# Sovereign Debt Standstills

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# Motivation

## Response to COVID-19

- G20 agreed on a 'sovereign debt standstill' to poorest countries:
  - Debt service suspension
  - Without haircuts
- Proposals to include private creditors and middle-income countries (Bolton et al., 2020)
- Similar to guiding principle in recent sovereign debt restructurings

## Before COVID-19

- "Reprofiling" before IMF programs
- Liquidity shock triggered standstills (bond covenants)

## Overview of the paper

### What we do

- Quantify effects of **one-time debt relief** (standstills and/or haircuts) after a negative shock
- Simplest **sovereign default** model with **long-term debt**

### What we find

*Standstills*

- Create sovereign welfare **gains** but creditors' capital **losses**
- Consistent with creditors' reluctance to participate (even w/o free-riding problem).
- Help generate **"debt overhang"** and thus opportunities for **"voluntary debt exchange"** (Hatchondo, Martinez and Sosa-Padilla, JME 2014)

*Haircuts* $\Longrightarrow$ sovereign and creditors' **gains**

▸ Lit Review

## Model: simplest framework with default and long-term debt

- Equilibrium default model à la Eaton-Gersovitz (Aguiar-Gopinath; Arellano) with long-term debt (Chatterjee-Eyigungor; Hatchondo-Martinez).

- Stochastic exchange economy

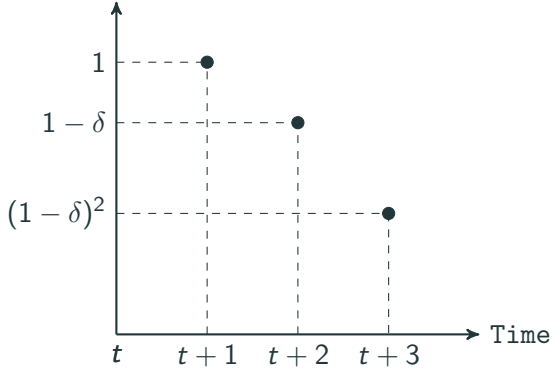
$$\log(y_t) = (1-\rho)\,\mu + \rho \log(y_{t-1}) + \varepsilon_t$$

- Objective of the government: $\mathbb{E}_t \sum_{j=t}^{\infty} \beta^{j-t} u(c_j)$

$$u(c) = \frac{c^{1-\gamma} - 1}{1-\gamma}, \text{ with } \gamma \neq 1.$$

## Model: borrowing opportunities

- Non-contingent long-term bonds with competitive risk-neutral lenders
- Bonds are perpetuities with geometrically decreasing coupon obligations.
- Exogenous maturity structure.



## Model: defaults

- **Total defaults:** if the government defaults, it will not pay any current or future coupon obligations contracted in the past

- A default event starts with the government's default decision and may end each period after the default period with probability $\psi$
- A government in default cannot borrow

- Each period the government is in default current income is reduced by

$$\phi(y) = \max\{y\left[\lambda_0 + \lambda_1[y - \mathbb{E}(y)]\right], 0\}$$

## Model: recursive formulation

$$V(b,y) = \max_{d \epsilon \{0,1\}} \{ d V_1(y) + (1-d) V_0(b,y) \}, \tag{1}$$

$$V_1(y) = u(y - \phi(y)) + \beta \, \mathbb{E}_{y'|y} \left\{ \psi V(0,y') + (1-\psi) V_1(y') \right\} \tag{2}$$

$$V_0(b,y) = \max_{b' \geq 0} \left\{ u(\underbrace{y - b + q(b',y)\overbrace{[b' - (1-\delta)b]}^{\text{issuance}}}_{\text{consumption}}) + \beta \, \mathbb{E}_{y'|y} V(b',y') \right\} \tag{3}$$

The bond price is given by the following functional equation:

$$q(b',y) = \mathbb{E}_{y'|y} \left\{ e^{-r} \left( 1 - \hat{d}(b',y') \right) \left[ 1 + (1-\delta) \, q\left( \hat{b}(b',y'), y' \right) \right] \right\} \tag{4}$$

## Calibration

Nothing new. Mexican data, quarterly frequency

We follow Hatchondo, Martinez and Sosa-Padilla (2014) and Hatchondo and Martinez (2017).

| | | |
|---|---|---|
| Risk aversion | $\gamma$ | 2 |
| Risk-free rate | $r$ | 1% |
| Discount factor | $\beta$ | 0.9745 |
| Probability default ends | $\psi$ | 0.083 |
| Debt duration | $\delta$ | 0.03 |
| Income autocorrelation coefficient | $\rho$ | 0.94 |
| Standard deviation of innovations | $\sigma_\epsilon$ | 1.5% |
| Mean log income | $\mu$ | $(-1/2)\sigma_\epsilon^2$ |
| Income cost of defaulting | $\lambda_0$ | 0.183 |
| Income cost of defaulting | $\lambda_1$ | 1.10 |

## No problem fitting data

| Targeted moments | | |
|---|---|---|
| | Model | Data |
| Mean Debt-to-GDP | 44 | 44 |
| Mean $r_s$ | 3.4 | 3.4 |
| Non-Targeted moments | | |
| $\sigma(c)/\sigma(y)$ | 1.4 | 1.2 |
| $\sigma(tb)$ | 0.8 | 1.4 |
| $\sigma(r_s)$ | 1.5 | 1.5 |
| $\rho(tb, y)$ | -0.8 | -0.7 |
| $\rho(c, y)$ | 0.99 | 0.93 |
| $\rho(r_s, y)$ | -0.7 | -0.5 |
| $\rho(r_s, tb)$ | 0.9 | 0.6 |

## Main exercise: the shock and the standstill

### Three shock sizes

- Endowment shock (only shock), mean debt (44%)
- Worsens access to debt markets (and thus the need for standstill)
  1. Small shock: spread increases by 250 bps (preserved market access; Mexico)
  2. Large shock: 1000 bps (sub-investment grade; 1000 bps in Sub- Saharan Africa)
  3. Default-triggering shock: country defaults w/o debt relief **but** repays with standstill

### Standstills

- No debt payments for $T^{DS}$ periods
- The government can borrow (or buy back debt)
- Creditors' holdings grow at the rate $r^{DS} = 1.85\%$ (risk-free rate + avg quarterly spread)
- Gov can declare a default. If so, standstill ends.

## Creditor's capital losses

Percent decline in the market value of debt (at the beginning of a period)

$$MV(b,y) = b\left[1-\hat{d}(b,y)\right]\left[1+(1-\delta)q(\hat{b}(b,y),y)\right]$$

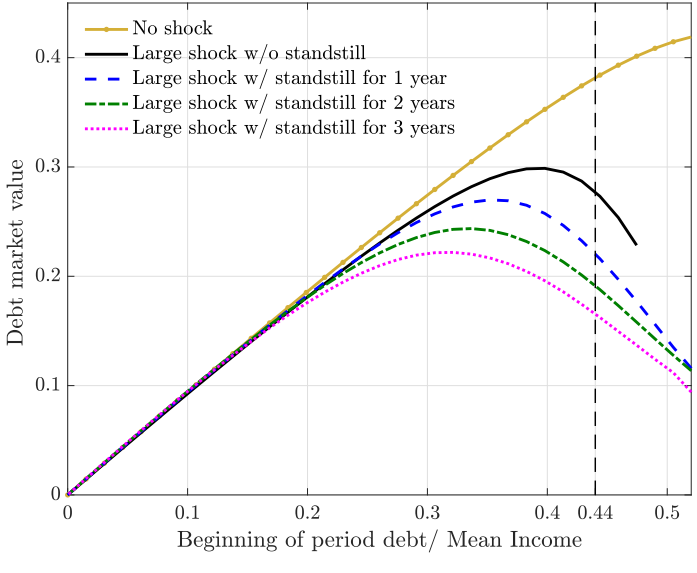
$$MV^{DS_j}(b,y) = b\left[1-\hat{d}^{DS_j}(b,y)\right](1+r^{DS})q^{DS_j}(\hat{b}^{DS_j}(b,y),y)$$

We have nothing to say about **how or if** capital losses could be imposed (e.g., "doctrine of necessity")

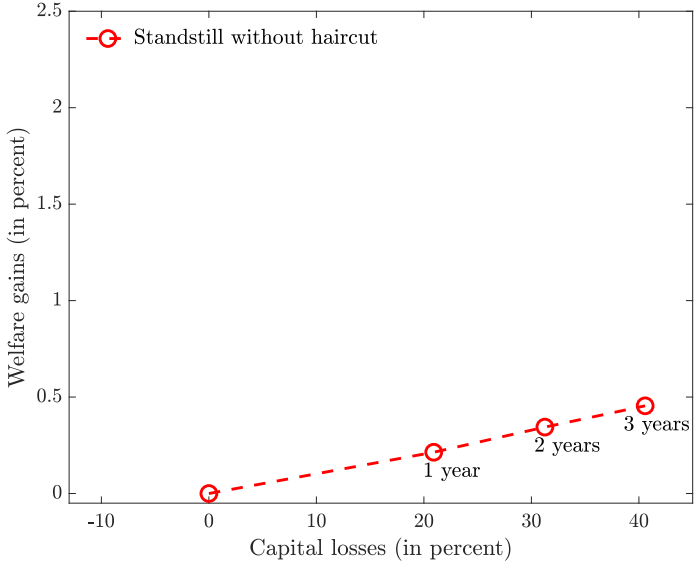
**Q: What is the best debt relief 'strategy' for a given creditor loss?**

# Standstills: lower MV and increase the "agreement zone"

Focus on the "Large" shock ($\uparrow$ spread: 1000 bps, $\downarrow y \approx 5\%$)

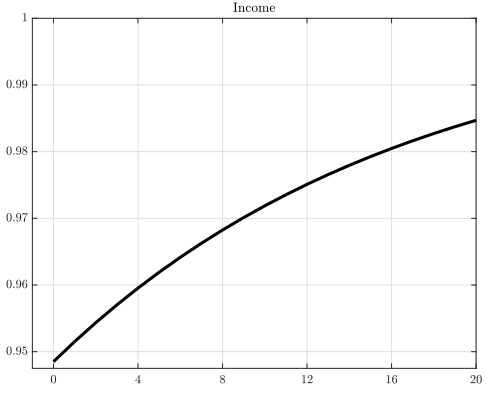


# Standstills: welfare gains and creditors' losses

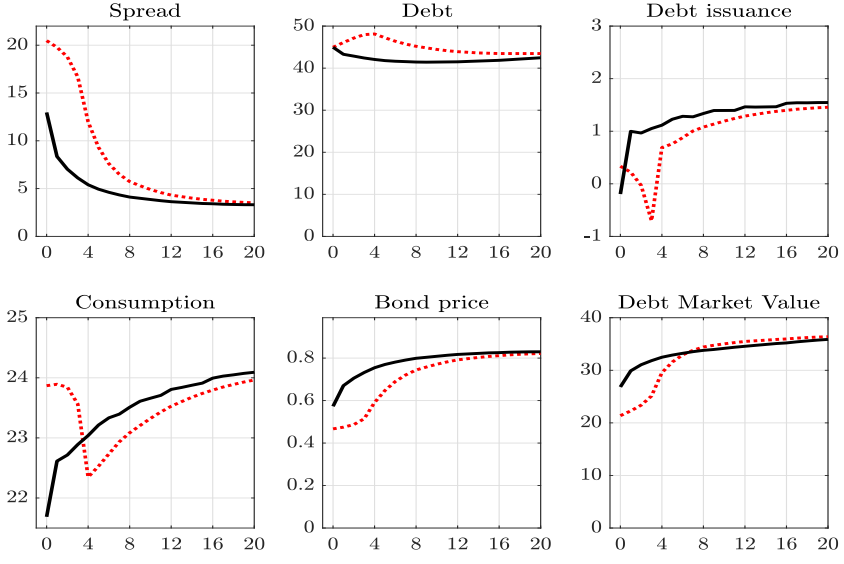


## Impulse response functions

- What happens after the shock and the debt relief?
- We illustrate the behavior of key variables for the simulation path in which future shocks are zero, for the **large shock**, and a **one-year standstill**.

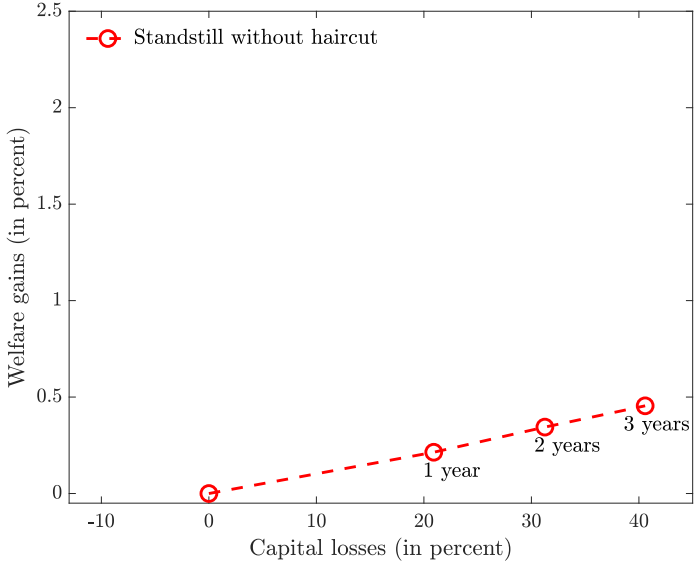


# IRFs: No debt relief vs. Standstill

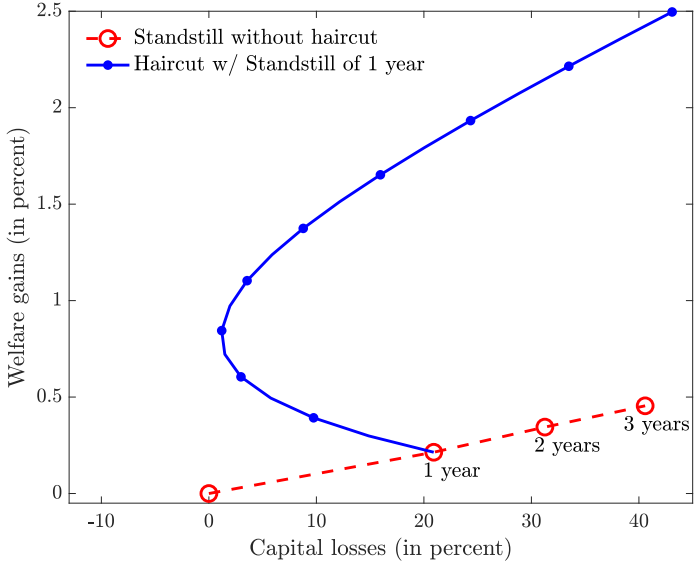



**Black:** No debt relief **Red:** 1yr Standstill

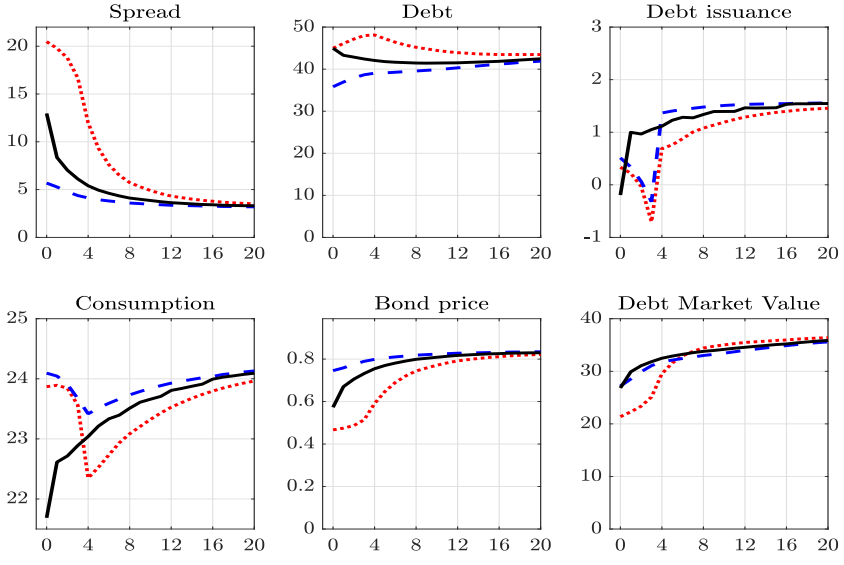
# Haircuts: still welfare gains and minimize creditors' losses



# Haircuts: still welfare gains and minimize creditors' losses

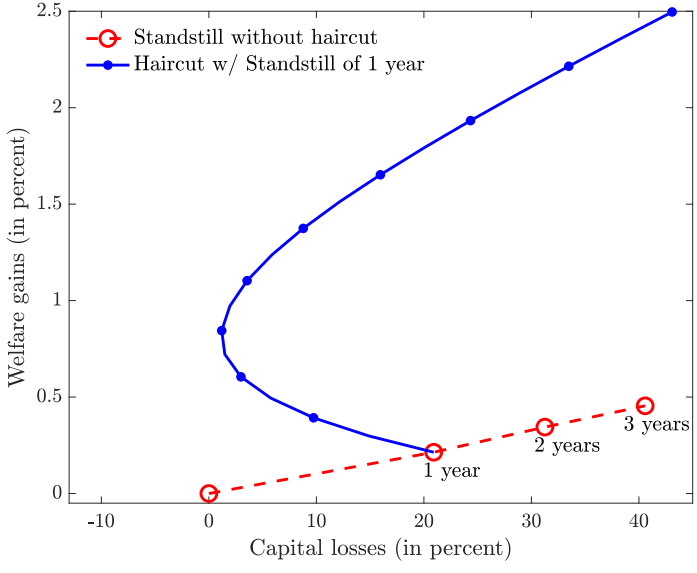


# IRFs: No debt relief vs. Standstill vs. Standstill + 20% haircut

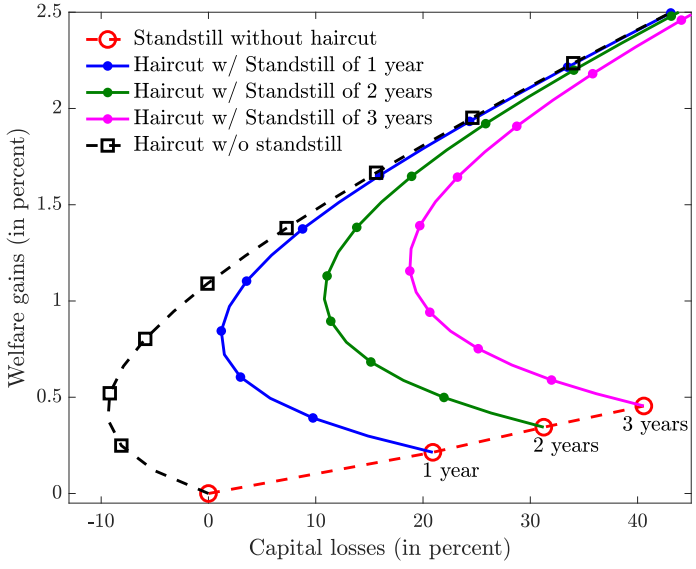



**Black:** No debt relief **Red:** 1yr Standstill **Blue:** 1yr Standstill + 20% Haircut

# ‘Only haircuts’ is the best option

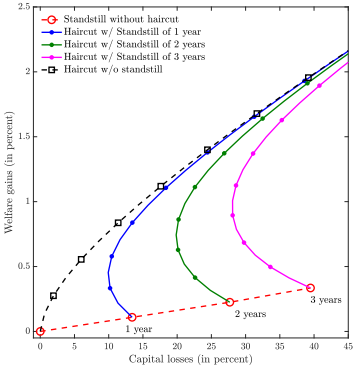


# ‘Only haircuts’ is the best option

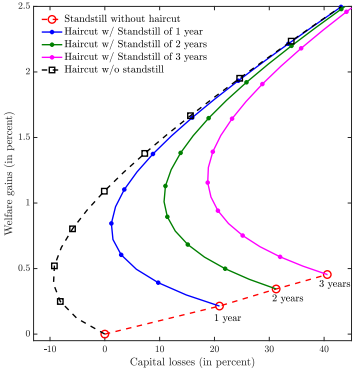



**But** losses from standstill are negligible for large enough haircuts

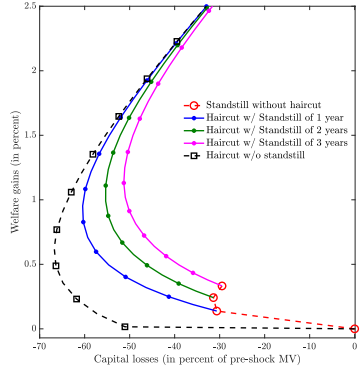
# ‘Only haircuts’ is the best option – holds for other shock sizes




Small ($\downarrow y \approx 3\%$)




Large ($\downarrow y \approx 5\%$)




Triggers default ($\downarrow y \approx 7\%$)

**Note:** for “Triggers default’ case standstills are mutually beneficial, but haircuts are superior

▸ MV plots

- Simple intuition: after a negative shock, the price of debt becomes very sensitive to changes in the debt level

- Standstills and haricuts move the debt in **opposite** directions:

  **Haircut:** debt $\downarrow \implies q \uparrow$

  **Standstill:** debt $\uparrow$ afterwards (postponed payments earn interest) $\implies q \downarrow\downarrow$

# Robustness

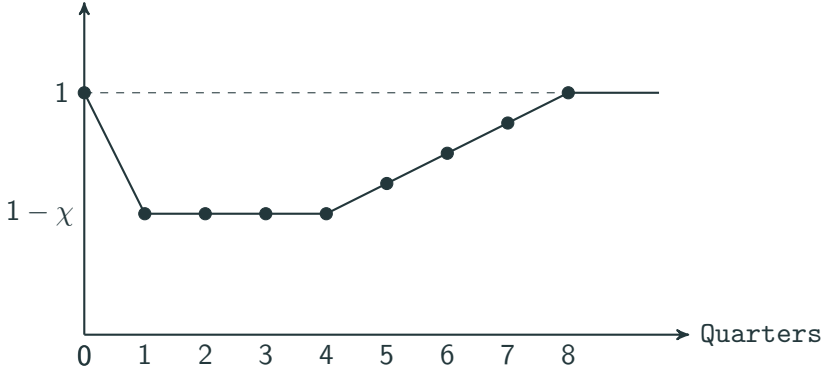
go to conclusions

Our results are robust to

1. Different *nature* of the shock: temporary drop in $y$, slow recovery ($\approx$ Covid-19)
2. Adding a sudden stop
3. Allowing for a positive recovery rate
4. Modeling the crisis as a 'debt shock' (not in these slides)

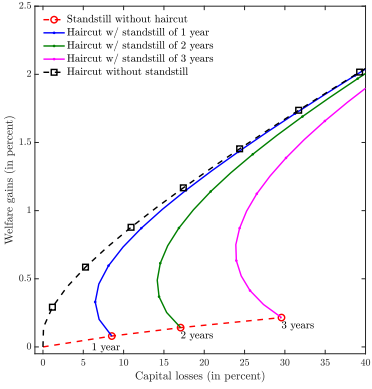
## Robustness 1: different nature of the shock

- Income drops for 4 quarters: $y^{\text{effective}} = (1 - \chi)\, y$
- After that, it recovers in another 4 quarters
- 'U-shaped' recovery $\approx$ Covid-19 shock

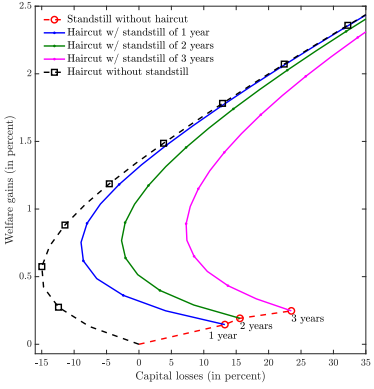


# Robustness 1: different nature of the shock

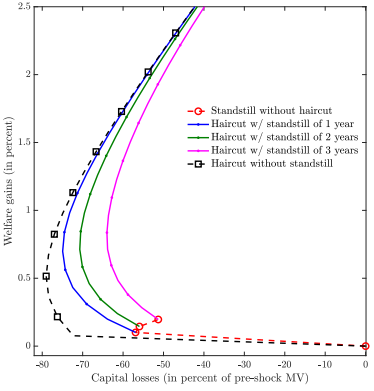
▸ MV curves




Small ($\chi = 7\%$)




Large ($\chi = 10.7\%$)




Triggers default ($\chi = 11\%$)

- Large shock + HC ($\approx 20\%$): welfare **and** capital gains
- 'Triggers default' shock: standstills mutually beneficial, haircuts superior

## Robustness 2: adding a sudden stop

- **Motivation:** liquidity concerns during the crisis $\rightarrow$ standstill may be particularly helpful in this case

- Country cannot issue new debt for 1 year (but can buyback if it wants)

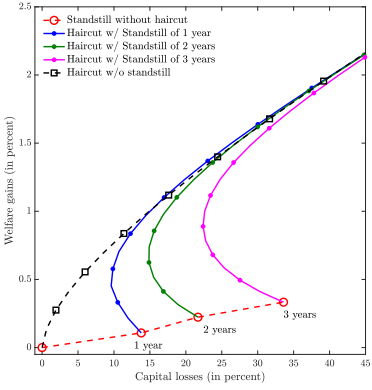
- Equivalent to imposing the following restriction for 4 quarters:

$$\text{Debt issuance} = \begin{cases} b' - (1-\delta)b \ \leq 0 & \text{for the No-DS case} \\ b' - (1-\delta)\,(1+r^{DS})b \ \leq 0 & \text{for the DS case} \end{cases}$$

- Same definition of the different shock sizes

# Robustness 2: adding a sudden stop

▸ MV curves

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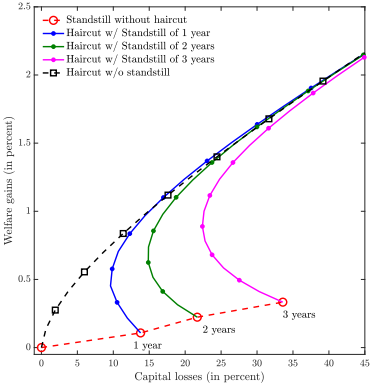


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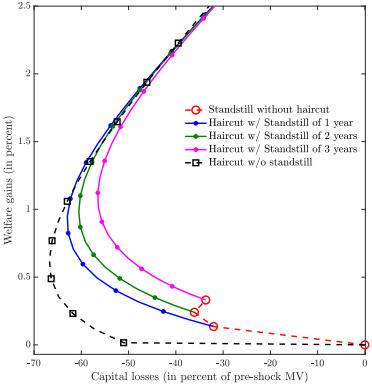



Triggers default

**Robust punchline:** not including haircuts in the design of the debt relief is not a good policy

## Robustness 3: adding a positive recovery rate

$$V(b,y) = \max_{d \epsilon \{0,1\}} \{dV_1(b,y) + (1-d)V_0(b,y)\},$$

$$V_1(b,y) = u(y - \phi(y)) + \beta \mathbb{E}_{y'|y} \left[\psi V(b_D, y') + (1-\psi) V_1(b_D, y')\right]$$

and $b_D = \min\{\alpha, b\}$ is the 'recovered' debt level.

$$V_0(b,y) = \max_{b' \geq 0} \left\{u\left(y - b + q(b',y)\left[b' - (1-\delta)b\right]\right) + \beta \mathbb{E}_{y'|y} V(b',y')\right\}.$$

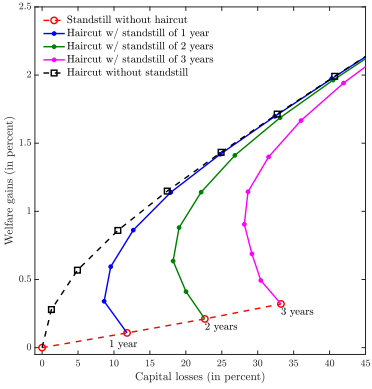
$$\text{subject to:} \quad b' > \quad (1-\delta)b \quad \text{only if} \quad q(b',y) > \underline{q},$$

## Robustness 3: adding a positive recovery rate

$$
\begin{aligned}
q(b', y) &= \frac{1}{1+r}\mathbb{E}_{y'|y}\left\{\left[1-\hat{d}\left(b', y'\right)\right]\left[1+(1-\delta)\, q(\hat{b}(b', y'), y')\right]\right\} \\
&\quad + \frac{1}{1+r}\mathbb{E}_{y'|y}\left\{\hat{d}\left(b', y'\right) q^D(b', y')\right\}
\end{aligned}
$$

$$
\begin{aligned}
q^D(b, y) &= \frac{1-\psi}{1+r}\mathbb{E}_{y'|y}\left\{\frac{b_D}{b} q^D(b_D, y')\right\} \\
&\quad + \frac{\psi}{1+r}\mathbb{E}_{y'|y}\left\{\left[1-\hat{d}\left(b_D, y'\right)\right]\ \frac{b_D}{b}\ \left[1+(1-\delta)\, q\left(\hat{b}(b_D, y'), y'\right)\right]\right\} \\
&\quad + \frac{\psi}{1+r}\mathbb{E}_{y'|y}\left\{\hat{d}\left(b_D, y'\right)\ \frac{b_D}{b}\ q^D(b_D, y')\right\}
\end{aligned}
$$

# Robustness 3: adding a positive recovery rate

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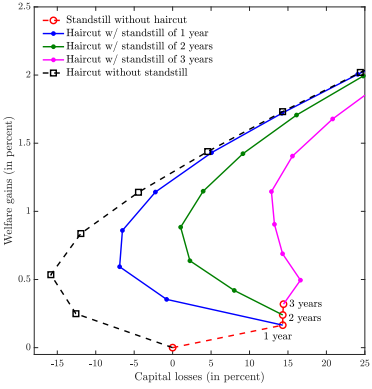


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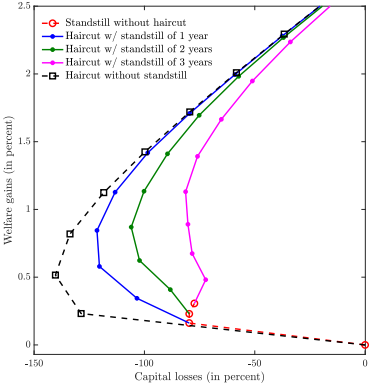



Triggers default

**Punchline:** main result (standstills alone aren't a good idea) is robust to modeling recovery

## Conclusions

- Standstills without haircuts do not seem to be the best form of debt relief
- Standstills help generate debt overhang and thus a role for haircuts.
- If standstills without haircuts are favored because of the regulatory cost of haircuts (Dvorkin et al., 2020) or the "Doctrine of necessity" (Bolton et al., 2020), inefficiencies triggered by these regulations appear to be significant.

**Thanks !**

# Related literature

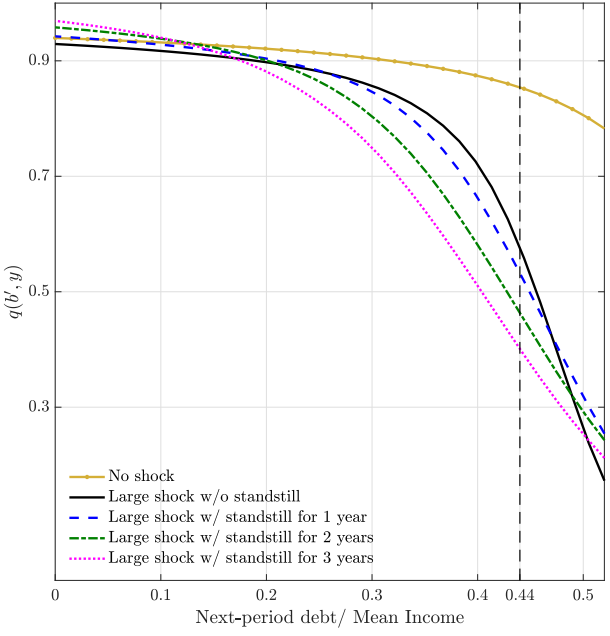
back

- Aguiar et al. (Econometrica 2019) and Dvorkin et al. (AEJ Macro 2020):
  - In debt restructuring (similar to debt relief), extensions of maturity (similar to standstills) are dominated by haircuts (except for the reasons in Dvorkin et al.)
  - Time inconsistency (debt dilution): the government issues too much debt and this problem is worse with longer maturities.

- Not with standstills: The government buys back debt. But standstills generate debt overhang.
- Inefficiencies of combining haircuts with standstills are not significant for large haircuts.

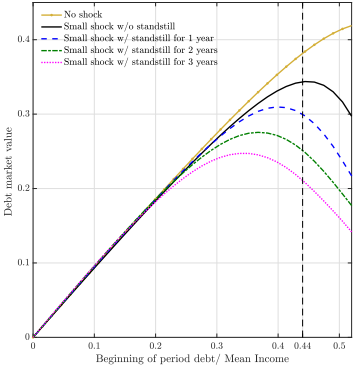
# Debt price (large shock)

back



# Debt market value curves

back

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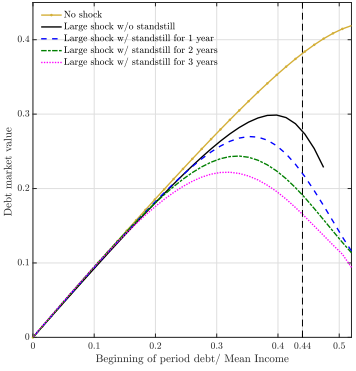


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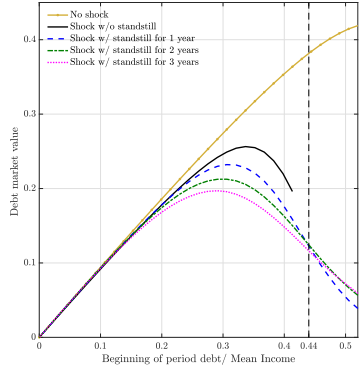
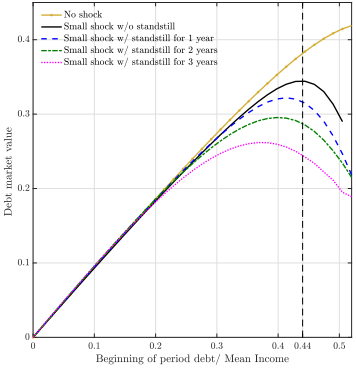



Triggers default

# Debt market value curves

back

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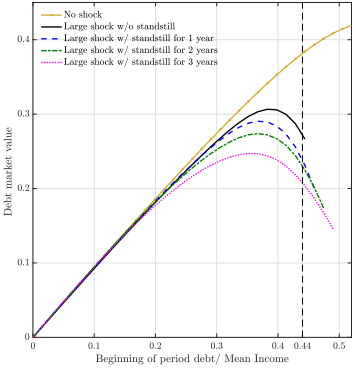


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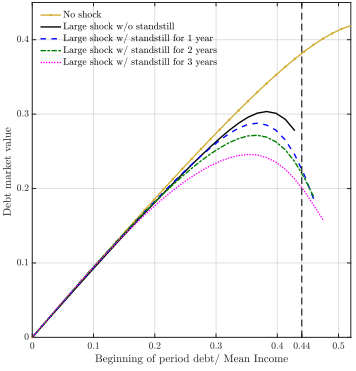


Triggers default

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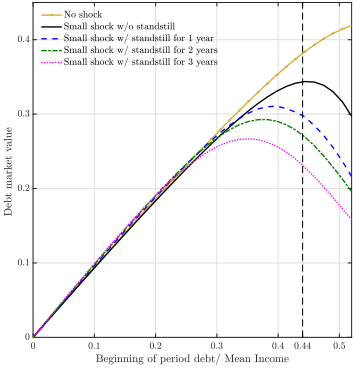


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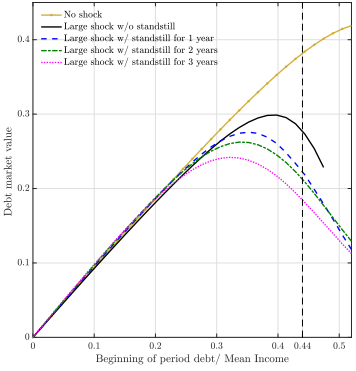


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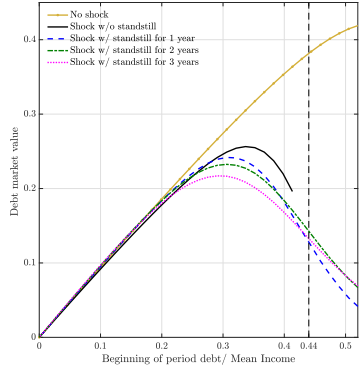


Triggers default