The Macroeconomics of Household Debt Relief

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INET Private Debt Conference
February 2022
High household debt in the U.S.

Source of concern?
Delinquencies shot up during Great Recession (though fell recently)
Debt relief?

- Frequent proposals for household debt relief, e.g:
  - Biden plan to cancel $10,000/person of student debt
  - covid-19 moratoria on foreclosures and student debt repayment
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- Why would the government interfere with private debt contracts?
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- Why would the government interfere with private debt contracts?
  1. want to achieve a certain level of redistribution
  2. want to increase aggregate demand, and think debt holds it back
Debt relief?

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- Why would the government interfere with private debt contracts?
  1. want to achieve a certain level of redistribution
  2. want to increase aggregate demand, and think debt holds it back

- Not obvious that any given debt relief proposal will achieve these!
  - Need to account for losers from debt relief, response of credit supply

- Today: a simple macro model of debt relief to think about all this
  - what types of debt relief are effective at achieving these goals?
Outline

1. Model

2. Ex-post debt relief
   Macro effect
   Welfare effect

3. Ex-ante debt relief
   Macro effect
   Welfare effect

4. Systematic debt relief
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Timeline

- Two periods $t = 0, 1$

\begin{align*}
\text{Income shock } e_0 & \quad \xrightarrow{\text{Repay } b_0} \\
\text{Initial debt } b_0 & \quad \xrightarrow{\text{Default}} \quad \text{Borrow } b_1, \text{ consume} \\
& \quad \xrightarrow{\text{Consume income}}
\end{align*}
Timeline

- Two periods $t = 0, 1$

Income shock $e_0$ ➔ Repay $b_0$ ➔ Income shock $e_1$ ➔ Repay $b_1$

Initial debt $b_0$ ➔ Default ➔ Borrow $b_1$, consume ➔ Default ➔ Income shock $e_1$ ➔ Consume income ➔ Consume income

Log utility over consumption, utility penalty for defaulting of $K_t$
Timeline

- Two periods $t = 0, 1$

Income in period $t$ is $e_t y_t$, where $y_t$ is aggregate income (GDP)

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- Log utility over consumption, utility penalty for defaulting of $K_t$

- Period 1: GDP is at potential $y_1 = 1$, consumer with $b_1$ chooses:

$$\max \{ \log (e_1 - b_1); \log (e_1) - K_1 \}$$
Period 1 choice

\[ V(e_1, b_1) = \max \{ \log(e_1 - b_1); \log(e_1) - K_1 \} \]
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- Default decision characterized by an *income threshold* \( \bar{e}_1 \)
- High income people repay, low income default
Period 1 choice

\[ V(e_1, b_1) = \begin{cases} \log(e_1) - K_1 & e_1 \leq \bar{e}_1(b_1) \equiv \frac{b_1}{1-e^{-K_1}} \\ \log(e_1 - b_1) & e_1 > \bar{e}_1(b_1) \end{cases} \]

- Here consumption effect of default is equal to \( b_1 \)
- Intuitively, debt repayment is foregone consumption
Entering period 1: probability of default

- Bottom line: default if $e_1 \leq \bar{e}_1(b_1)$
- More likely to default if more indebted, or lower income
Entering period 1: probability of default

- Bottom line: default if $e_1 \leq \bar{e}_1(b_1)$
- 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 $b_1$: $d_1(b_1) = F(\bar{e}_1(b_1))$
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 $b_1$:

$$Q(b_1) = \frac{b_1}{R} (1 - d_1(b_1))$$
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![Borrowing amount schedule](image1)

![Borrowing interest rate schedule](image2)
Period 0 choice

Initial debt $b_0$

Income shock $e_0$ → Repay $b_0$ → Income shock $e_1$ → Repay $b_1$

- Borrow $b_1$, consume
- Default
- Consume income

Consumption income

Period 0 GDP equals $y_0$

Household with income shock $e_0$ chooses max \{ $V_r(e_0)$, $V_d(e_0)$ \}.

$V_r(e_0) = \max_b \{ \log (y_0 e_0 - b_0 + Q(b_1)) + \beta E e_1 [V(e_1, b_1)] \}$

$V_d(e_0) = \log (y_0 e_0) + \beta E e_1 [\log (e_1)] - K_0$
Period 0 choice

Income shock $e_0$  Repay $b_0$  Income shock $e_1$  Repay $b_1$

Initial debt $b_0$  Borrow $b_1$, consume  Default  Consume

Consume income  Income shock $e_1$  Default  Consume income

$V_r(e_0) = \max b_1 \{ \log (y_0 e_0 - b_0 + Q(b_1)) + \beta E[e_1[V(e_1, b_1)]] \}$

$V_d(e_0) = \log (y_0 e_0) + \beta E[e_1[\log (e_1)] - K_0$
Period 0 choice

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

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

\[
V^d (e_0) = \log (y_0 e_0) + \beta \mathbb{E}_{e_1} [\log (e_1)] - K_0
\]
Period 0 choice and default rate

\[ V_0 (e_0) = \max \{ V^r (e_0); V^d (e_0) \} \]
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**

\[ V_0(e_0) = \max \{ V^r(e_0); V^d(e_0) \} \]

- Income shocks \( e_0 \) distributed i.i.d with cdf \( F \) (mean 1)
- Fraction of consumers who default at date 0: \( d_0 = F(\bar{e}_0) \)
General equilibrium

- Savers own financial intermediaries, have $e_t = 1$ & are unconstrained
  - consume $MPC^S$ out of the PV of income and intermediary profits:
    
    $$c^S_0 = MPC^S \left( y_0 + \frac{1}{R} + b_0 (1 - d_0) \right)$$
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    \]
- Mass 1/2 each of borrowers and savers
- Aggregate spending in period 0:
  \[
  c_0 = \frac{1}{2} \int c_0^B (e_0) \, dF (e_0) + \frac{1}{2} c_0^S
  \]
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  \]
- Given \( K_0, K_1 \), in **general eqbm** everyone maximizes and mkts clear
  1. Small open economy: \( R \) fixed, \( c_0 - y_0 \equiv \text{imports} \)
  2. Demand-determined economy: \( R \) fixed, \( y_0 \) adjusts so that \( c_0 = y_0 \)
Debt relief in the model

- We model debt relief as unexpected declines in $K_0$ and/or $K_1$
- Idea: make it easier for borrowers to default, but let them still choose what is optimal for them
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  - Make student loans dischargeable in bankruptcy
  - Lower bankruptcy fees or time bankruptcy stays on credit report
  - Information campaign explaining bankruptcy, or lowering stigma...
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- These are all ways to give debt relief to those who need it most
  - Blanket transfers actually reduce default rates in the model
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- Distinguish between:
  - *Ex-post* debt relief: $K_0 \downarrow$ (after debt issued, but before it’s repaid)
  - *Ex-ante* debt relief: $K_1 \downarrow$ (before debt is issued)
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   Macro effect
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Consumption effect of ex-post debt relief

- Given existing $b_0$, unexpectedly lower $K_0$ by $\Delta K_0$

- For now, no aggregate demand feedback (small open economy)

- Consequences:

  1. Consumer defaults rise by $\Delta d_0$
  2. Aggregate borrower spending increases by $ACED \cdot b_0 \cdot \Delta d_0$ where $ACED$ is the consumption effect of default for the marginal defaulter, normalized by her debt $b_0$
  3. Bank profits fall by $b_0 \Delta d_0$
  4. Saver spending falls by $MPC_S \cdot b_0 \Delta d_0$

Effect on aggregate spending:

$$\Delta c_{soe0} = (ACED - MPC_S) b_0^2 \Delta d_0$$
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Consequences: [assuming $\Delta K_0$ small enough]

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- Effect on aggregate spending:
  \[ \Delta c_{soe}^0 = (ACED - MPC^S) \frac{b_0}{2} \Delta d_0 \]
Effect of fall in $K_0$ on default rate and borrower spending

Values: repaying vs default

Consumption: repaying vs default

Total spending effect: $\Delta d_0 \times ACED \cdot b_0$
Effect of fall in $K_0$ on default rate and borrower spending

- $K_0 \downarrow$ changes $V^d$, not decisions conditional on defaulting/repaying
Effect of fall in $K_0$ on default rate and borrower spending

Values: repaying vs default

Consumption: repaying vs default

Total spending effect: $\Delta d_0 \times ACED \cdot b_0$

- $\Delta d_0$: effect per switcher
- $ACED \cdot b_0$: number of switchers
Macro effect of ex-post debt relief: $ACED$ vs $MPC^S$

- Now, we allow a feedback between consumption and output
- In this demand determined economy, Keynesian-cross logic implies

$$\Delta y_0 = M \cdot (ACED - MPC^S) \frac{b_0}{2} \Delta d_0$$

where $M$ is the (government) spending multiplier

- In the model, $M > 1$, so the direct consumption effect is amplified
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- **Key question**: how large is $ACED$ vs $MPC^S$?
  - $MPC^S \simeq 0$ to 0.15 from studies of spending from illiquid accounts
  - $ACED$ is more complicated: requires unobserved counterfactual
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  - $ACED$ is more complicated: requires unobserved counterfactual
  - Strategy from Indarte (2021): ratio of $\Delta d_0$ from raising income in both states vs only in default state reveals the $ACED$.
  - Her estimates imply $ACED \simeq 0.1$ to 0.5 [depending on risk aversion]
Implementing this to calculate macro effect

- Back-of envelope calculation:
  - Suppose ex-post debt relief that causes default rate on unsecured consumer credit to rise by $\Delta d_0 = 1\%$
  - Upper bound on effect on level of GDP in that year:

\[
\frac{\Delta y_0}{y_0} = \frac{M}{2} \cdot \left( \frac{ACED}{0.5} - \frac{MPC^S}{0} \right) \cdot \frac{b_0}{2y_0} \cdot \Delta d_0 = 0.25\%
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- Is this reasonable?
  - Direct estimates from cross-regional effects suggest yes
    [Verner-Gyöngyösi 2020, Auclert-Dobbie-Goldsmith-Pinkham 2022]
Implementing this to calculate macro effect

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▶ Is this big or small?

▶ For a comparison, the CBO estimates the $783$ billion in stimulus checks in CARES Act boosted GDP by $0.6\%$, so multiplier of $0.16$

▶ Here, debt relief multiplier is $1$ (GDP $0.25\%$ per $52$bn of debt relief)

▶ Caveat: likely an upper bound, and assumes only ex-post relief.
Welfare effect

- Logic for welfare is different
  - Borrower: no effect at margin (indifferent!)
  - ...but inframarginal effect on all $d_0$ defaulters of $\Delta K_0$
  - Savers: lose wealth from extra defaults

- Assume social welfare is $W = \int U^B(e_0) \, dF(e_0) + \lambda U^S$
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Assume social welfare is $W = \int U^B(e_0) \, dF(e_0) + \lambda U^S$ then:

$$\Delta W^{soe} = d_0 - \lambda u'(c_0) \frac{b_0}{2} \Delta d_0$$

Debt relief improves welfare if $\lambda u'(c_0)$ small enough.
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- Further improvement from $\Delta y_0 > 0$ if there is an aggregate demand externality (in demand-determined economy)
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- Questions here:
  - is there no other way to do this redistribution? eg tax system
  - again assumes all ex-post effect. what about ex-ante? next
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Ex-ante debt relief

- Ex-ante debt relief: at time 0, unexpectedly lower $K_1$ by $\Delta K_1$
  - \textit{before} banks choose interest rates ($Q$) and borrowers choose $b_1$

- Consequences:
  
  1. Banks change their debt price schedule to restore zero profits
  2. Aggregate borrower spending unambiguously declines by $\Delta c_{B0} < 0$
  3. Bank profits do not change
  4. Saver spending does not change

Effect on aggregate spending $\Delta c_{soe0} = \Delta c_{B0} < 0$ why? adverse credit supply shift!
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Consequences: [assuming $\Delta K_1$ small enough and small open economy]

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  2. Aggregate borrower spending **unambiguously declines** by $\Delta c_0^B < 0$
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- Effect on aggregate spending

  $$\Delta c_0^{soe} = \frac{\Delta c_0^B}{2} < 0$$

  why? adverse credit supply shift!
Lenders understand that default probability goes up in period 1

- Respond with higher rates/tighter credit limits
Discussion: magnitudes and implementation

- Effect aggravated in demand determined economy:

\[ \Delta y_0 = M \cdot \frac{\Delta c_0^B}{2} < 0 \]

- Not easy to discipline the magnitude of \( \Delta c_0^B \)
  - Existing literature suggests it is negative and non-trivial
    
    [Mitman, Albanesi-Nosal, Gross-Kluender-Liu-Notowidigdo-Wang,...]
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- Can we lower \( K_0 \) without also inducing expectation of lower \( K_1 \)?
  - In general, we will have:
    \[ \Delta c_0 = \underbrace{\Delta c_0}_{>0} \bigg|_{\Delta K_0} + \underbrace{\Delta c_0}_{<0} \bigg|_{\Delta K_1} \]
    and no guarantee that this will be positive.

- Remember the mass of borrowers \( \gg \) mass of defaulters, and spending of all borrowers is impacted by credit supply contraction from \( \Delta K_1 \)
Welfare effect of ex-ante debt relief

- Again, $\Delta K_1$ has no effect on saver welfare
  - Just a shift in the timing of payments
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  1. Reduce utility penalties tomorrow for all inframarginal defaulters
  2. but make it harder to borrow today for all ($\Delta Q < 0$ at each $b_1$)
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- Total effect balances these two [from envelope theorem]

$$\Delta W_0^{soe} = \frac{1}{2} \left( \beta d_1 - u' \left( c_0^{B,r} \right) \Delta Q \right)$$

This provides a theory of optimal $K_1$ [Zame, Chatterjee-Corbae-Nakajima-Ríos-Rull, Livshits-McGee-Tertilt, Dávila]

“Smoothing across states vs smoothing over time”
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Consider demand-determined economy

Suppose desired spending increases by $\Delta y_0^{exo}$

Effect on spending:

1. Defaults **decline** by $\Delta d_0$
2. $\Delta d_0$ borrowers lower their spending by $ACED \cdot b_0 \Delta d_0$
3. Savers increase their spending by $MPC^S \cdot b_0 \Delta d_0$
Countercyclical defaults and automatic stabilization

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1. Defaults decline by $\Delta d_0$
2. $\Delta d_0$ borrowers lower their spending by $ACED \cdot b_0 \Delta d_0$
3. Savers increase their spending by $MPC^S \cdot b_0 \Delta d_0$

Consequence: default is an automatic stabilizer

“Effective” spending only rises by $\Delta y_0^{exo} - (ACED - MPC) \frac{b_0}{2} \Delta d_0$
Quantifying the automatic stabilizer effect

- In Auclert-Mitman we prove that the excess fluctuations of GDP $y_0^*$ in an economy without a countercyclical default rate are given by:

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

with parameters above, this is about 1.12

- This is like any other automatic stabilizer [eg government spending, income tax], and can be similarly effective.
An even better automatic stabilizer?

- Our proposal: *build* on opposite response of $c_0$ to $K_0$ and $K_1$
- Commit to a policy rule of the type:
  
  $$K_t (y_t, y_{t-1}) = \bar{K} + \psi (y_t - y_{t-1})$$

  where $\bar{K}$ can be set (e.g.) based on standard tradeoff
- Make it easier to default when realized GDP growth is low.

Low realized growth $\rightarrow$ ex-post debt relief today

Expect future growth $\rightarrow$ expect less debt relief, crowd in credit supply

This is what we call: "Consumer Bankruptcy as Aggregate Demand Management"

Full paper coming soon!
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Towards a practical implementation

- In our model, household incomes and GDP are tightly linked
- Further, we assume that the policy maker knows GDP in real time
- In the U.S., the unemployment rate is:
  - available in “real time”, at a disaggregated level
  - perhaps a more accurate indicator of borrower income & default risk
- One concrete proposal would be to set the bankruptcy filing fee and means test to vary with the growth rate of state unemployment:
  - When state unemployment ↑, fees ↓ and the means test is relaxed
  - When state unemployment ↓, fees ↑ and the means test is tightened
Conclusion

- Ex-post debt relief can boost GDP and raise welfare
- But ex-ante debt relief tends to hurt GDP (and possibly welfare)
- In our proposal, we would:
  - Conduct debt relief through existing legal framework for default
  - Make it easier to default when realized GDP growth is low
- Our model suggests that this would dampen GDP fluctuations and realize the stabilization potential of debt relief
Thank you!