

# The Costs and Consequences of Sovereign Borrowing

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# In honor of Ken Rogoff

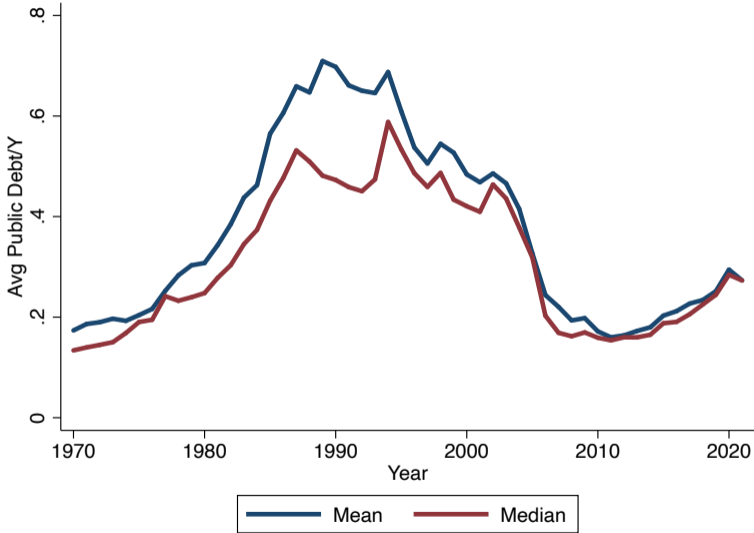
# In honor of Ken Rogoff

- ▶ The Eras Tour... today I'll mention
  - (i) Debt overhang on growth
  - (ii) Political economy
  - (iii) Why countries repay
  - (iv) Costs of default
  - (v) Debt buybacks

# Lending to Poorer Countries

- ▶ Sample from WDI from 1970 to 2021
- ▶ Focus on countries with 1970 GDP per capita  $<$  \$10,000 (in 2015 dollars)
  - ▶ Argentina is in, Greece is out
  - ▶ Up to 52 countries
- ▶ Debt is “External debt stocks, public and publicly guaranteed (PPG)”
  - ▶ Excludes domestic debt

# Average External Public Debt to GDP



# Motivation of Talk

- ▶ Fifty years since the (latest) explosion of lending to emerging and developing economies
- ▶ Draw some insights and lessons from data and theory
  - ▶ What sovereign borrowing does and doesn't do
  - ▶ Contrast with neoclassical Conventional Wisdom (CW)
- ▶ Implications for policy and future research
  - ▶ Increase the joint surplus of government and lender  $\Rightarrow$  Private welfare  $\uparrow\downarrow$ ?
  - ▶ Should we make markets more or less efficient?

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  - ▶ Increase the joint surplus of government and lender  $\Rightarrow$  Private welfare  $\uparrow\downarrow$ ?
  - ▶ Should we make markets more or less efficient?
- ▶ Make a case using data and theory that – arguably – correcting inefficiencies may be welfare reducing

# Conventional Wisdom on Debt

- ▶ Benefits...
  - ▶ Relaxing  $S = I$  constraint on investment
  - ▶ Smoothing shocks
- ▶ Inefficiencies...
  - ▶ Limited commitment
  - ▶ Limited state contingency
  - ▶ Rollover risk
  - ▶ Default Costs (reputation, trade/output, inequality)
- ▶ Solving the latter would improve the former (?)



# Debt and Capital as Complements

## The Neoclassical Conventional Wisdom

- ▶ Key constraint:  $B \leq \nu K$
- ▶ e.g. Cohen and Sachs (1986), Barro, Mankiw, Sala-i-Martin (1995)
- ▶ Key prediction:  $K$  and  $B$  both increase along transition
- ▶ No distinction between public and private debt
- ▶ Dynamics driven by adjustment costs or complementary inputs
- ▶ Speed of transition driven by technology (and fast)

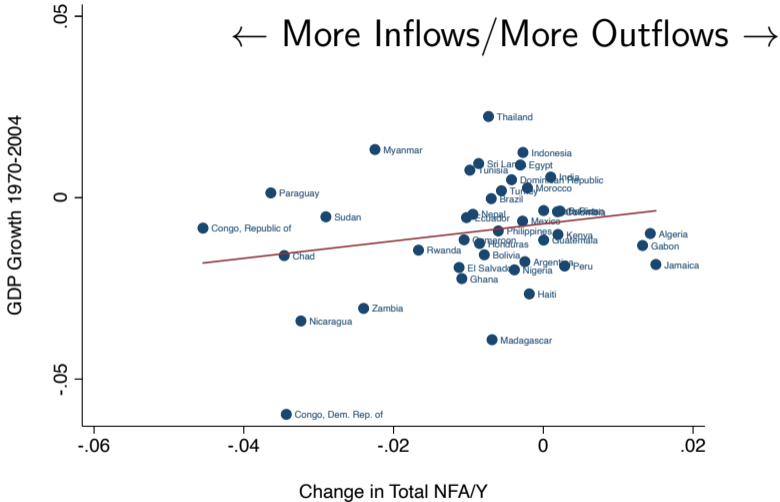
# Debt and Capital as Complements

## The Neoclassical Conventional Wisdom

- ▶ Conventional Wisdom “retired” by Gourinchas and Jeanne (2013)’s “Allocation Puzzle”
- ▶ Faster growth associated with net outflows

# Allocation Puzzle 1970-2004

Total Flows



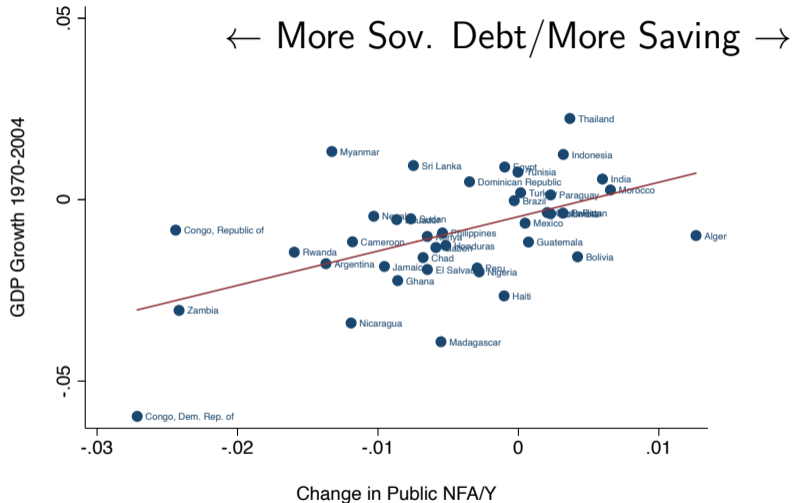
# Debt and Capital as Substitutes

- ▶ Key constraint:  $W^G(B) \geq W^D(K)$
- ▶ With  $W^{G'}(B) < 0$  and  $W^{D'}(K) > 0$
- ▶ e.g. Thomas & Worrall (1994), AAG (2009), AA(2011)
- ▶ Two interpretations
  - ▶ Deviation/default more attractive with large  $K$
  - ▶ Taxation of capital more likely with large  $B$
- ▶ Key prediction: As  $B \uparrow \Rightarrow K \downarrow$

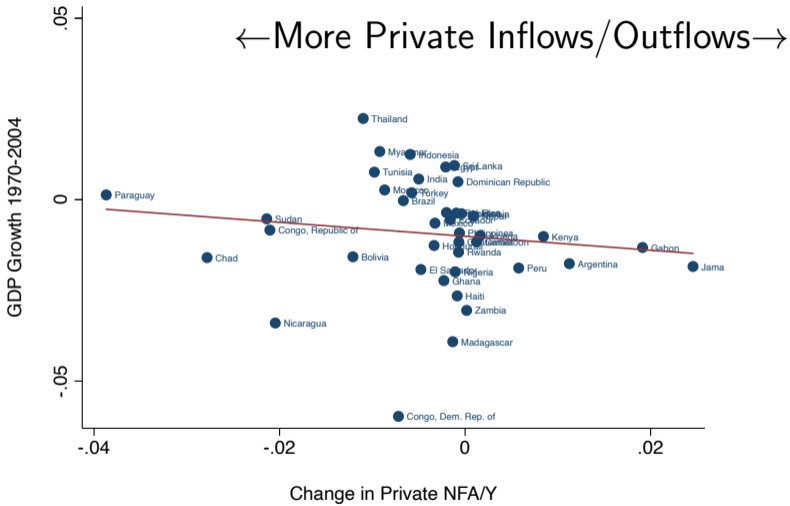
# Debt and Capital as Substitutes

- ▶ Key variable is public debt
  - ▶ Tradeoff between government borrowing and private investment
  - ▶ Private capital flows move in reverse direction of public flows
- ▶ Countries differ in political-economy distortions
- ▶ Speed of transition driven by speed of debt accumulation/repayment

# Allocation Puzzle 1970-2004: Public Flows

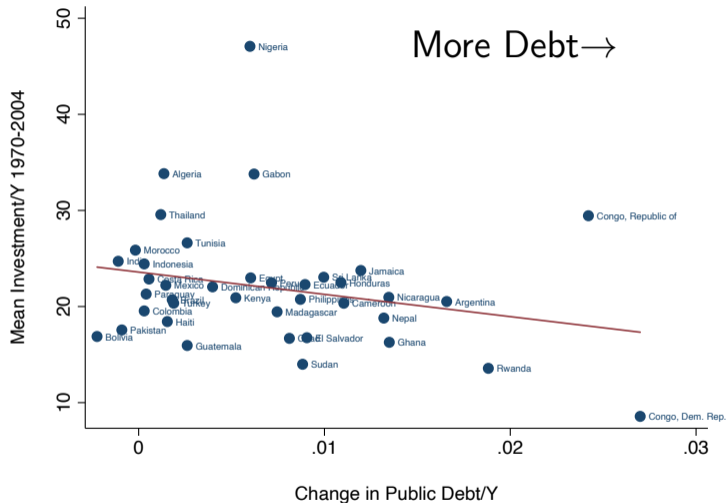


# Allocation Puzzle 1970-2004: Private Flows



# Debt and Average Investment Rate 1970-2004

B & K Substitutes

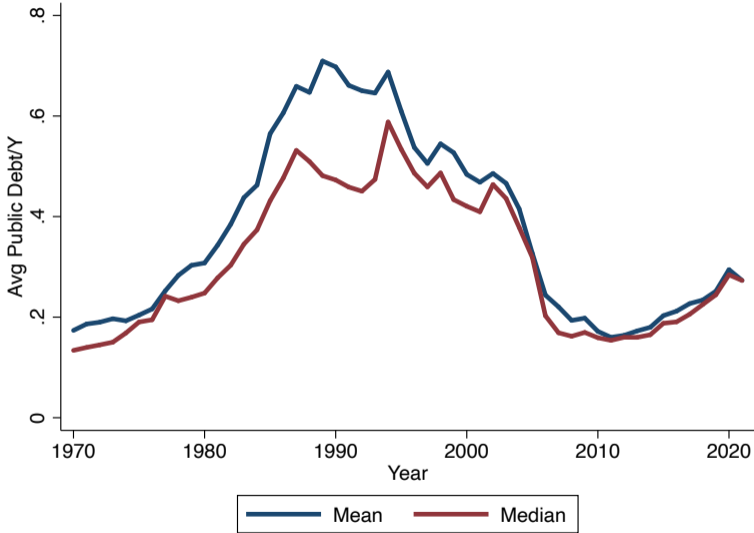




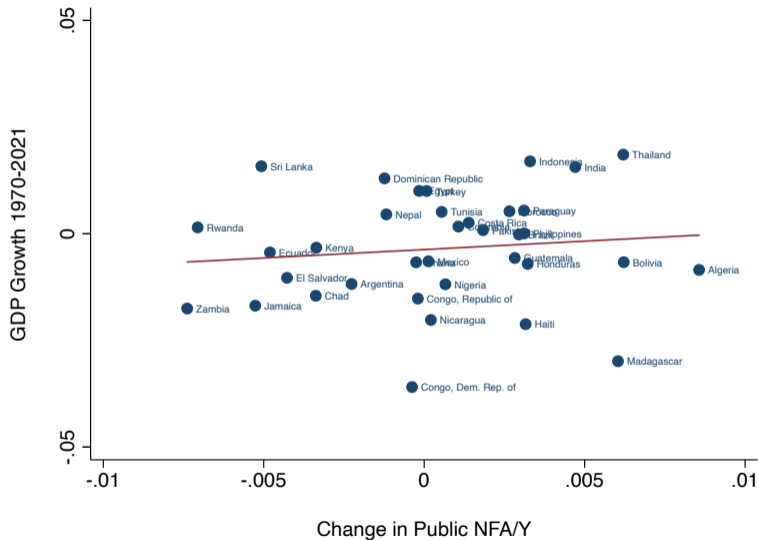
# Taking Stock

- ▶ Government borrowing negatively correlated with investment
- ▶ Government borrowing negatively correlated with growth
- ▶ Public Debt and Capital are Substitutes
- ▶ Private flows have reverse correlations
- ▶ Long-run correlation
  - ▶ Business Cycle frequencies government borrowing pro-cyclical

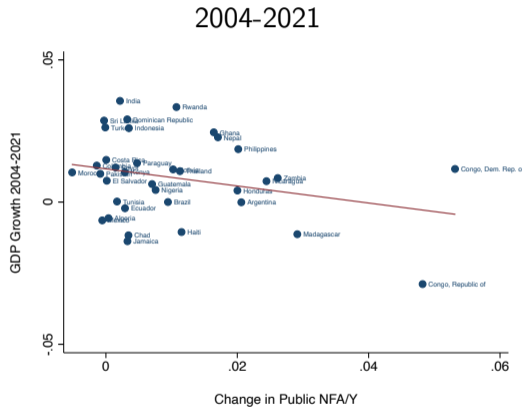
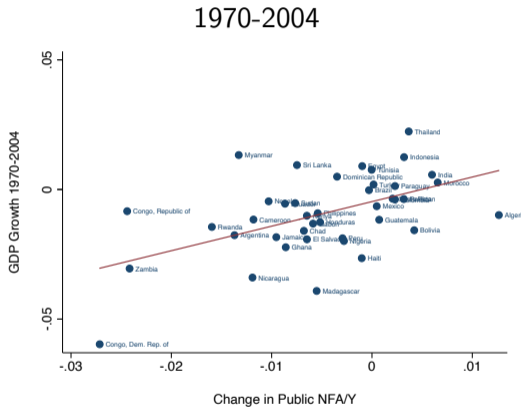
# A Caveat: Updating the Sample



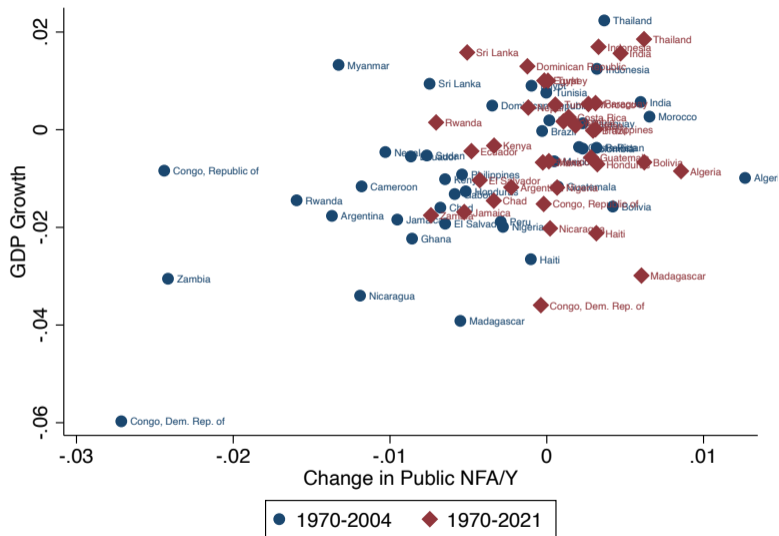
# Public Flows 1970-2021



# Public Flows 1970-2021



# Public Flows over Two Periods



# Taking Stock

- ▶ No evidence of complementarity in longer sample
- ▶ Weaker evidence of crowding out
- ▶ But ...
  - ▶ Deepening of domestic debt markets
  - ▶ Debt forgiveness not exogenous
  - ▶ Never borrowed different than debt forgiveness or restructured
    - ▶ Model is “too Markovian”
    - ▶ Histories matter

# What does sovereign debt do?

- ▶ Not an engine of growth
- ▶ Not a path to higher investment

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- ▶ Volatility generator

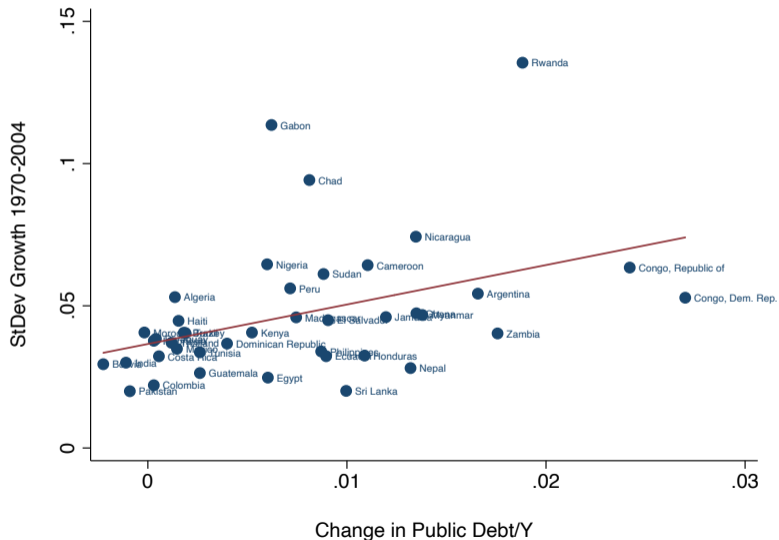


# What does sovereign debt do?

- ▶ Not an engine of growth
- ▶ Not a path to higher investment
- ▶ Volatility generator
- ▶ Compute standard deviation of annual  $\Delta \ln(GDP)$ ,  $\Delta \ln(G)$ , and  $\Delta \ln(C)$
- ▶ Correlate with change in Public Debt

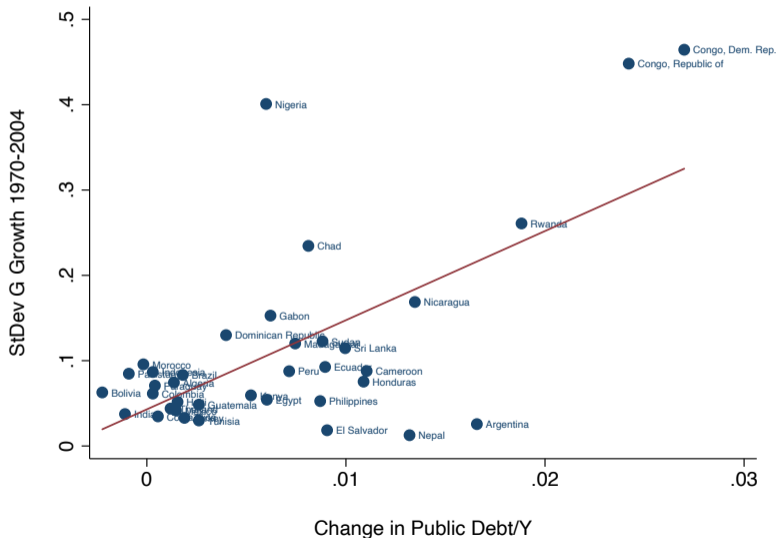
# Debt and Volatility 1970-2004

GDP Growth



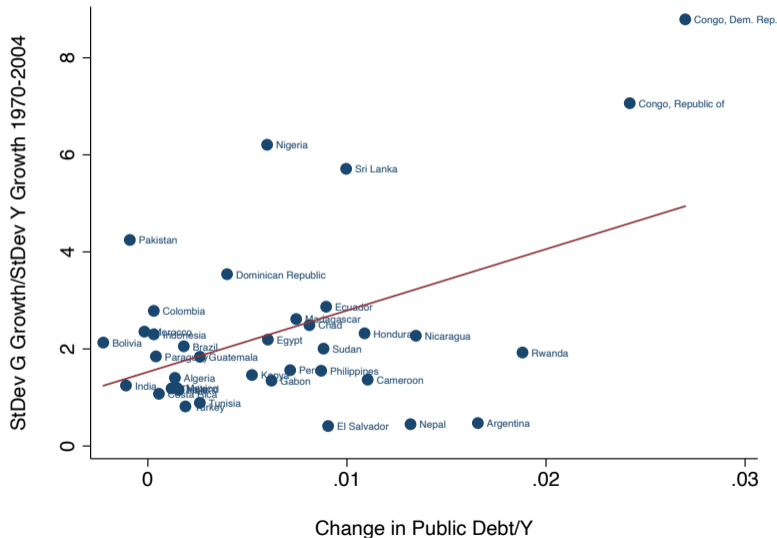
# Debt and Volatility 1970-2004

G Growth



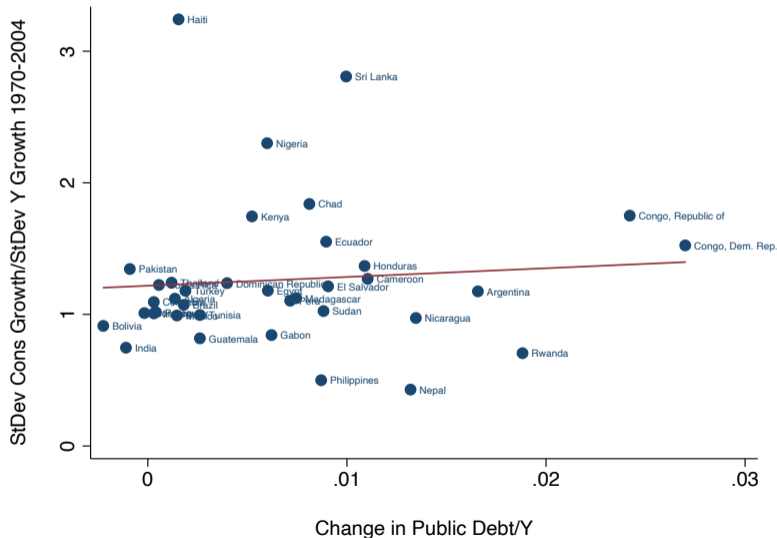
# Debt and Relative Volatility 1970-2004

G Growth rel to Income Growth



# Debt and Relative Volatility 1970-2004

Cons Growth rel to Income Growth



# Taking Stock

- ▶ Debt associated with higher volatility
- ▶ Debt associated with higher relative volatility
- ▶ Particularly strong for  $G$
- ▶ Opposite of “smoothing” expenditure
- ▶ Tax Smoothing?
  - ▶ Long time frame
  - ▶ Theory predicts savings in long run (buffer stock)
- ▶ Volatility to some extent a choice/consequence

# Implications

- ▶ Sovereign debt generates slower growth and more volatility
- ▶ Opposite of Conventional Wisdom
- ▶ Potential responses:
  - (i) Double down on neoclassical paradigm
    - ▶ Correct inefficiencies in debt markets
    - ▶ Provide debt/fiscal guidelines to governments
    - ▶ Recover original promise
  - (ii) View inefficiencies as positive
    - ▶ Poorly working debt markets help correct Pol. Econ. frictions
    - ▶ More limits on government borrowing the better

# A View from the Standard Quantitative Model

- ▶ Ingredients of standard sovereign debt model:
  - ▶ Business cycle fluctuations
  - ▶ No investment
  - ▶ Default costly and strategic
  - ▶ Impatient decision maker relative to international  $R^*$



# Is this a good laboratory?

- ▶ No investment: Gourinchas & Jeanne (2006,2013), AA(2011)
- ▶ Default costs are key
  - ▶ Hébert and Schreger (2017); Farah-Yacoub, Graf von Luckner, Ramalho, and Reinhart (2022)
- ▶ Impatience is key: PE distortion
  - ▶ Not why countries repay, but why do they borrow
- ▶ Strategic default: Is this realistic?
- ▶ Generates extra volatility
  - ▶ Pro-cyclical bond prices  $\Rightarrow$  Pro-cyclical borrowing
  - ▶ Consistent with data

# Some Predicted Moments

## Benchmark Long-Term Debt Model

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Outcome	Ergodic Mean
$\frac{B}{Y}$	17.5%
Default Frequency	7% per annum
Mean $r - r^*$	8.4 %
StDev $r - r^*$	4.6%
$\frac{\sigma(\ln c)}{\sigma(\ln y)}$	1.11
$\rho(TB/Y, Y)$	-0.66

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# Lessons from the Model

- ▶ Is access to debt markets a good thing?
  - ▶ Extends Aguiar, Amador, and Fourakis IMF Review (2020)
- ▶ What is the source of the welfare wedge?
  - ▶ Impatient government
    - ▶ Political turnover
  - ▶ Risk averse citizenry
    - ▶ Incumbent does not bear full downside risk of default
    - ▶ Incentive to gamble for re-election by borrowing

# Value of Credit Markets

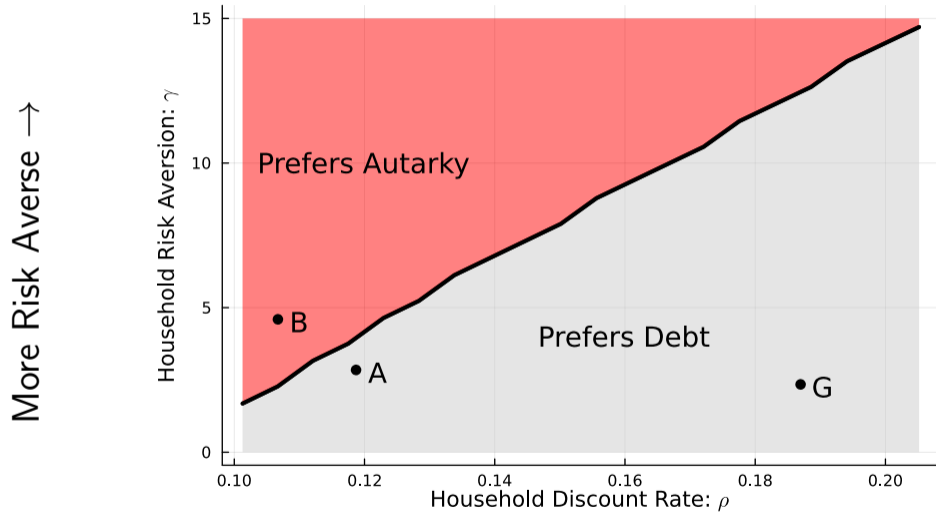
## Welfare Gain from Debt Access

- ▶ Solve model under assumed government's preferences
- ▶ Compute private welfare gain from access to debt markets

$$\frac{V(y, b = 0)}{V^A(y)}$$

- ▶  $V$  embeds private HH's preferences
- ▶ Express in consumption equivalents
- ▶ Compares equilibrium with debt to extreme of never borrowing
- ▶ Ask for what private preference parameters does autarky dominate?

# Value of Credit Markets



← More Patient/More Impatient →

# Sources of Welfare Losses

- ▶ HH's prefer Autarky if rel. patient or risk averse
- ▶ Bringing consumption forward
- ▶ Volatility of consumption
- ▶ Costs of default (very important)
  - ▶ Early consumption in exchange for risk of default a bad gamble for reasonable discount rates and risk aversion

# Rollover Risk

- ▶ Move away from purely strategic default
- ▶ Evidence in the data for self-fulfilling runs
  - ▶ Suggestive cases like Europe 2012
  - ▶ AA(2023) use cleaner identification from debt swaps in DR
  - ▶ Exploits buyback boondoggle insight
- ▶ Value of lender of last resort (LoLR)?

# The Logic of Rollover Crises

- ▶ If government indebted enough...
  - ▶ If creditors are willing to lend, government does not default
  - ▶ If creditors “run”, government forced to default
- ▶ Pure coordination failure
- ▶ LoLR corrects failure
  - ▶ No money spent in equilibrium
- ▶ With perfect information, LoLR ideal policy response
  - ▶ Perfectly discriminate between fundamental and rollover crises
  - ▶ Stack deck in favor of LoLR



# Value of Credit Markets

## Welfare Gain from LoLR

- ▶ Compare welfare with and without LoLR in a model of runs
- ▶ Focus on model with one-period debt
  - ▶ Absent runs, ST debt close to efficiency
  - ▶ Equilibrium maximizes joint welfare of lenders and government . . . but not citizens
- ▶ Caveat: Need extreme impatience on part of the government

# Some Predicted Moments

## Short-Term Debt Model

	Rollover Model	LoLR Model
$\frac{B}{Y}$	7%	16%
Default Frequency	1.9%	1.4% per annum
Mean $r - r^*$	2.0 %	1.5%
StDev $r - r^*$	1.2%	1.0%
$\frac{\sigma(\ln c)}{\sigma(\ln y)}$	1.07	1.20
$\rho(TB/Y, Y)$	-0.19	-0.16
Share Defaults from Runs	100%	0%

# Some Predicted Moments

## Short-Term Debt Model

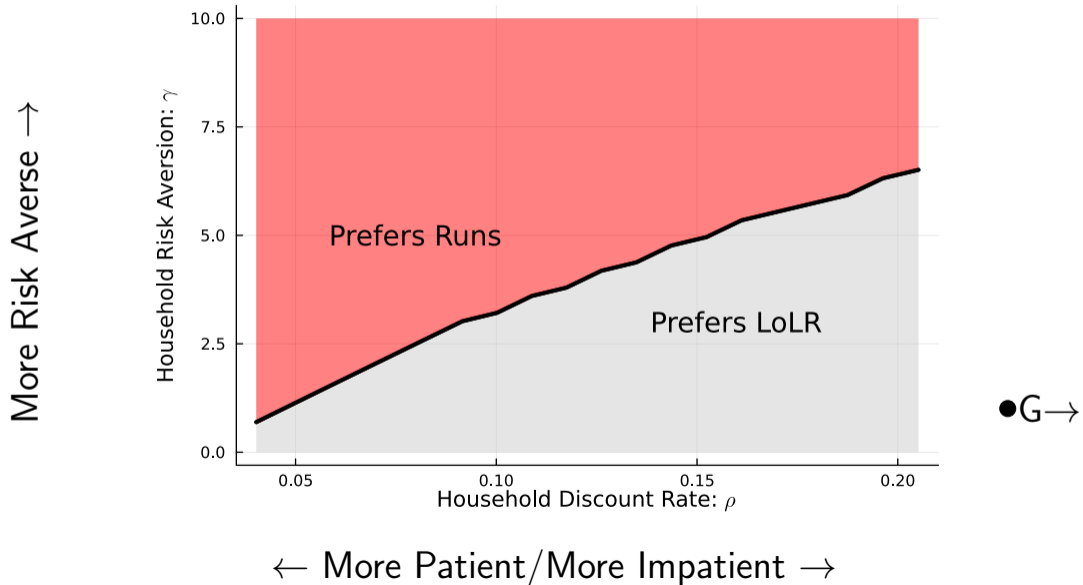
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# Value of Credit Markets

## Welfare Gain from LoLR

- ▶ Government borrows more with LoLR
  - ▶ Prices are very different
  - ▶ Seems like moral hazard, but. . .
  - ▶ No money from LoLR on path
  - ▶ Efficient if government and citizenry agree
- ▶ Generates more consumption volatility
- ▶ Generates modest decline in default
  - ▶ Note: All defaults in Rollover Crisis model are due to runs
  - ▶ LoLR does not eliminate all defaults in equilibrium

# Value of LoLR



# Value of LoLR

- ▶ Market price of rollover risk provides some discipline ...
- ▶ But, at a heightened cost of default
- ▶ Caveats...
  - ▶ Quantitative Run Models not well developed
  - ▶ Ex ante welfare
- ▶ If most defaults are due to lack of LoLR, then imperative to understand welfare consequences

# Policy Implications

- ▶ Plausibly ex ante better off without access to debt markets or even LoLR
- ▶ Different than value of LoLR in midst of crisis
- ▶ Key policy takeaways:
  - ▶ Understand broader welfare implications of debt markets
  - ▶ Correctly *sign* welfare response to market innovations and interventions
  - ▶ Lessons for exit of default state and re-entry to debt markets

# Summing Up

- ▶ Hard to identify positive value of sovereign borrowing
- ▶ Clear patterns of negative outcomes both before and after default
- ▶ Maybe examples like Covid are best case ...
  - ▶ Shock relatively persistent in EMs
  - ▶ Calls more for insurance than self-insurance
  - ▶ See how plays out
- ▶ Rethink value of access to debt markets
- ▶ Rethink value of mitigating inefficiencies
  - ▶ Lack an enforceable public debt counterpart to MacroPru
  - ▶ Case for market-based discipline



Thank You