# The Economics of Low Interest Rates

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# Outline

- What are the causes, consequences, and policy implications of the very low real interest rate environment we have seen for a long time?
- I'll discuss this research agenda based on six recent papers
- The question is fundamentally one of slow-moving but persistent structural forces
- Hence the conceptual framing and empirical analysis has to focus on the long-run, beyond business cycles

# Outline

- I'll start with theory
- First, I'll introduce the idea of indebted demand that explains how rising inequality through the demand-side causes a fall in r*
- Second, I'll focus on the supply-side consequences of falling r* and highlight how falling r* can be contractionary as it promotes industry concentration at low rates

# Outline

- I'll then move to empirics
- First, I illustrate how preferences are indeed non-homothetic in data from a variety of sources, thus validating the basic premise of indebted demand. I'll quantify how non-homotheticity generates savings glut of the rich
- Second, I present evidence across states within the U.S., and over long span of history across countries, that rising inequality is closely associates with a rise in wealth-to-income ratio – in-line with indebted demand
- Third, I present empirical evidence on how falling rates near ZLB are differentially advantageous to industry leaders

# Outline

- I'll last turn to policy implications
- First, monetary policy has limited ammunition as it works partly through debt creation
- Second, revenue-neutral redistributive taxation, e.g. appropriately calibrated wealth tax, is important to bring the macroeconomy back into balance and avoid liquidity trap style problems
- Third, anti-trust policy becomes even more important
- Fourth, fiscal policy must straddle the "Goldilocks dilemma" in an indebted demand world as $R^G < G$ for government borrowing, but $R^P > G$ for private sector borrowing

# Indebted Demand

- When rich save more out of lifetime income, and extreme inequality rises

  … need to stimulate demand today through debt creation: rich save/lend, non-rich borrow [Why is higher saving not equal to higher investment?]

  … but that reduces demand in the future when borrowers have to repay the debt

  … only solution is for interest rate to fall, so non-rich could borrow even more!

  … this **indebted demand** cycle continues, until interest rate hits zero lower bound (ZLB)

  … if extreme inequality persists, remain stuck in perpetual **debt trap**

# Indebted Demand model

- Non-homothetic preferences
  … people derive greater utility from accumulating wealth (*a*) as they get richer

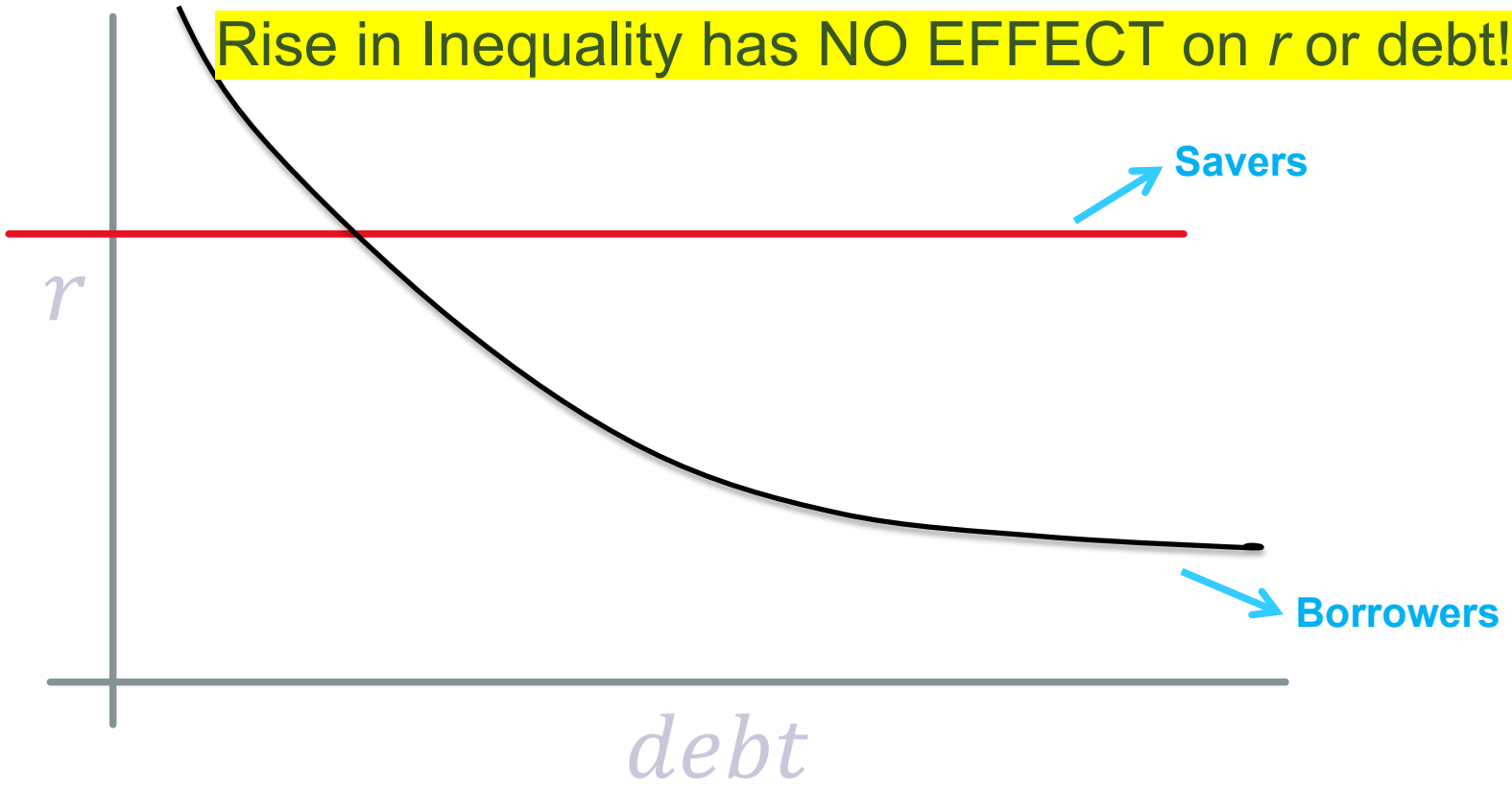
$$\int_0^{\infty} e^{-(\rho+\delta)t} \left\{ \log c_t^i + \frac{\delta}{\rho} . v(a_t^i) \right\} dt$$

- Euler equation in steady-state for the rich
  … determines the long-run saving supply schedule

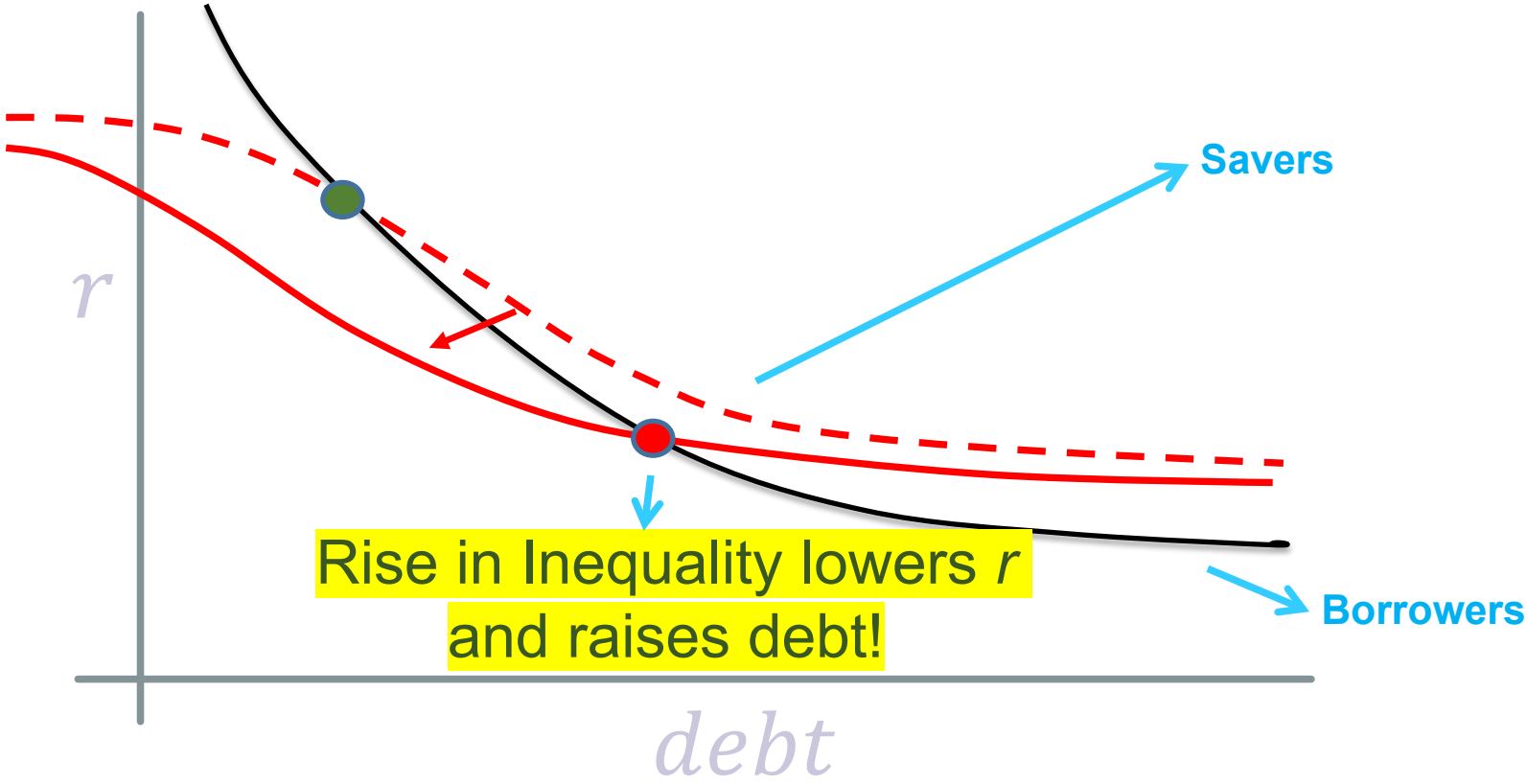
$$r = \rho . \frac{1 + \rho/\delta}{1 + \frac{\rho}{\delta} . av'(a)}$$

See Mian, Sufi and Straub (QJE 2021) for formal details

# Standard homothetic models



# Indebted Demand model



# Supply-side consequences of low r*

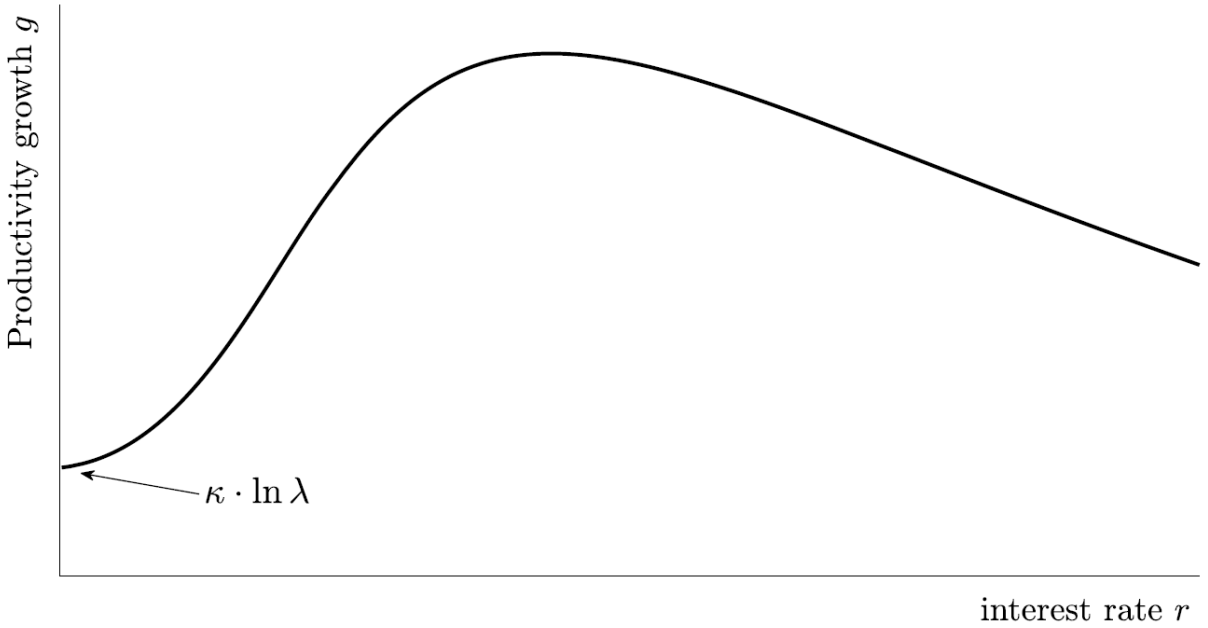
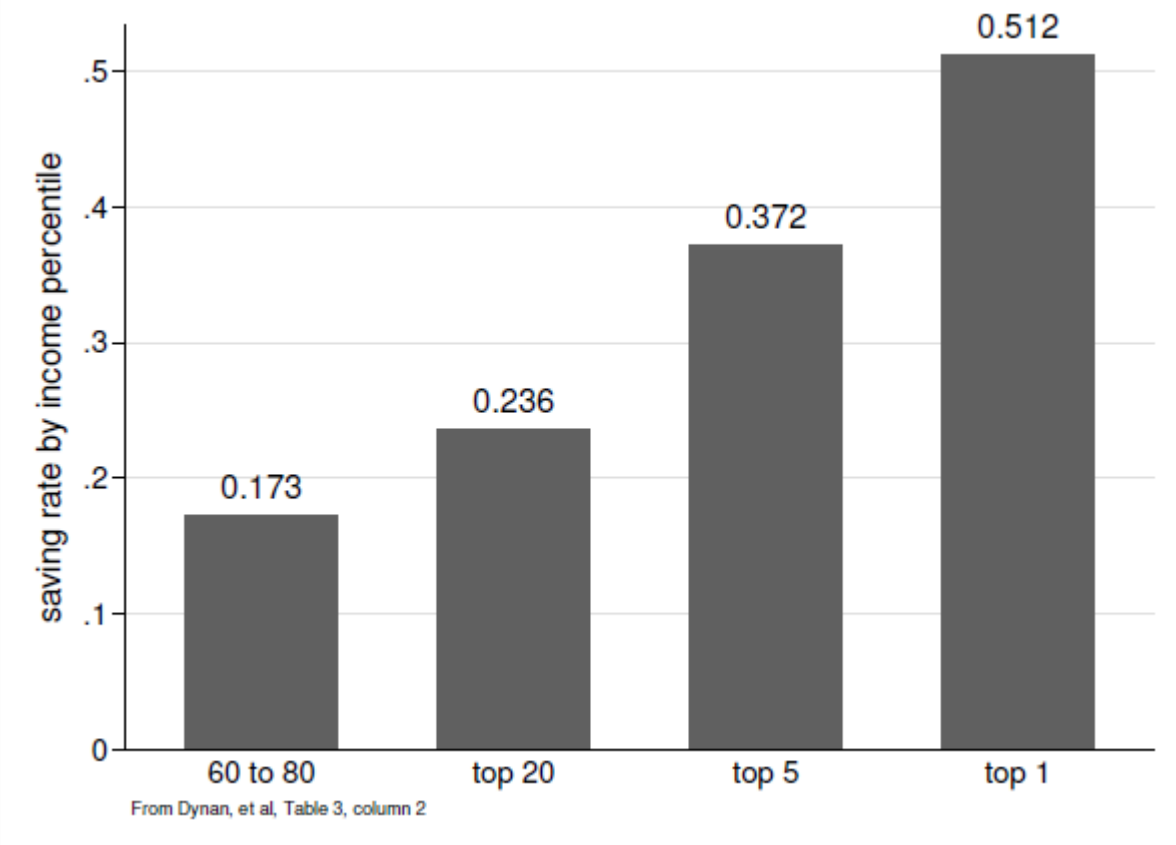



FIGURE 3.—Steady-state growth and the interest rate: inverted-U.

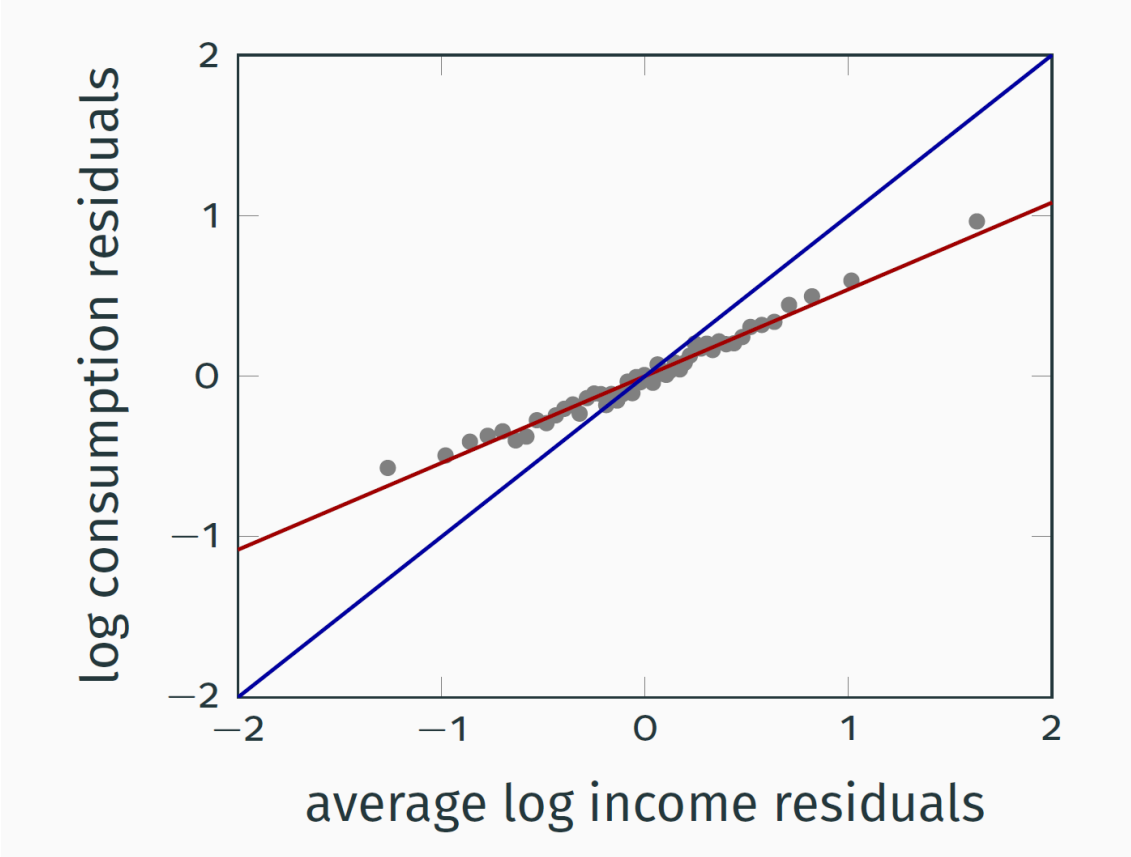
See Liu, Mian and Sufi (Ectma 2022) for formal details

# Are preferences non-homothetic at the top of the income / wealth distribution?

# Dynan et al (JPE 2004)
# The rich save more out of *lifetime* income (SCF)

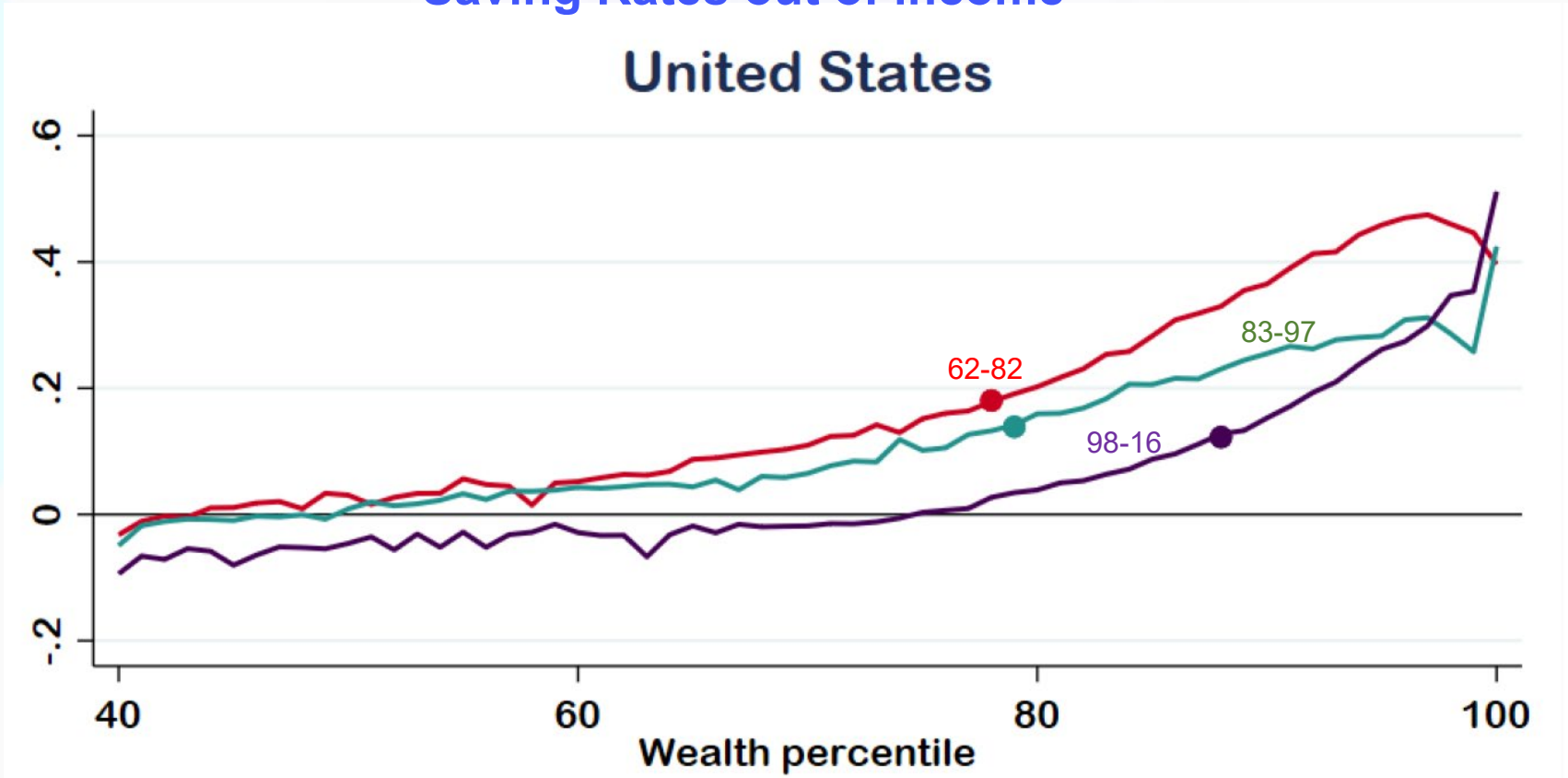


# Straub (2019): Consumption has elasticity < 1 w.r.t. income (PSID)



# Mian, Sufi and Straub (2022): “Savings glut of the rich”

## Saving Rates out of income



# Important saving rate measurement issues

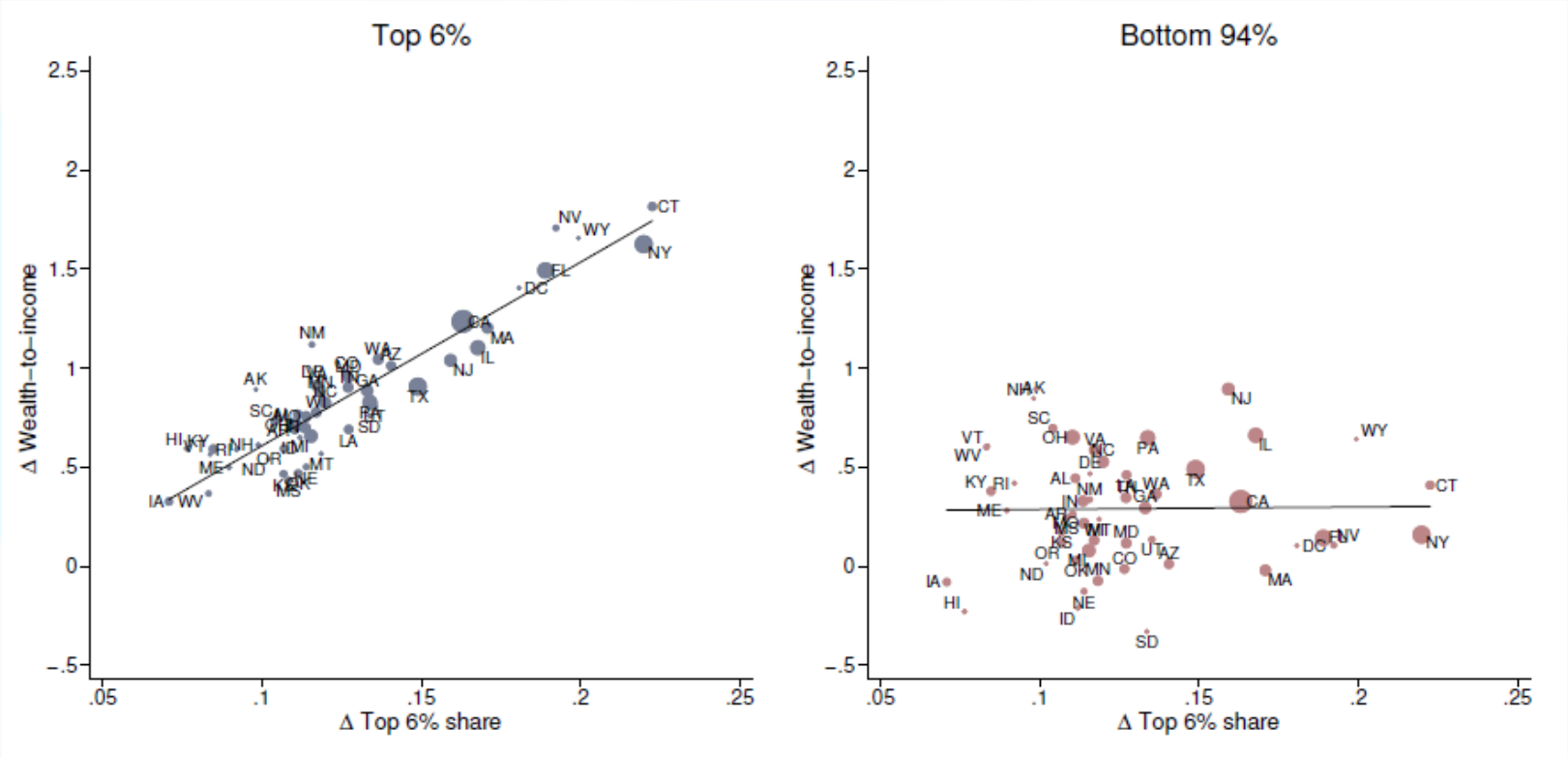
- Aggregation across households must be consistent with national accounts

$$S_t = \Delta W_t - \pi_t * W_{t-1}$$

- A large and increasingly larger share of saving from the very rich is through corporations, e.g. buy backs (tax efficiency reason etc)
- These and other savings in housing must be properly accounted for. See “saving glut of the rich” for more details
- Recent work by Bauluz, Novokmet and Schularick (2022) shows saving glut of the rich in other major economies as well

# Is the Indebted Demand force relevant globally and historically?

# Mian, Sufi and Straub (2022b)
# US State-level experiment




Rise in inequality leads to greater wealth accumulation, driven entirely by the top 6%

# How do we measure r* over long period of time, across countries?

- In standard models, the steady state real interest rate $(r)$ is given by

$$r = \frac{g}{\sigma} + \rho$$

*(where $g$ is the growth rate, $\rho$ is the discount rate and $\sigma$ is the IES.)*

- In steady state, present value of aggregate wealth (W) equals

$$\mathrm{W} = \frac{\alpha * I}{r - g}$$

*(where $I$ is national income and $\alpha$ is the capital share.)*

- Defining yield as $y = \frac{\alpha * I}{W}$ (average return on wealth), we can express yield as

$$r^* = y = \rho + g\frac{1-\sigma}{\sigma}$$

# Testing indebted demand using aggregate yields

- Indebted demand predicts inequality will reduce the effective discount rate and thus yields.

- We test this in cross country data, using an unbalanced panel of 22 developed countries between 1870 and 2019.

- $y_{j,t} = \alpha_j + \beta_1 * \theta_{j,t} + \beta_2 * g_{j,t} + \gamma * Z_{j,t} + \varepsilon_{j,t}$

  *(where $\theta$: top 1% share of income & $Z$ is a vector of controls)*

- or in differences of $l$ years

$$\Delta_l y_{j,t} = \alpha_j + \beta_{1,l} * \Delta_l \theta_{j,t} + \beta_{2,l} * \Delta_l g_{j,t} + \gamma_l * \Delta_l Z_{j,t} + \varepsilon_{j,t}$$

*(where $\Delta_l x_{i,t} = x_{i,t} - x_{i,t-l}$)*

| | $y_j$ | | | $\Delta_{40} y_j$ | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\theta_j^{top1\%}$ | -0.19*** | -0.13*** | -0.092** | | | |
| | (0.031) | (0.022) | (0.044) | | | |
| $\mathbb{E}[g^Y]$ | 0.19*** | 0.15*** | 0.13*** | | | |
| | (0.056) | (0.040) | (0.039) | | | |
| $I/\bar{W}_{i \neq j}$ | | 0.49** | | | | |
| | | (0.19) | | | | |
| $\Delta_{40}\theta_j^{top1\%}$ | | | | -0.20*** | -0.13** | -0.23** |
| | | | | (0.048) | (0.052) | (0.100) |
| $\Delta_{40}\mathbb{E}[g^Y]$ | | | | 0.21*** | 0.15*** | 0.10*** |
| | | | | (0.038) | (0.039) | (0.032) |
| $\Delta_{40} I/\bar{W}_{i \neq j}$ | | | | | 0.48*** | |
| | | | | | (0.11) | |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | No | No | Yes | No | No | No |
| No. Countries | 22 | 22 | 22 | 10 | 10 | 10 |
| N | 1,296 | 1,296 | 1,296 | 565 | 565 | 565 |
| R-sq | 0.434 | 0.571 | 0.710 | 0.139 | 0.382 | 0.086 |

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Standard errors are dually clustered by country and date for columns 1-3. For column 4, standard errors are Newey-West with maximum lag length of 40 years prior. $y_j = cI/W_j$ denotes capital income to wealth ratio, while $\Delta_{40} x_t$ denotes forty year changes in variable $x$, such that $\Delta_{40} x_t = x_t - x_{t-40}$

# Decomposing wealth into saving and capital gains

- Wealth in any period follows the accounting identity

$$W_{t+1} = S_t + (1 + \pi_t)W_t + \delta_t$$

*(where $S$ is savings, $\pi$ is the capital gains rate and $\delta$ is destruction due to war etc.)*

- We can construct the hypothetical series with no capital gains

$$W_{t+1}^{\pi=0} = S_t + W_{t-1} + \delta_t$$

- We can also construct the cumulative aggregate capital gain as

$$\Pi_t = \prod_{s=0}^{t}(1 + \pi_s)$$

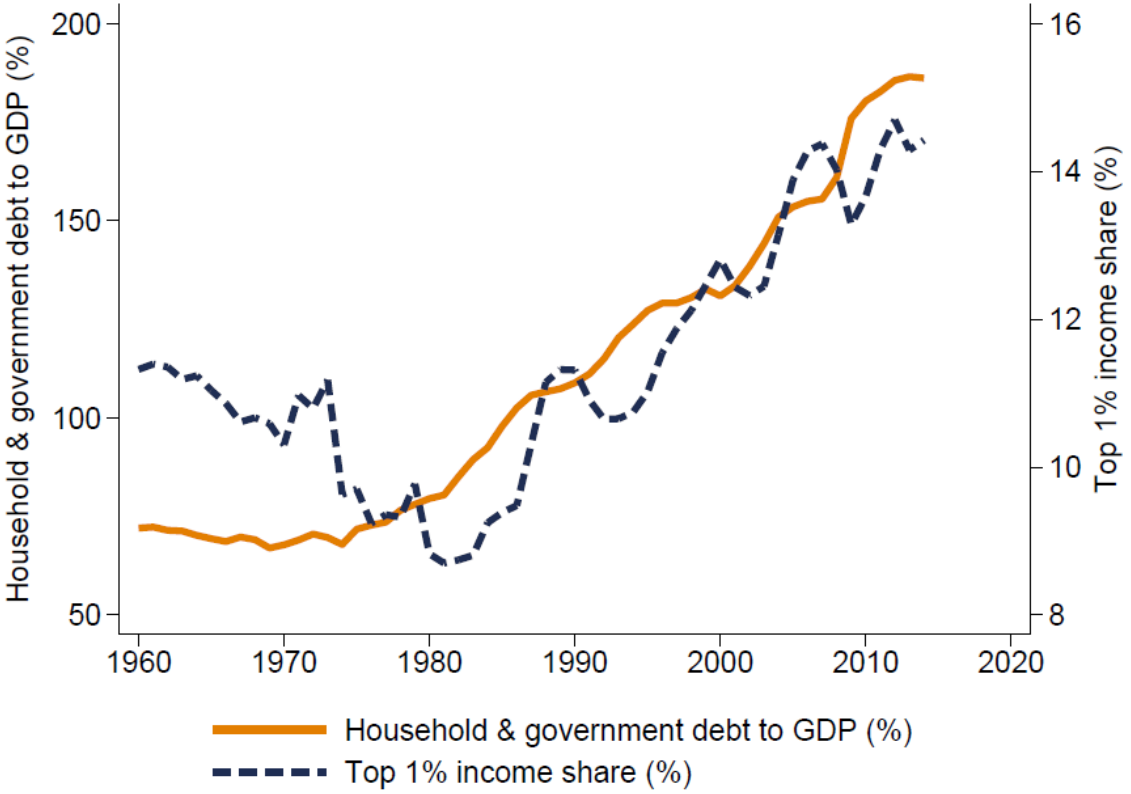
| | $\Pi_j$ | | | $y_j - y_j^{\pi=0}$ | | | $y_j^{\pi=0}$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| $\theta_j^{top1\%}$ | 8.64*** | 4.54*** | 4.58*** | -0.47*** | -0.48*** | -0.35*** | 0.27*** | 0.29*** | 0.39*** |
| | (0.92) | (0.74) | (1.07) | (0.093) | (0.063) | (0.096) | (0.071) | (0.048) | (0.12) |
| $\mathbb{E}[g^Y]$ | 0.75 | 0.70** | 1.01 | -0.13*** | -0.10* | -0.15 | 0.25*** | 0.22*** | 0.30** |
| | (0.68) | (0.27) | (1.00) | (0.029) | (0.054) | (0.10) | (0.0044) | (0.015) | (0.12) |
| $\alpha$ | -0.62 | -1.26* | -1.15* | | | | | | |
| | (0.88) | (0.65) | (0.62) | | | | | | |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes | No | No | Yes |
| Global Factor | No | Yes | No | No | Yes | No | No | Yes | No |
| No. Countries | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| N | 930 | 930 | 930 | 950 | 950 | 950 | 951 | 951 | 951 |
| R-sq | 0.634 | 0.794 | 0.825 | 0.573 | 0.705 | 0.679 | 0.595 | 0.656 | 0.619 |

Standard errors in parentheses

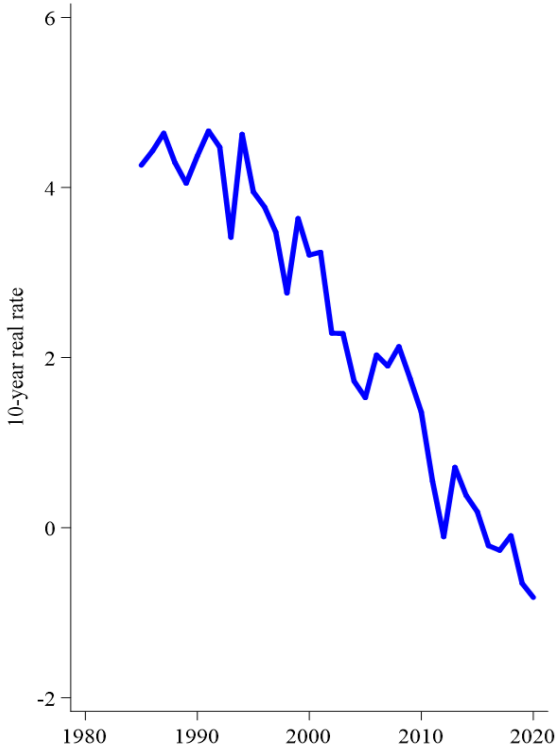
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Standard errors are dually clustered by country and year. $y_j^{\pi=0} = \frac{y}{W^{\pi=0}}$ denotes income to wealth with no capital gains since 1946, $y_j - y_j^{\pi=0}$ denotes the change in income to wealth shares since 1946 due to capital gains, while $\Pi_j$ denotes the log of cumulative percentage capital gains since 1946. $\mathbb{E}[g^Y]$ denotes predicted real gdp growth from an AR(5) model of realised growth, while $\alpha$ denotes capital's share of income.

# Rising inequality is associated with rising debt



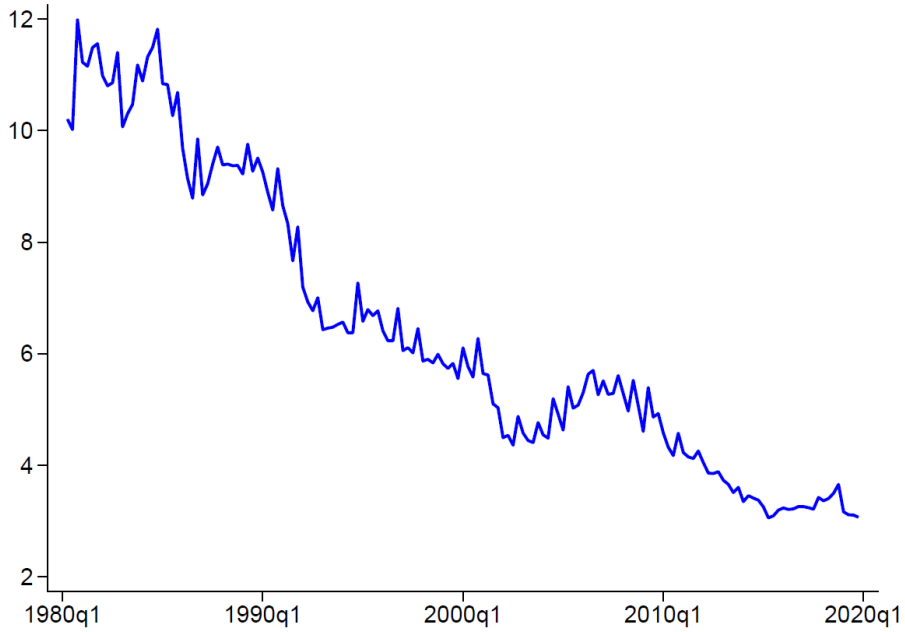

# …. and falling rates



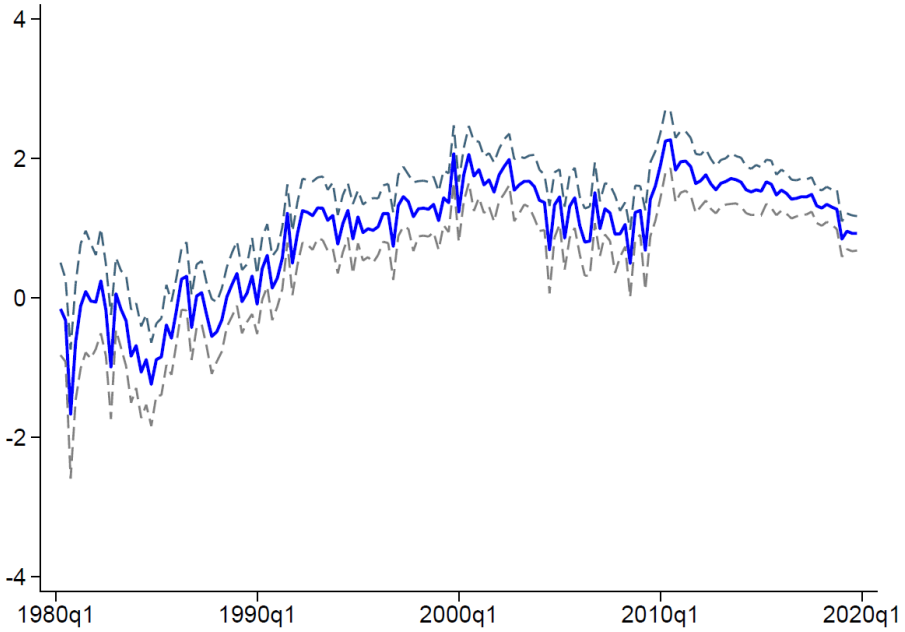
# Are low rates more advantageous to industry leaders?

# Liu, Mian, Kroen and Sufi (2022)

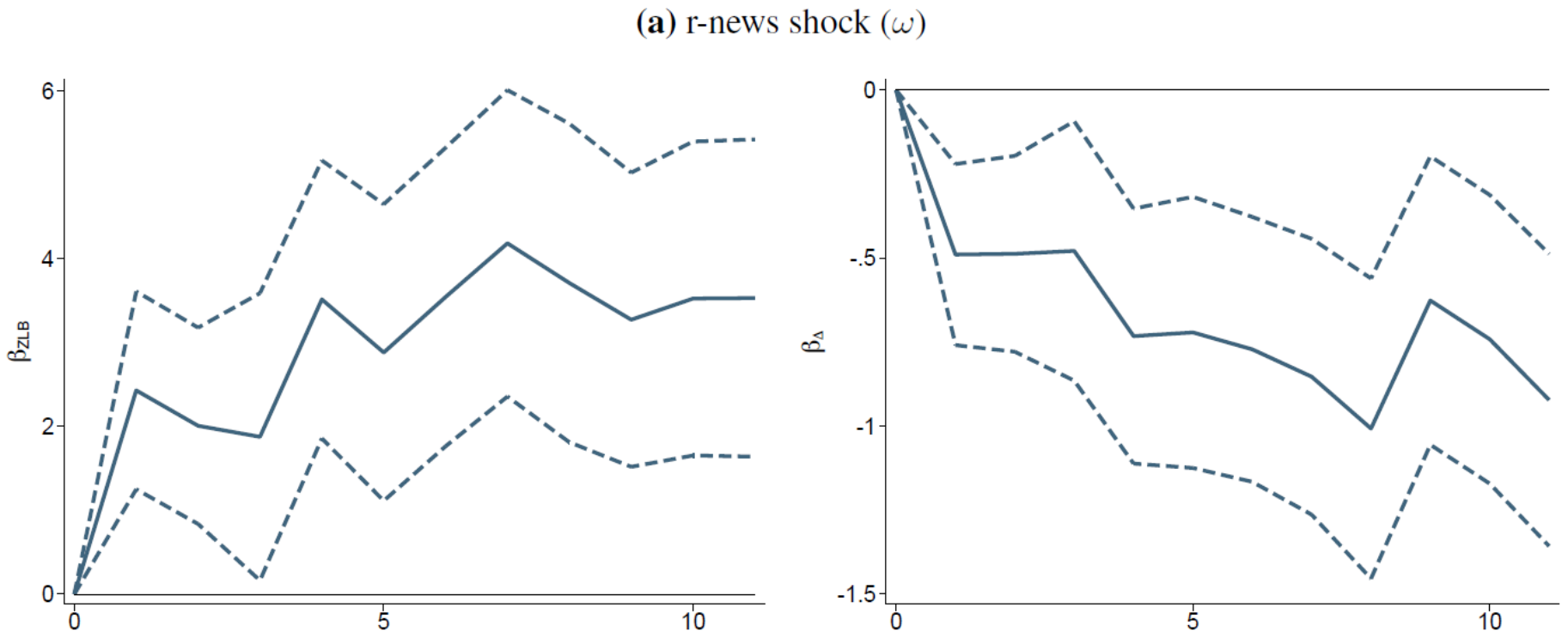
**(a)** Leader Borrowing cost




**(b)** Spread between leaders and followers



# Borrowing cost IRF to interest rate shock



# Overall IRFs to interest rate shock

| | Dependent Variable | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | borrowing cost | log debt | log assets | leverage | log PPE | capital exp | acquisitions | stock return |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $\hat{\beta}_{ZLB}$ | 3.66*** | -0.81*** | -0.16*** | -0.38*** | -0.60*** | -0.16*** | -0.19*** | -0.45*** |
| | (1.01) | (0.26) | (0.037) | (0.12) | (0.13) | (0.047) | (0.052) | (0.058) |
| $\hat{\beta}_{\Delta}$ | -0.96*** | 0.13** | 0.037*** | 0.056* | 0.094*** | 0.023 | 0.042*** | 0.091*** |
| | (0.24) | (0.062) | (0.0084) | (0.029) | (0.033) | (0.016) | (0.012) | (0.015) |
| N | 137,960 | 177,760 | 234,067 | 249,312 | 247,343 | 228,906 | 212,148 | 303,155 |
| R-sq | 0.31 | 0.14 | 0.16 | 0.25 | 0.25 | 0.10 | 0.08 | 0.41 |

# Estimating competition-neutral FF rate

| Panel B: Combining estimates of neutral rate | | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| | Baseline | Common sample | Vector Regression |
| $\bar{\hat{\eta}}$ | 4.37*** | 3.84*** | 3.84*** |
| | (0.47) | (0.41) | (0.39) |
| N | 306,213 | 113,591 | 113,591 |

# What are policy implications for a world with Indebted Demand?

# Implications for monetary policy

- Rising inequality forces the hand of monetary policy by lowering r*

  … reduces space for monetary policy to operate

- Easy monetary policy often raises demand through debt creation

  … but that creates indebted demand, putting downward pressure on future rates: monetary policy has limited ammunition.

  "the sustainability of debt burdens depends on interest rates remaining low" – Mark Carney

- Persistent extreme inequality pushes monetary policy against ZLB, and economy stagnates inside a debt trap

# Monetary Policy and Indebted Demand

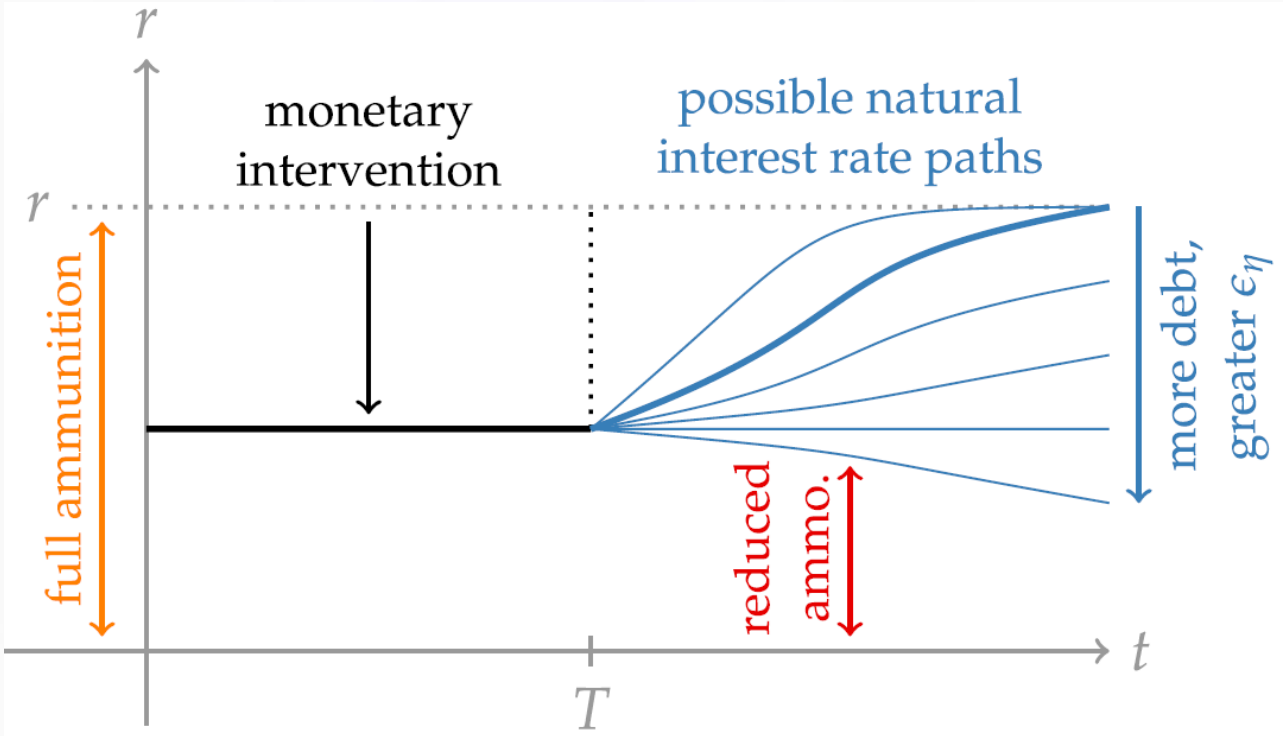



FIGURE XII

Debt Limits the Ammunition of Monetary Policy

# Implications for fiscal policy

Mian, Sufi and Straub (2022c) "A Goldilocks theory of fiscal deficits''

- Historically $R^G < G < R^P$ for the U.S., where nominal growth in between return on government and private borrowing
- This creates a goldilocks role for fiscal policy in a low R* environment. Persistent demand shortfalls cannot be met by higher private debts due to the indebted demand force.
- But government debt is different as $R^G < G$, due to "convenience yield" of government bonds. Government can use this advantage to boost demand out of ZLB, but ``free lunch'' ends at $R^G = G - \phi$, where $\phi$ is semi-elasticity of $R^G$ w.t.t. government debt
- We calibrate that the U.S. was around that boundary pre-Covid, with a structural primary deficit of ~ 2% of GDP

# Other policy implications

- Revise macroeconomic models to incorporate the key role that inequality plays in determining macroeconomic dynamics and fundamentals

  … possibly explains persistent over-forecasting of interest rates

- Monetary policy is ill-equipped to deal with weak aggregate demand resulting from extreme inequality. Emphasis should be on,

  … policies that deliver equitable and inclusive growth

  … progressive taxation, including wealth taxes

  ... Increase public investment, especially in areas that promote equality of opportunity

  … promote competitive markets