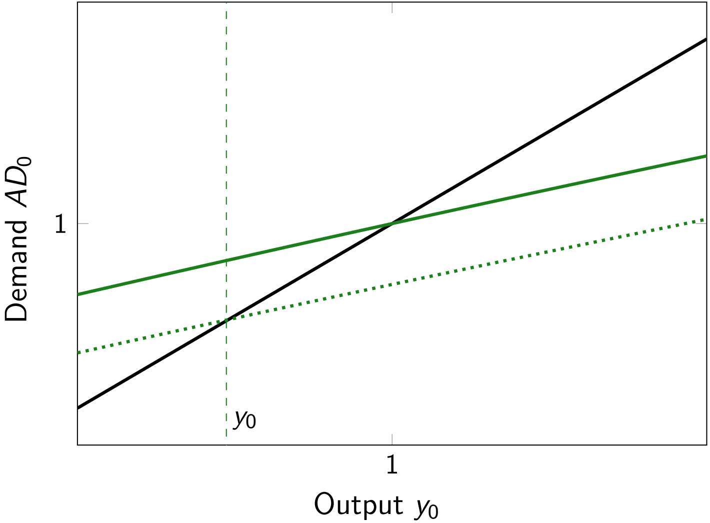
Taxes and spending as automatic stabilizers

- Initial equilibrium $y_0 = 1$, $\Theta = 0$: $AD_0\left(1, t_0\left(1\right), g_0\left(1\right), 0\right) = 1$



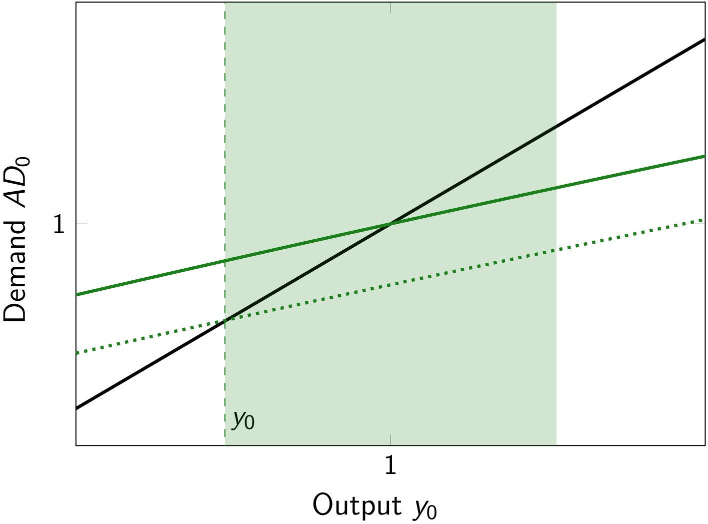
Taxes and spending as automatic stabilizers

- Negative demand shock: $AD_0\left(y_0, t_0\left(y_0\right), g_0\left(y_0\right), \Theta\right) = y_0$



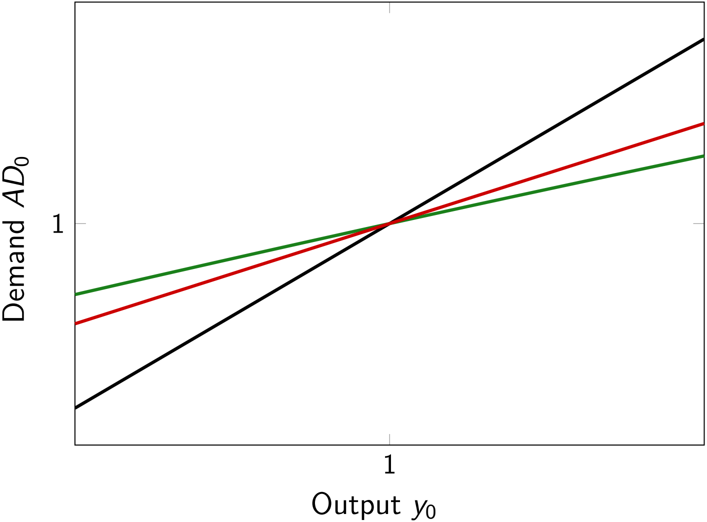
Taxes and spending as automatic stabilizers

- Output fluctuations under demand shocks



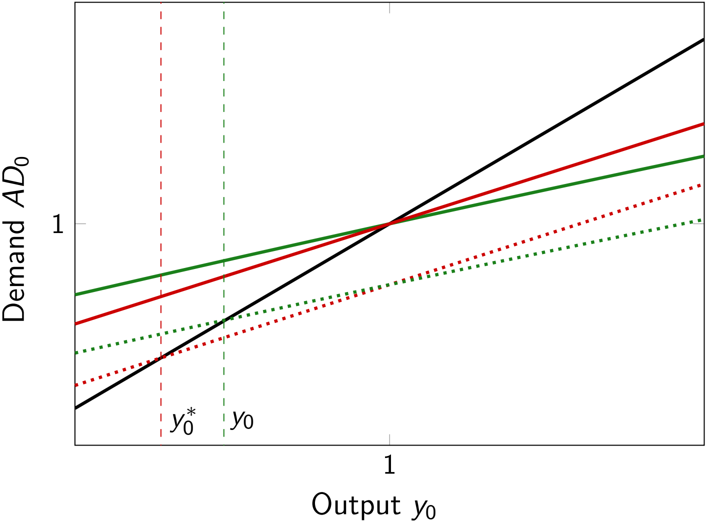
Taxes and spending as automatic stabilizers

- Counterfactual with fixed t_0, g_0: we'll see that $AD_0(y_0)$ *steepens*



Taxes and spending as automatic stabilizers

- Same demand shock, larger change in y_0^* st $AD_0\left(y_0^*, t_0, g_0, \Theta\right) = y_0^*$



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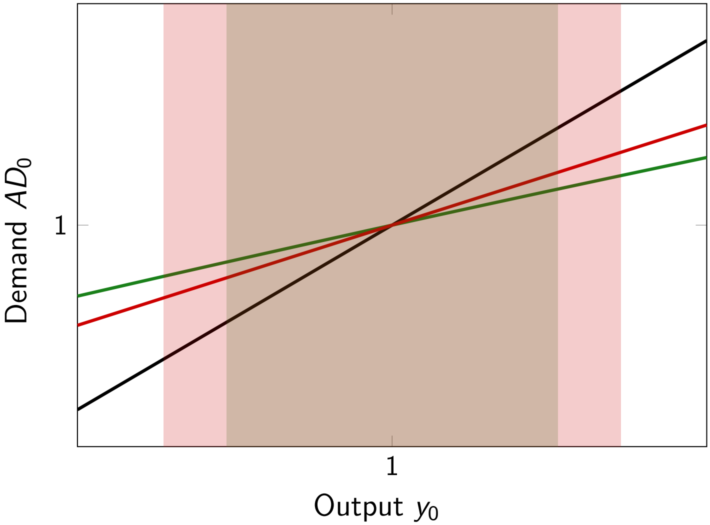

General formulation

- With S stabilizers, determination of period 0 output is

$$AD\left(y, s_1\left(y\right) \cdots s_S\left(y\right), \Theta\right) = y$$

- Let dy^* be outcome with all stabilizers shut off, $\epsilon_s = 0$.
- Let $M^* \equiv \left(1 - \frac{\partial AD}{\partial y}\right)^{-1}$ be the Keynesian multiplier in that case.

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Proposition (Contribution of automatic stabilizers to fluctuations)

$$\frac{\mathrm{std}\left(dy^*\right)}{\mathrm{std}\left(dy\right)} = 1 + M^* \cdot \sum_{s \in S}\left(-\epsilon_s \cdot \alpha_s\right)$$

Taxes and spending as automatic stabilizers

- **Stabilization ratio**:

$$\boxed{\eta = \frac{\mathrm{std}\left(dy^{*}\right)}{\mathrm{std}\left(dy\right)} = 1 + M^{*} \cdot \sum_{s \in S} \left(-\epsilon_{s} \cdot \alpha_{s}\right)}$$

"How much more volatile would output be without stabilizers?"

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- For instance, here with t and g as stabilizers,

$$\eta = 1 + \epsilon_t \cdot \frac{MPC_0 - R \cdot MPC_1}{1 - MPC_0} + \left(-\epsilon_g\right) \cdot \frac{1 - R \cdot MPC_1}{1 - MPC_0}$$

  where $MPC_0 = \frac{\partial c_0}{\partial z_0}$ and $MPC_1 = \frac{\partial c_0}{\partial z_1}$.

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  where $MPC_0 = \frac{\partial c_0}{\partial z_0}$ and $MPC_1 = \frac{\partial c_0}{\partial z_1}$.

- In full-fledged HANK model go, similar formula, but need to adjust "MPC_0" for persistence of shock, then can set "MPC_1"$= 0$.

Automatic stabilizers quantified

	Stabilization ratio		
	Suff. stat.	Simple HANK	Quant. Model
Acyclical G	1.20	1.21	
Acyclical deficits	1.09	1.09	
Acyclical bankuptcy	—	—	
All three acyclical	—	—	
Active bankruptcy policy	—	—	

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1. Automatic stabilizers in a two period framework
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Updated environment

- Two types $I = 2$ (borrowers and savers)
  - Mass $1/2$ of savers S
  - Mass $1/2$ of borrowers B, with option to default in both periods
  - For simplicity: no taxes/spending, $z_{it} = e_{it} y_t$
- Borrowers now have defaultable legacy debt $b_0 > 0$ owed to savers

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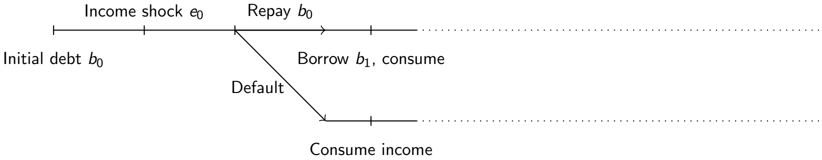
- Borrowers now have defaultable legacy debt $b_0 > 0$ owed to savers
  - Default involves utility cost K_0, K_1 and financial market exclusion
  - We think of K_0, K_1 as an **instruments of policy** (more instruments later)

Timeline

- Two periods $t = 0, 1$



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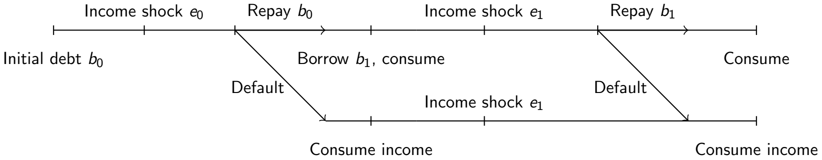

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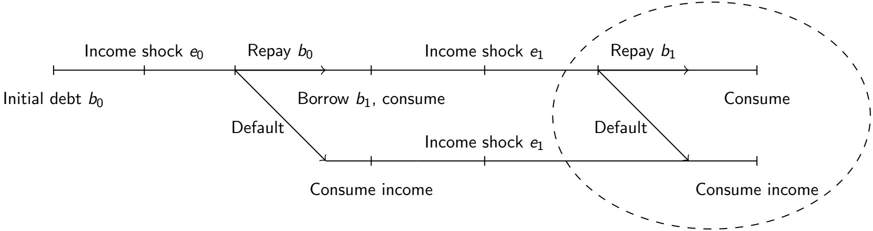
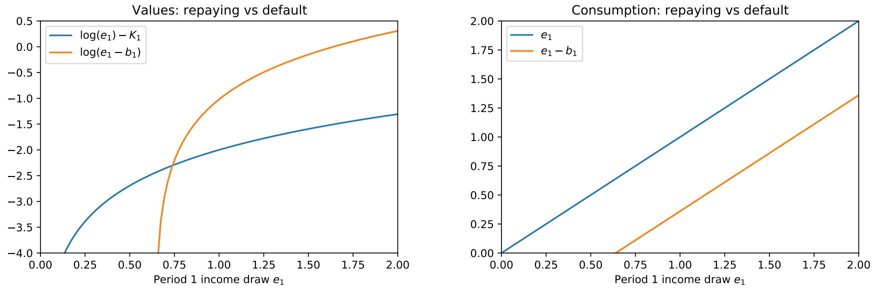


Period 1 choice

$$V(e_1, b_1) = \max\{u(e_1 - b_1); u(e_1) - K_1\}$$



Period 1 choice

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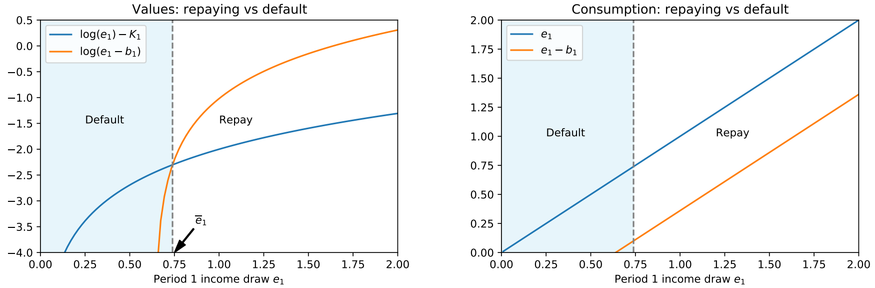
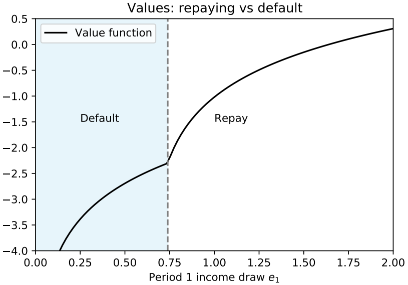
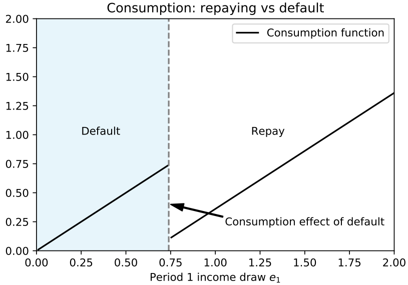


- Default decision characterized by income threshold $\overline{e_1}$
- Repay when $e_1 \geq \overline{e_1}$

Period 1 choice

$$V\left(e_1, b_1\right) = \begin{cases} u\left(e_1\right) - K_1 & e_1 \leq \overline{e_1}\left(b_1\right) \\ u\left(e_1 - b_1\right) & e_1 > \overline{e_1}\left(b_1\right) \end{cases}$$

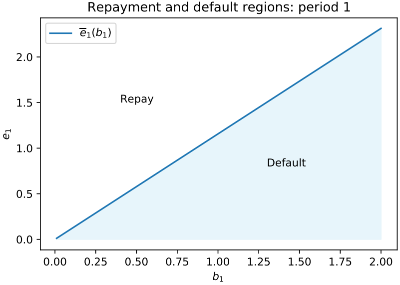




- Here, **consumption effect of default** is $CED = b_1$
- Intuitively, debt repayment is foregone consumption

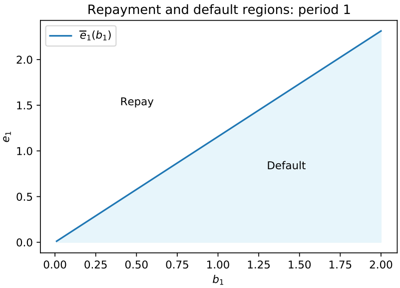
Entering period 1: probability of default

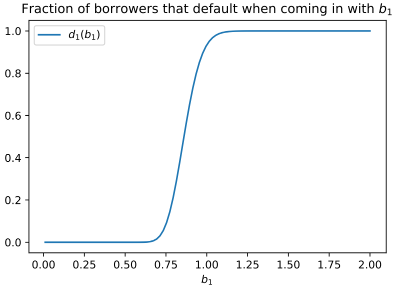
- Bottom line: default if $e_1 \leq \overline{e_1}(b_1)$
- More likely to default if more indebted, or lower income



Entering period 1: probability of default

- Bottom line: default if $e_1 \leq \overline{e_1}(b_1)$
- More likely to default if more indebted, or lower income
- Income shocks e_1 distributed i.i.d with cdf F
- Fraction of borrowers that default given b_1: $d_1(b_1) = F(\overline{e_1}(b_1))$





Loan pricing: banks internalize default risk

- Competitive intermediaries face cost of funds R, diversify loan risks
- Amount they offer to a borrower that promises to repay b_1:

$$Q\left(b_1\right) = \frac{b_1}{R}\left(1 - d_1\left(b_1\right)\right)$$

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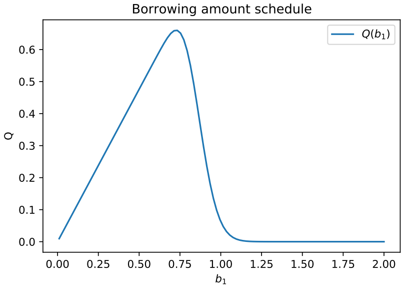

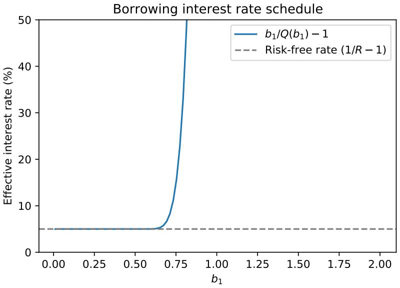

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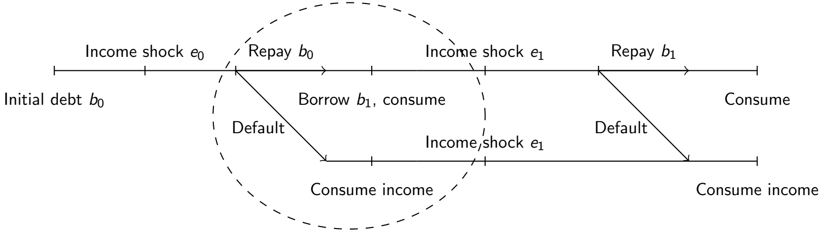

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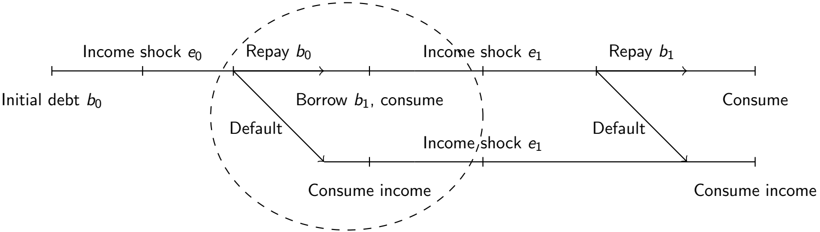


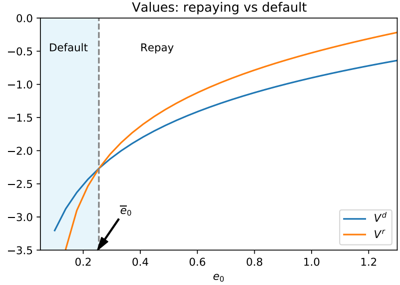
- Period 0 GDP is y_0
- Household with income shock e_0 chooses $\max\left\{V^r(e_0), V^d(e_0)\right\}$ w.

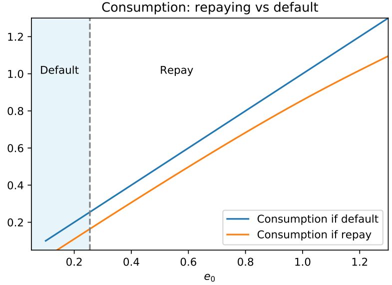
$$V^r(e_0) = \max_{b_1}\left\{u\left(y_0 e_0 - b_0 + Q(b_1)\right) + \beta\mathbb{E}_{e_1}\left[V(e_1, b_1)\right]\right\}$$

$$V^d(e_0) = u(y_0 e_0) + \beta\mathbb{E}_{e_1}\left[u(e_1)\right] - K_0$$

Period 0 choice and default rate

$$V_0(e_0) = \max\left\{V^r(e_0); V^d(e_0)\right\}$$





- Assume parameters are such that there is a single threshold $\overline{e_0}$

Period 0 choice and default rate

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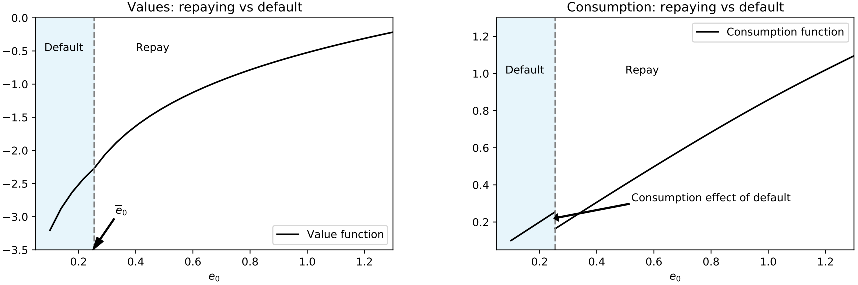

- Consumption effect of default still positive, but less than b_0
- Repayers can roll over some of their debt (depending on Q)

Period 0 choice and default rate

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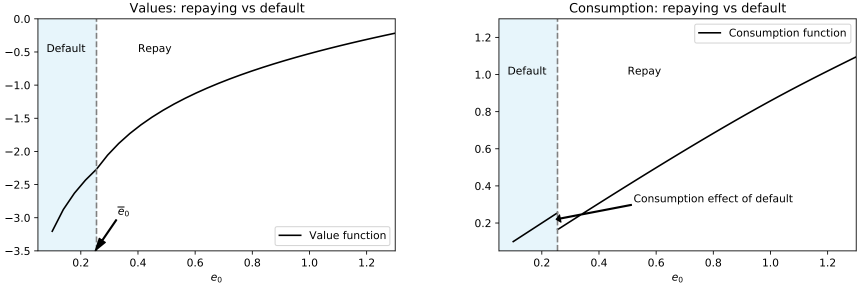

- Income shocks e_0 distributed i.i.d with cdf F (mean 1)
- Fraction of consumers who default at date 0: $d_0 = F\left(\overline{e_0}\right)$

General equilibrium

- Savers own financial intermediaries, have $e_t = 1$ & are unconstrained
  - consume MPC^S out of the PV of income and intermediary profits:

$$c_0^S = MPC^S \left(y_0 + \frac{1}{R} + b_0 \left(1 - d_0\right) \right)$$

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- Aggregate spending in period 0:

$$c_0 \left(y_0, d_0 \left(y_0 \right) \right) = \frac{1}{2} \int c_0^B \left(e_0 \right) dF \left(e_0 \right) + \frac{1}{2} c_0^S$$

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- New equation characterizing equilibrium:

$$c_0\left(y_0, d_0\left(y_0\right)\right) = y_0$$

How consumer default affects the Keynesian cross

- What is α for consumer default d ?

$$\alpha_d = \frac{\partial AD}{\partial d} = \left(ACED - MPC^S\right) \cdot \frac{b_0}{2}$$

ACED is the consumption effect of default for the marginal defaulter, normalized by her debt b_0

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  $ACED$ is the consumption effect of default for the marginal defaulter, normalized by her debt b_0

- What is ϵ for consumer default d ?

$$\epsilon_d = \frac{\partial d}{\partial y} = F'\left(\overline{e_0}\right) \frac{\partial \overline{e_0}}{\partial y} < 0$$

  since higher output raises $V^r - V^d$ for all e_0

- So, provided that:

$$ACED > MPC^S$$

  consumer default fits our definition of an automatic stabilizer

Bankruptcy as an automatic stabilizer

Lemma (Automatic stabilizer role of bankruptcy)

Let y_0^* denote output in counterfactual with cst d_0. For small shocks:

$$\frac{\mathrm{std}\left(dy_0^*\right)}{\mathrm{std}\left(dy_0\right)} = 1 + M^* \cdot \left(ACED - MPC^S\right) \frac{b_0}{2y_0} \left(-\frac{\partial d_0}{\partial \log y_0}\right)$$

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- Sufficient statistic for original $\mathbf{Q}$. Back of envelope:
  - $MPC^S \simeq 0$ to 0.15 from studies of spending from illiquid accounts
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  - For instance:

$$1 + \underbrace{M^*}_{2} \cdot \left(\underbrace{ACED}_{0.5} - \underbrace{MPC^S}_{0}\right) \cdot \underbrace{\frac{b_0}{2y_0}}_{0.25} \cdot \underbrace{\left(-\frac{\partial d_0}{\partial \log y_0}\right)}_{\sim 0.5} \sim 1.13$$

Automatic stabilizers quantified

	Stabilization ratio		
	Suff. stat.	Simple HANK	Quant. Model
Acyclical G	1.20	1.21	
Acyclical deficits	1.09	1.09	
Acyclical bankuptcy	1.13	—	
All three acyclical	1.42	—	
Active bankruptcy policy	—	—	

Outline

1. Automatic stabilizers in a two period framework
2. Consumer default as an automatic stabilizer
3. Quantitative evaluation

Quantitative model overview

- "HANK" w/ household default
  - similar to Livshits, MacGee, Tertilt (2007)
  - but general equilibrium + nominal rigidities
- Household model:
  - OLG, ages $j = 1 \dots J$
  - Idiosyncratic income risk and expenditure risk
- Production:
  - Cobb-Douglas production in k, n, adj costs on k
  - Sticky prices and wages $\rightarrow$ standard price and wage NKPCs
- Government policy:
  - Bankruptcy code: filing fee, exclusion from credit, Chapter 7 & 13
  - Fiscal: progressive taxation, PAYGO pensions, rules for g, t
  - Monetary: constant R benchmark (also consider Taylor rule)

Calibration / Estimation

- Calibrate steady state parameters to match
  - life-cycle profiles: income, wealth, consumption, debt and default
  - cross-section: debt, chargeoffs, default, income
- Estimate slopes of NKPCs, fiscal rule parameters, and shock processes for $\beta, g, mp, tfp, tax, \epsilon^p, \epsilon^w, \zeta^m$, via SMM to match
  - standard deviations and covariances of standard aggregates
  - cyclicality of bankruptcy, chargeoffs and debt
  - regression coefficient of output on taxes and spending
  - fiscal rule parameter estimates: $\phi_{ty} = 0.34$, $\phi_{gy} = -0.15$

Cyclical Properties of Data & Model

	Model			Data		
Var	Std Dev	Cor(y,x)	Cor(x,x_{-1})	Std Dev	Cor(y,x)	Cor(x,x_{-1})
Y	0.011	1.000	0.619	0.010	1.000	0.880
C	0.015	0.502	0.355	0.009	0.883	0.876
G	0.014	-0.768	0.634	0.012	-0.420	0.848
I	0.050	0.928	0.621	0.054	0.894	0.872
N	0.015	0.938	0.629	0.011	0.808	0.960
BK	0.144	-0.173	0.612	0.170	-0.251	0.409
CO	0.172	-0.327	0.785	0.185	-0.604	0.812
D	0.039	-0.323	0.869	0.024	-0.180	0.914
w	0.019	0.466	0.496	0.931	-0.048	0.229
π	0.033	-0.042	0.314	0.011	0.198	0.777
i	0.024	0.251	0.690	0.028	0.370	0.988
π^w	0.023	0.112	0.715	1.675	0.103	0.766
tax	0.037	0.651	0.557	0.060	0.579	0.567
B^g/Y	0.017	-0.794	0.745	0.048	-0.558	0.901

Param. Estimates · Variance decomp. · IRFs

Model counterfactuals

Counterfactuals

1. Baseline: turn off benchmark automatic stabilizers
   - Countercyclical government spending
   - Countercyclical deficits
2. Eliminate countercyclical bankruptcy
   - Penalties increase in recessions to ensure acyclical default rate
3. Active use of bankruptcy policy for demand magement
   - Penalties reduced in recession, triples bankruptcy rate cyclicality

Automatic stabilizers quantified

	Stabilization ratio		
	Suff. stat.	Simple HANK	Quant. Model
Acyclical G	1.20	1.21	1.22
Acyclical deficits	1.09	1.09	1.11
Acyclical bankuptcy	1.13	—	1.06
All three acyclical	1.42	—	1.44
Active bankruptcy policy	—	—	0.92

Comparison to earlier papers on automatic stabilizers

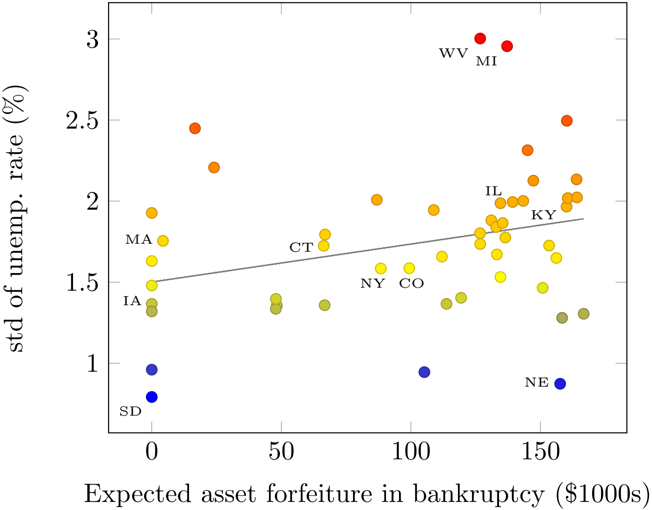
- McKay-Reis (2016)
  - Remove income tax stabilizers $\rightarrow$ *reduce* $\mathrm{std}(Y)$ by 0.5%
  - Our model $\rightarrow$ increase $\mathrm{std}(Y)$ by 11%
- Kekre (2021)
  - Increase generosity of UI by $4\times \rightarrow$ reduce $\mathrm{std}(Y)$ by 8%
  - Our active policy: increase $\frac{\partial d}{\partial \log y}$ by $3\times \rightarrow$ reduce $\mathrm{std}(Y)$ by 8%

Conclusion

- Bankruptcy serves as an automatic stabilizer in response to shocks
  - Transfer that rises in bad times, reduces magnitude of fluctuations
  - Quantitatively, dampens output fluctuations by around 6%
- Active bankruptcy policy can help aggregate demand management
  - Simple "lean against wind" policy further dampens by 8%
- Feasible alternative to ad-hoc policy changes that
  - achieves ex-post redistribution to constrained households
  - avoids credit supply contraction

Thank you!

Bankruptcy generosity and unemployment cyclicality



Back

Simple HANK model

- Consider a canonical HANK model with demand shock Θ
- Intertemporal Keynesian Cross: [Auclert-Rognlie-Straub]

$$d\mathbf{Y} = d\mathbf{C} + d\mathbf{G} = \mathbf{M}\left(d\mathbf{Y} - d\mathbf{T}\right) + \mathbf{M}^{\Theta} d\Theta + \mathbf{M} d\mathbf{G}$$

- Fiscal rules

$$\begin{aligned} dG_t &= \epsilon_g dY_t \\ dT_t &= \epsilon_t dY_t + \phi_t dB_{t-1} \end{aligned}$$

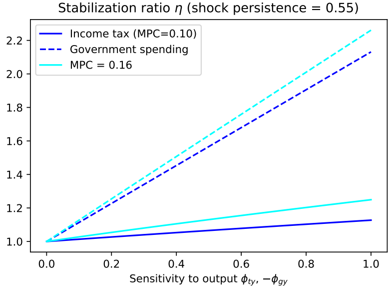
- Then:

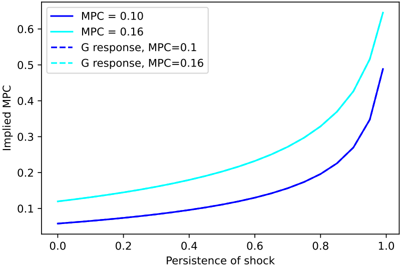
$$\left[I - \mathbf{M} + \epsilon_t \left(\mathbf{M} - \phi_t \mathbf{MC}\left(\rho\right)\right) + \left(-\epsilon_g\right)\left(\mathbf{I} - \phi_t \mathbf{MC}\left(\rho\right)\right)\right] d\mathbf{Y} = \mathbf{M}^{\Theta} d\Theta$$

  where $\rho \equiv 1 + r - \phi_t < 1$.

- Calibrate the model to feature a certain $M_{0,0}$, then feed in shocks $d\Theta$ with different persistences, calculate $\eta \equiv \mathrm{sd}\left(d\mathbf{Y}^*\right)/\mathrm{sd}\left(d\mathbf{Y}^*\right)$

Stabilization coefficient in simple HANK model





Implied MPC from

$$\eta = 1 + \epsilon_t \cdot \frac{MPC}{1 - MPC} + (-\epsilon_g) \cdot \frac{1}{1 - MPC}$$

Back

Model setup: household problem

- Write S for aggregate state
- Consider interim state after shocks z, κ have realized
- Household with option to default solves:

$$W_j(b, z, \kappa; S) = \mathbb{E}_{\epsilon^R, \epsilon^D}\left[\max_{d \in \{0,1\}} (1-d)\left(V_j^R(b, z, \kappa; S) + \epsilon^R\right) + d\left(V_j^D(z; S) + \epsilon^D\right)\right]$$

where ϵ^R, ϵ^D are type-I EV distributed with parameter $\frac{1}{\alpha}$.

- Value of repaying is:

$$\begin{aligned} V_j^R(b, z, \kappa; S) \quad &= \quad \max_{c, beq \geq 0, b'} u(c) - v(n) + 1_{\{j=J\}} w\left(beq\right) \\ & \quad\quad +\beta 1_{\{j \neq J\}} \mathbb{E}\left[W_{j+1}(b', z', \kappa'; S')\right] \\ s.t. & \\ c + \frac{beq}{1+r} + Q_j^R(b', z; S) \quad &= \quad b - \kappa + y_j\left(z, n\right) \end{aligned}$$

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where ϵ^R, ϵ^D are type-I EV distributed with parameter $\frac{1}{\alpha}$.

- Value of defaulting is:

$$V_j^D(z;S) = \begin{cases} X_j\left(-F-\gamma y_j(z,n),z;S\right)-K & y_j(z,n)\leq \overline{y_j} \\ X_j\left(\overline{b}_j(z)-F,z;S\right)-K & \text{otherwise} \end{cases}$$

where

$$\overline{b}_j(z) = -\frac{\bar{\zeta} y_j(z,n)}{\nu}$$

Model setup: exclusion value

- Value function in exclusion given by:

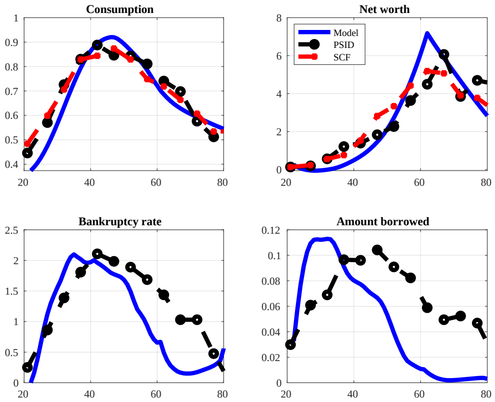
$$
\begin{aligned}
X_j(b,z,\kappa;S) \quad = \quad & \max_{c,beq\geq 0,b'>b^{max}} u(c)-v(n)+1_{\{j=J\}}w\left(b'\right) \\
& +\beta 1_{\{j\neq J\}}\Big\{\nu\mathbb{E}\left[V_{j+1}(b',z',\kappa';S')\right] \\
& +(1-\nu)\mathbb{E}\left[X_{j+1}(b',z',\kappa';S')\right]\Big\}
\end{aligned}
$$

subject to

$$
\begin{aligned}
c+\frac{beq}{1+r}+Q_j^X(b',z;S) \quad &= \quad b+y_j\left(z,n\right)+T_j(b,z,\kappa) \\
b^{max} \quad &\equiv \quad \min\left\{0,Q_j^X(b',z;S)-b=\bar{\zeta}y_j\left(z,n\right)\right\}
\end{aligned}
$$

where $T_j(b,z,\kappa)$ is a transfer to guarantee households a consumption floor $\underline{c}$ in exclusion.

Calibrated life-cycle profiles



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Estimated shock processes

Z	σ^Z	ρ^z
mp	0.01	0.65
β	0.001	0.54
G	0.002	0.90
tfp	0.001	0.98
ϵ	1.05	0.5
ϵ^w	0.64	0.32
tax	0.007	0.30

Model all shocks as AR(1), eg, $Z_t = \rho^z Z_{t-1} + \sigma^z \eta$, $\eta \sim N(0,1)$

Back

Estimated parameters

Parameter	Interpretation	Value
κ^w	Slope of wage NKPC	0.005
κ^p	Slope of price NKPC	2.69
Ψ	Elasticity of investment to Q	1.89
ϕ_π	Taylor rule coef. on π_{t+1}	1
$\phi_{g,y}$	Spending rule coef. on y_t	-0.155
$\phi_{\tau,y}$	Tax rule coef. on y_t	0.3357
$\phi_{g,b}$	Spending rule coef. on b_{t-1}	0
$\phi_{\tau,b}$	Tax rule coef. on b_{t-1}	0.024

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Variance decomposition

		Variance Decomposition						
Variable	Std Dev	β	mp	G	tfp	ϵ	ϵ^w	tax
Y	0.0185	7%	29%	48%	1%	0%	8%	7%
C	0.0143	31%	4%	33%	2%	0%	12%	18%
G	0.0262	2%	7%	87%	0%	0%	2%	2%
I	0.0711	0%	60%	26%	0%	0%	9%	3%
N	0.0230	7%	30%	45%	5%	0%	8%	7%
BK	0.118	1%	17%	33%	3%	0%	7%	40%
CO	0.180	1%	12%	38%	3%	0%	8%	38%
d	0.0592	1%	7%	46%	3%	0%	14%	30%
w	0.0096	1%	1%	51%	1%	0%	33%	13%
π^w	0.0102	1%	4%	50%	2%	0%	26%	17%
π	0.0271	1%	4%	49%	2%	0%	26%	18%
i	0.0270	1%	11%	46%	2%	0%	24%	17%

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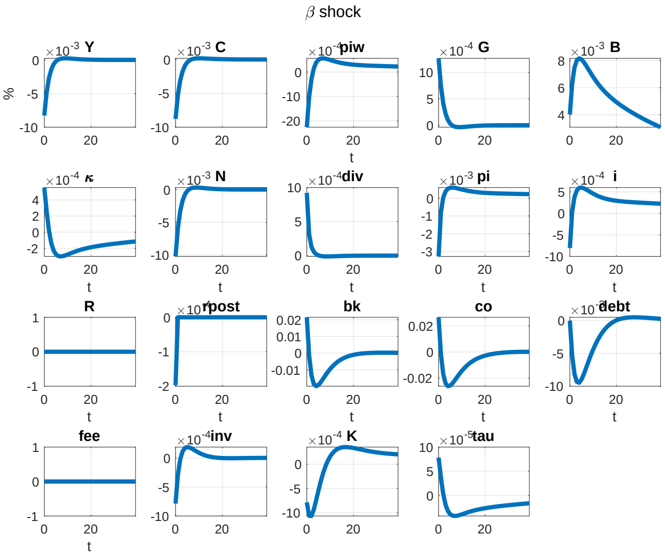
IRFs to Estimated Shocks



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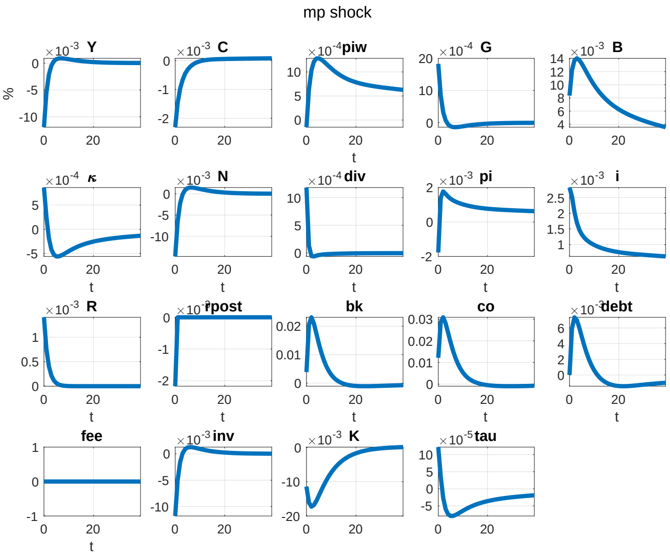

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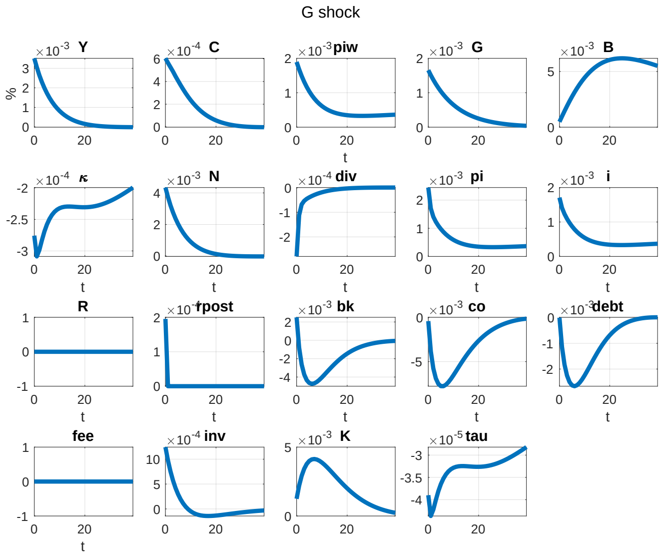

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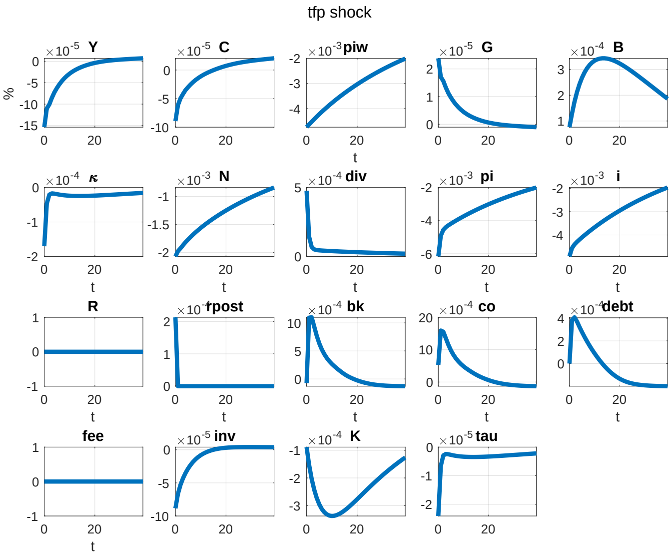

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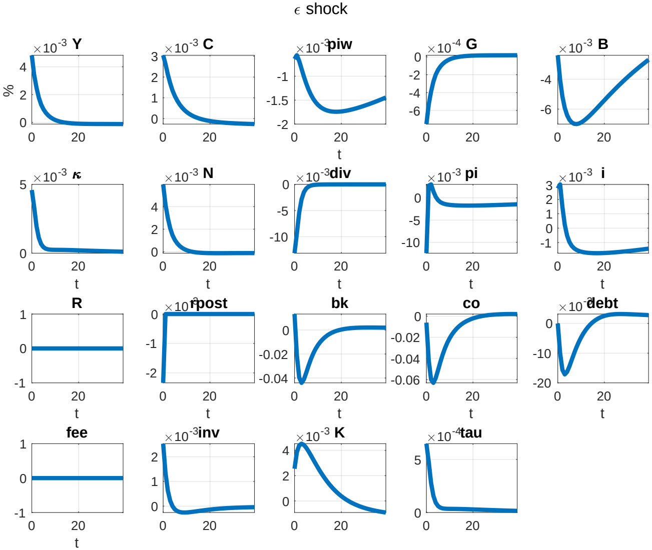

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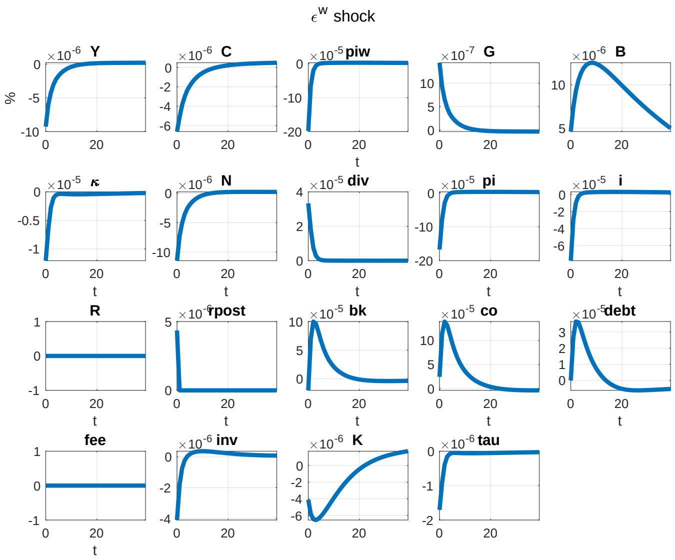

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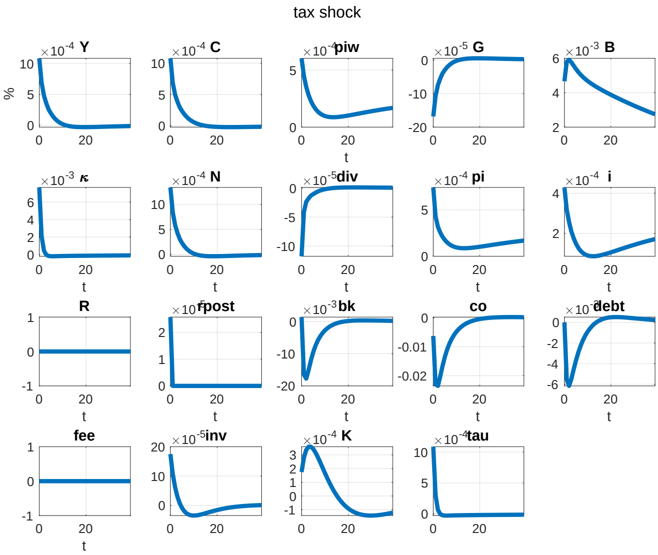

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