"Wealth Inequality, Labor Market Arrangements and the Secular Decline in the Real Interest Rate"

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Developing a dynamic macroeconomic model in which the secular decline in real interest rates arises endogenously from rising wealth inequality, from John B. Donaldson, Hyung Seok E. Kim, and Rajnish Mehra https://www.nber.org/papers/w34016

Wealth Inequality, Labor Market Arrangements and the Secular Decline in the Real Interest Rate

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We develop a dynamic macroeconomic model in which the secular decline in real interest rates arises endogenously from rising wealth inequality. Challenging the standard "safe asset shortage" hypothesis, the model shows how falling real rates can coexist with a stable safe asset ratio—closely matching U.S. empirical patterns. The mechanism combines limited financial market

Motivation

- Narrative Motivation
- Historical Motivation
- An Economist's Motivation

Senator Warren

Figure: Senator Warren

- Senator Warren, **always a provocateur but with a more positive connotation**, was quoted as saying "I warned about an ecnomic crash years before 2008, but people in power wouldn't listen."
- In her statement for the 2020 presidential race, she proposes
  - **Reduce Household Debt**
  - **Monitor and Reduce Leveraged Coporate Lending**
  - **Strengthen Manufacturing**
  - **Limit Potential Shocks to the Economy**

A Snapshot:
"Why the US right wants to put workers in the boardroom?"
Financial Times, Feb 01, 2021

Having a seat on the board would give workers the potential to alter the course of corporate deliberations, improve information flow and build trust © Micah Green/Bloomberg

- "Republican senator Marco Rubio and congressman Jim Banks, chair of the largest conservative caucus on Capitol Hill, will introduce a bill that would require worker representatives to be granted a seat on some corporate boards."

Marx

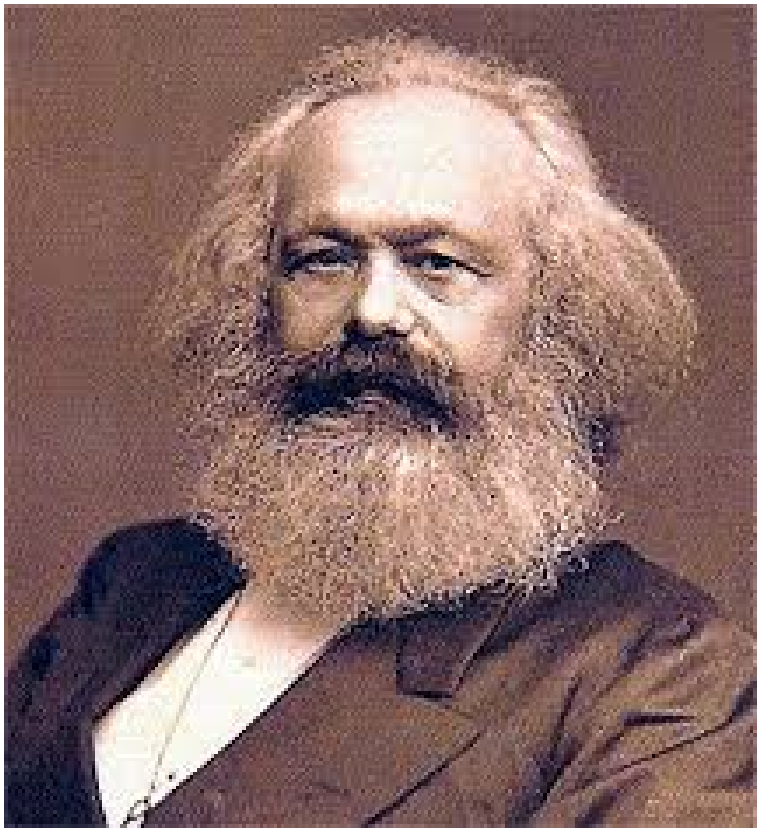


Figure: K. Marx

"Centralization"

- Marx (1867) makes a related point by saying that "*capital grows in one place to a huge mass in a single hand, because it has in another place been lost by many,*" which rationalizes *centralization* as distinct from *accumulation and concentration.*
- Lenin (1916) gathered census statistics in the early 1900s to reach his self-constituted indictment of the future of capitalism, summarized by his dicta: "the enormous growth of industry and the remarkably rapid concentration of production. . . are one of the most characteristic features of capitalism...Concentration of production, however, is much more intense than the concentration of workers, since labor in the large enterprises is much more productive."
- Kwon et al. (2022) document that the concentration of corporate businesses in terms of asset and sales share of the top enterprises in the US has been accelerating for the past 100 years.

A Brief History on Stakeholder Capitalism

- Management philosophy in the 1950s and 1960s was very much stakeholder oriented (**"Coporate Fraternalism(온정주의(溫精主義) 적 기업문화)"**). The authors (Sutton, Harris, Kaysen, and Tobin (1956, p. 65) of the well-known study of American business in the 1950s stated: "corporation managers generally claim they have four broad responsibilities: to consumers, to employees, to stockholders, and to the general public... each group is on an equal footing; the function of management is to secure justice for all and unconditional maxima for none."
- Jacob Fugger (1459-1525), whose overall wealth is estimated to be comparable to 2% of Europe's GDP at that time, was perhaps a first provocateur to inspire the idea of a *stakeholder equilibrium*. He initiated a housing project for Ausburg's working poor, referred to as the *Fuggerrei*, and its resulting settlement remains in service even 500 years later, housing the poor as usual (see: *the Richest Man Who Ever Lived: The Life and Times of Jacob Fugger* by G. Steinmetz, 2015). A plaque in Ausburg describes the Fuggerei as follows: *The brothers Uhlig, George and Jacob Fugger of Augsburg, who are convinced they were born to serve the city and feel obligated to return property received from all mighty and just God, have out of piety and as a model of openhearted generosity, given, granted, and dedicated 106 homes with all fixtures to the diligent and hardworking but poor fellow citizens.*

A Stakeholder Economy

- What is a "Stakeholder Economy"?

  "Stakeholder capitalism" is the notion that firms should undertake their investment plans with a focus on benefiting all of their stakeholders: customers, employers, joint venture partners, owners (stockholders), the communities in which they operate and, broadly speaking, "society as a whole."

- Many questions:
  - Who is a "legitimate" stakeholder?
  - Does it emphasize long term ESG investing as often claimed?
  - How does it complement the notion that all constituencies have a "place at the table"?
  - Alleged to foster sustainable development
  - Reaction to "Firm Value Maximization": shareholder value vs. "stakeholder value"

An Economist's Motivation

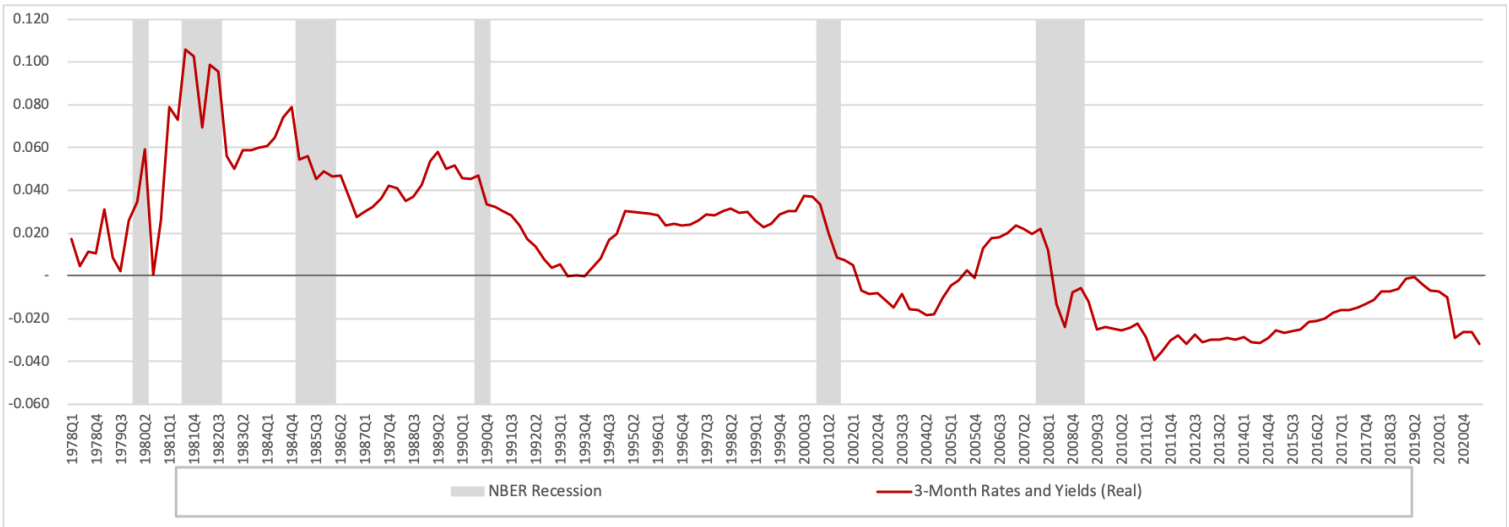


Figure: Secular Decline in real interest rates

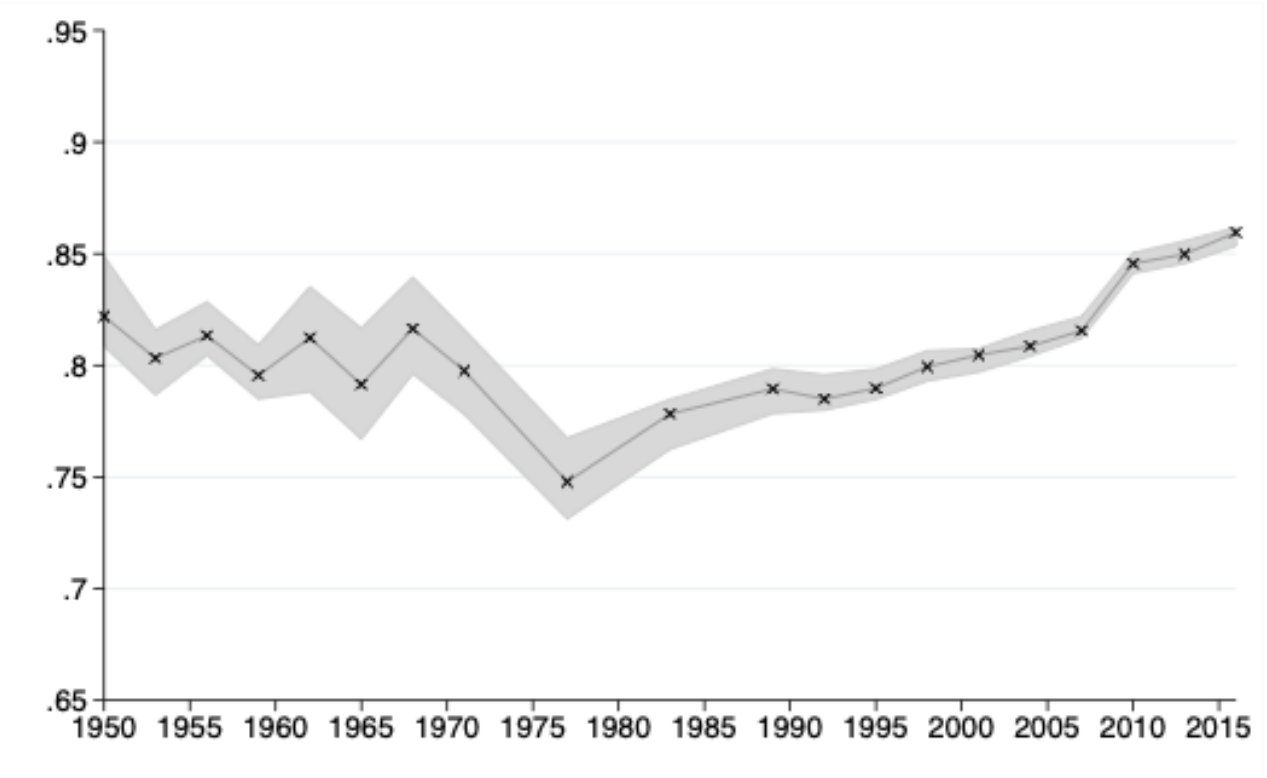


Figure: Gini Coefficients for Wealth:1949-2016
Source: Kuhn et al. (2020)

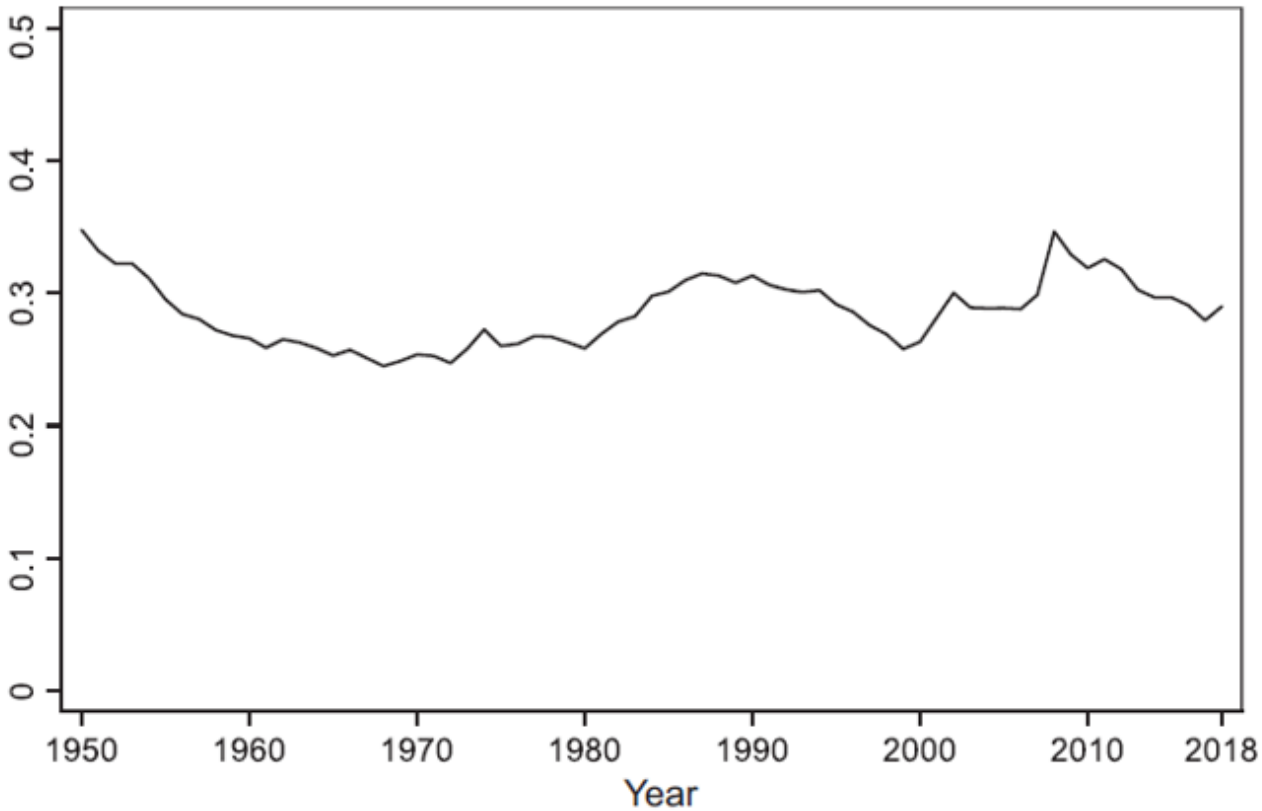


Figure: Safe-Asset Ratio: 1950-2018
Source: Barro et al. (2022)

Motivation: Shimer (2005) Puzzle

ROAD MAP

Restricted Focus

- In the spirit of a stakeholder economy, how might firms better take into account the interests of their workers in an environment of increasing wealth inequality due to the increasing centralization of capital ownership?
  - There is nothing to say about customers, communities etc., as in this simple model these folks are all the same agents.
  - The present study does not consider wealth redistribution as a solution, and it retains firm value maximization cum a new labor market arrangement.
- In a Marxian-centralization-like environment, can the proposed "Coasian decentralized mechanism" still foster the economy's sustainable economic growth?
- Two types of the centralization of capital ownership
  - Wealth concentration ("Marxian centralization" by Marx, 1867)
  - Automation (not today)

Road Map

- The Positivistic experiment (today): **Search for a positive model that matches well with the stylized facts described above**

Later (Not today)

- Identifying a benchmark stakeholder economy, i.e., a Coasian decentralized mechanism to address an *pecuniary externality* inevitably led by the "realistic" concentrated ownership of capital, what is often referred to as the *stakeholder externality*.
- The "normative" experiment: Model-generated data are compared with data characterizing the period 1970-2015 for the US economy. Then ask what the "parallel" economy would have "looked like" if stakeholder considerations of the above type had been in effect during the 1970-2015 period. The goal here is thus not to match the data but to uncover the potential degree of stakeholder externalities from it (similar to Berger et al.'s (2023) exercise in spirit).

Literature Review

We stand on the shoulders of giants.

MODEL

In a Nutshell

A Mix of RBC and MIT models;
The former represents the Prescottian spirit, while the latter being largely emblematic of the presence of externalities.

- The present essay introduces a novel externality, what we refer to as the *safe-asset-ratio externality*.
- Note that the present authors are at most Prescott No. 2s.

Map of each model feature to the empirical fact it is meant to explain.

Model feature	Key economic role in the model	Empirical fact or moment it helps match
Limited stock-market participation (two-agent setup)	Concentrates capital-income risk on a shrinking elite, raising their precautionary saving	High and rising U.S. wealth inequality; narrow equity-ownership distribution
Egalitarian Kalai–Myerson wage bargaining inside a DMP search framework	Generates a present-value wage asset that is normally smoother than productivity; its risk rises with inequality	Counter-cyclical labor share; smoother wages vs. safe-asset bonds; helps solve the Shimer unemployment-volatility puzzle
Representative firm issues one-period default-free bonds	Leverages stockholders, so their consumption volatility spikes when their population share falls	Downward trend in real risk-free rates despite almost flat aggregate safe-asset ratio
Habit-formation heterogeneity across groups	Lifts effective risk aversion for richer agents, reproducing Gini levels of 0.70–0.83	U.S. wealth-Gini level and its rise since the early 1980s
Fixed aggregate bond supply in the calibration	Lets prices absorb demand shifts, so the safe-asset ratio stays flat while rates fall	Empirical flatness of the safe-asset ratio (Barro et al., 2022) concurrent with declining real rates
Search-and-matching labor market with vacancy costs	Combined with the wage-asset channel, delivers realistic unemployment & vacancy volatility	Unemployment volatility (“Shimer puzzle”) and Beveridge-curve dynamics

Stockholder

The model:

1. Stockholders

$$V^s(\Omega_0^s) = \max_{\{h_t^s, c_t^s, e_{t+1}^s, b_{t+1}^s\}} \mathbb{E}_0^s \sum_{t=0}^{\infty} \beta^t [u^s(c_t^s - \chi^s \mathbf{c}_{t-1}^s - H(h_t^s))]$$

stockholder precautionary parameter

hours

shareholder consumption

hours disutility

$$\text{s.t. } c_t^s + p_t^e e_{t+1}^s + p_t^b b_{t+1}^s \leq w_t^s h_t^s + (p_t^e + d_t) e_t^s + p_t^b b_t^s$$

price of equity (e_t)

one period default free bond price

$$u^s(c_t^s - \chi^s \mathbf{c}_{t-1}^s - H(h_t^s)) = \frac{(c_t^s - \chi^s c_{t-1}^s - B_s(h_t^s)^{\psi})^{1-\gamma} - 1}{1-\gamma}$$

Workers

$$V^n\left(\Omega_0^n\right) = \max_{\left\{c_t^n, h_t^n, c_t^{n,e}, c_t^{n,u}, b_{t+1}^n\right\}} \mathbb{E}_0^n \sum_{t=0}^{\infty} \beta^t \left(u^n\left(\tilde{c}_t^n - \chi^n \mathbf{c}_{t-1}^n - n_t L\left(\tilde{h}_t^n\right)\right)\right)$$

precautionary parameters

hours of workers

$$\text{s.t. } c_t^n = n_t c_t^{n,e} + \left(1 - n_t\right) c_t^{n,u},$$

tax to fund

$$n_t c_t^{n,e} + \left(1 - n_t\right) c_t^{n,u} + p_t^b b_{t+1}^n \leq \underbrace{w_t^n h_t^n n_t}_{\text{wage income to employed}} + b\left(1 - n_t\right) + b_t^n - T_t$$

unemployment payment

$$n_{t+1} \leq \left(1 - \rho\right) n_t + s_t \left(1 - n_t\right).$$

Firm

$$\max_{\{i_t, h_t^s, x_t\}} d_t + p_t^e \equiv d_t + \mathbb{E}(\tilde{M}_{t,\,t+1}\left(\tilde{p}_{t+1}^e + \tilde{d}_{t+1}\right)|\Omega_t^f)$$

$$\text{s.t. } d_t \equiv f\left(k_t, \mu_s h_t^s, h_t^n n_t\right) z_t - i_t - \mu_s w_t^s h_t^s - w_t^n h_t^n n_t - \underbrace{\frac{\kappa}{2} x_t^2 n_t}_{\text{labor adjustment cost}} - \varphi\bar{k} + p_t^b \varphi\bar{k}$$

$$k_{t+1} = (1-\delta) k_t + \underbrace{G\left(\frac{i_t}{k_t}\right) k_t}_{\text{capital adjusted cost}}$$

$$n_{t+1} = (1-\rho) n_t + \underbrace{x_t n_t}_{\substack{\text{hiring rates} \\ \times \text{ workforce}}} .$$

- Technology:

$$y_t = f(k_t, \mu_s h_t^s, n_t h_t^n) z_t = \underbrace{z_t}_{\substack{\text{TFP shocks} \\ \text{(“Prescottian supply shocks ”)}}} A k_t^{\alpha} \left(\left(\mu_s h_t^s\right)^{\mu} \left(h_t^n n_t\right)^{1-\mu}\right)^{1-\alpha} \tag{1}$$

- w_t^n: the egalitarian bargained wage for workers (to be specified shortly).

The Labor Market

a. Standard search and matching frictions

$$m_t = \sigma_m v_t^{\sigma} (1 - n_t)^{1-\sigma}$$

b. Job value to the firm

$$J_t = \max_{\{x_t\}} \left[h_t^n f_3(k_t, \mu_s h_t^s, n_t h_t^n) z_t - w_t^n h_t^n - \frac{\kappa}{2} x_t^2 + (1 - \rho + x_t) \, \mathbb{E}_t \left[\tilde{M}_{t+1}^s \tilde{J}_{t+1} \right] \right] \tag{2}$$

c. Worker's value of being employed:

$$EP_t - U_t$$

where

$$EP_t = w_t^n h_t^n + (1 - \rho) \beta \mathbb{E}_t \tilde{\Lambda}_{t,t+1}^n \widetilde{EP}_{t+1} + \rho \beta \mathbb{E}_t \tilde{\Lambda}_{t,t+1}^n \tilde{U}_{t+1}$$

$$U_t = L(h_t^n) + b + s_t \beta \mathbb{E}_t \tilde{\Lambda}_{t,t+1}^n \widetilde{EP}_{t+1} + (1 - s_t) \beta \mathbb{E}_t \tilde{\Lambda}_{t,t+1}^n \tilde{U}_{t+1}.$$

"Distribution Risk" and Egalitarian bargaining

a. Key quantity: "distribution risk," i.e., the degree of cross-agent risk-sharing

$$\phi_t \equiv \frac{u_1^s\left(c_t^s - \chi^s \mathbf{c}_{t-1}^s - H(h_t^s)\right)}{u_1^n\left(c_t^n - \chi^n \mathbf{c}_{t-1}^n - n_t L(h_t^n)\right)} = \frac{\lambda_t^s}{\lambda_t^n}, \tag{3}$$

b. Egalitarian wage bargaining: division of the surplus in utility terms to satisfy

$$\eta\left(V_t^s\left(\Omega_t^s\right) - \bar{V}_t^s\right) = (1-\eta)\left(V_t^n\left(\Omega_t^n\right) - \bar{V}_t^n\right), \tag{4}$$

Corollary

When financial markets are complete, egalitarian and present value Nash bargaining coincide since $\phi_t \equiv 1$ *for all* t.

Proposition

Egalitarian bargaining generalizes the standard DMP present-value Nash bargaining to accommodate a time-varying revision of labor's share of the match value, $\widetilde{\eta}_t$, that satisfies:

$$\frac{EP_t - U_t}{\eta_t} = \frac{J_t}{(1-\eta_t)}, \tag{5}$$

where the joint match value, S_t, is given by

$$S_t = EP_t - U_t + J_t,$$

and

$$\widetilde{\eta}_t = \frac{\eta}{(1-\eta)\frac{1}{\widetilde{\phi}_t} + \eta}. \tag{6}$$

- Present-value wage:

$$\begin{aligned} W_t^{\text{pv}} &= w_t^n + \mathbb{E}_t \left[\sum_{j=1}^{\infty} (1-\rho)^j \left(\prod_{k=1}^{j} \cdot \widetilde{M}_{t,t+k}^s \right) \widetilde{w}_{t+j}^n \right] \\ &= w_t^n + (1-\rho) \cdot \mathbb{E}_t \left[\widetilde{M}_{t,t+1}^s \widetilde{W}_{t+1}^{\text{pv}} \right]. \end{aligned}$$

Contrast with the textbook Nash bargaining model

Proposition

Under the assumptions of Section 2.1-2.4, and the requirement that wages in all matches, new or existing, are renegotiated every period following the aggregate shock, egalitarian wage bargaining implies that the equilibrium share of the match surplus accruing to workers is time varying and given by (6). Furthermore, the worker's per period wage bill is

$$w_t^n h_t^n = (1-\eta_t)\zeta_t + \eta_t \pi_{n_t} \tag{7}$$

where ζ_t and π_{n_t}, respectively, represent an employed worker's dynamic reservation value and the match benefit to the firm of one marginally added worker. These quantities are made explicit below:

$$\zeta_t = b + (c_t^{n,e} - c_t^{n,u}) - \chi^n(\mathbf{c}_{t-1}^{n,e} - \mathbf{c}_{t-1}^{n,u}) = b + (L(h_t^n) - L(0))$$

and

$$\pi_{n_t} = \left[h_t^n f_3(k_t, \mu_s h_t^s, h_t^n n_t) z_t + \frac{\kappa}{2} x_t^2 + \kappa x_t s_t \right]$$

.

“Distribution Risk”: Some Discussion

- The degree of contractual incompleteness in the spirit of Williamson (1975, 1985) (e. g. *ex post* opportunism), often emphasized in the incomplete contracting literature
- Hence *ex post* inefficiencies
- The degree of pledgeability, reminiscient of the counterpart of rational bubble theory (e.g. Hirano and Yanagawa, 2017)

SIMULATION RESULT

Calibration

- A RBC-style Calibration, undeniably emblematic the RBC revolution in macroeconomcs (e.g., Kydland and Precsott, 1982; Cooley's monumental book, 1995)
- Except the "calibration" of wealth inequality
  - The model economy is characterized by the "polarized" one where the stockholder group always owns 90 % of the economy's financial wealth, irrespective of secular changes in the prior group's population, μ_s.
  - The latter feature is a **TRICK** which mimics the recent evolution of the US economy's wealth distribution; greater wealth tends to belong to a fewer hands over time.
  - Gini coefficient for wealth:

$$\bar{G}^W = 1 - \left(\frac{\mu_s}{1+\mu_s} + \frac{\bar{W}^n}{\bar{W}^s + \bar{W}^n} \right) \tag{8}$$

  - Restrictions on precautionary saving parameters χ^s and χ^n:

$$\chi^s = a + b \cdot \chi^s \tag{9}$$

  - In our choice of χ^s and χ^n, χ^n can be chosen arbitrarily. Given this choice χ^s becomes endogenous following (9).

Gini Coefficient

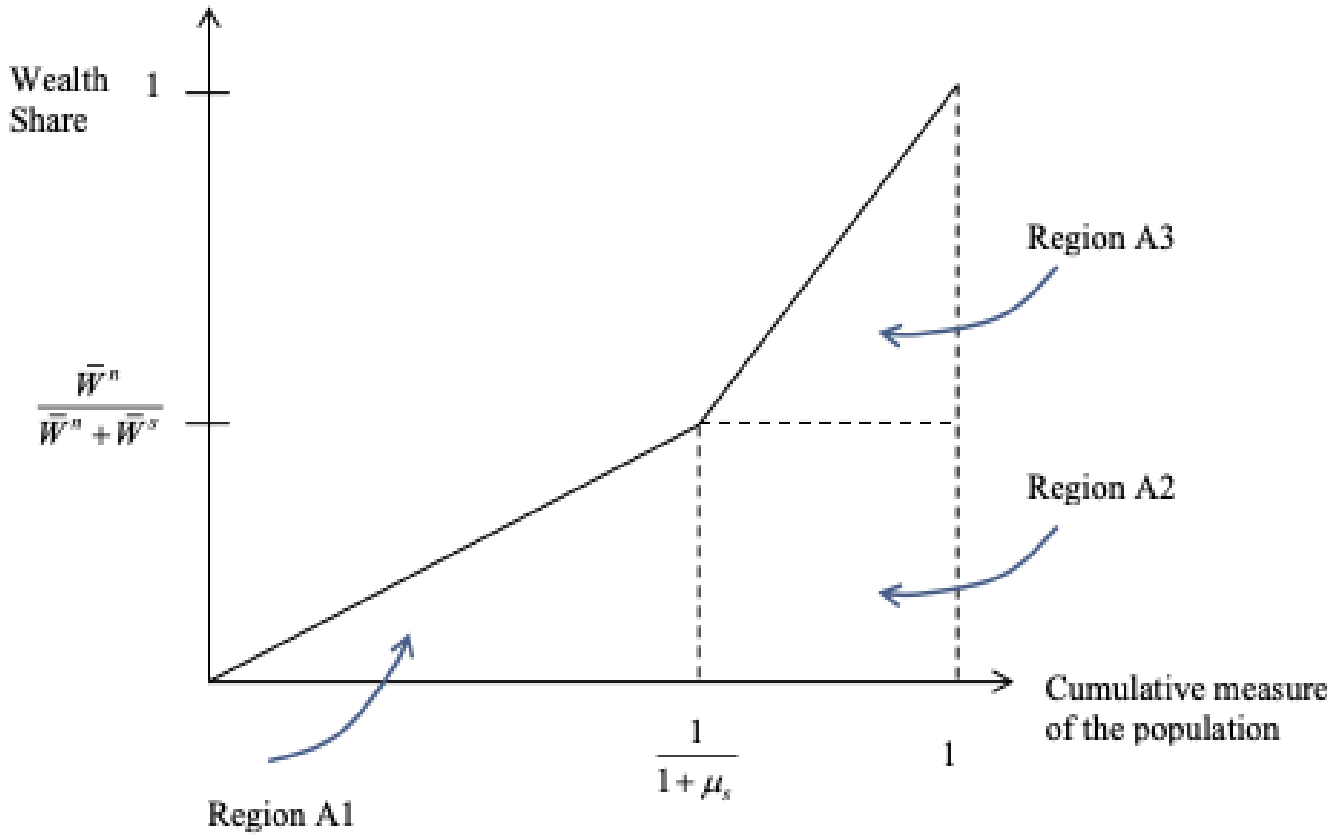


Table: **Exogenous Parameters: Baseline Case**

	Parameter	Value	Attribution
α	(production parameter)	$\alpha = .36$	Cooley and Prescott (1992); commonplace[(i)]
μ_s	(the economy's wealthy group)	$\mu_s = .11$	Lansing (2015)
φ	(leverage parameter)	$\varphi = .43$	proposed in Kandel and Stambaugh (1992); Rouwenhorst (1995) [(ii)]
ξ	(capital cost-of-adjustment parameter)	$\xi = .45$	Jermann (1988); Guvenen (2009)
δ	(quarterly capital depreciation rate)	$\delta = .02$	Kydland and Prescott (1982); Kaltenbrunner and Lochstoer (2010)
γ	(coefficient of relative risk aversion)	$\gamma = 2$	commonplace [(iii)]
η	(Nash bargaining parameter)	$\eta = .5$	commonplace [(iv)]
ψ	(Frisch labor supply parameter)	$\psi = 1.4$	Jaimovich and Rebelo (2009) [(v)]
A	(production function coefficient)	$A = 1.25$	arbitrary; pure scale parameter
ρ	(quarterly separation rate)	$\rho = .10$	Davis, Haltiwanger and Schuh (1996)[(vi)]
σ	(match elasticity)	$\sigma = .5$	Petrouglo and Pissarides (2001)
b	(unemployment benefit)	$b = 0$	see extensive footnote [(vii)]
β	(economy-wide quarterly subjective discount factor)	$\beta = .99$	commonplace; yields an annualized average capital return of 4%

Table: **Capital Ownership Concentration Parameters**

μ_s	$\mu^{(i)}$	γ	χ^s	χ^n	$\overline{\phi}$	$\bar{\eta}$	$\bar{G}^W$	$\overline{v}/\overline{u}$
High Wealth Inequality								
0.09	.075	2	.68	.08	.82	.45	.83[ii]	1
Baseline								
.111	.10	2	.61	.08	.80	.44	.80[iii]	1
Low Wealth Inequality								
.25	.20	2	.44	.08	.71	.41	.70	1

[i] μ equals $\mu_s/1+\mu_s$, representing the economy's top μ% of income earners.
[ii] $\bar{G}^W = .83$ is the highest wealth Gini coefficient observed across all OECD countries in 2016.
[iii] The $\bar{G}^W = .80$ is the wealth Gini coefficient averaged between 1971 and 2013 from Kuhn et al. (2020). Quadrini (2000), Krusell and Smith (1998), and Favilukis (2013) also report that the $\bar{G}^W$ range is between .75 and .81.

MODEL IMPLICATION

	Data[(i)]	Near-Completeness	Baseline	Investment Shock	Baseline w/ $\gamma = 2.5$	Highest Wealth Inequality	DMP-RBC[(ii)]
		$\gamma = 2$ $\bar{G}^W = .70$	$\gamma = 2$ $\bar{G}^W = .80$	$\gamma = 2$ $\bar{G}^W = .80$	$\gamma = 2.5$ $\bar{G}^W = .80$	$\gamma = 2$ $\bar{G}^W = .83$	$\gamma = 2$ $\bar{G}^W = .00$
Panel A: Macro and Labor Market Statistics							
Macro variable							
$\mathrm{SD}(\tilde{y})$	1.59	1.66	1.52	1.54	1.59	1.61	1.23
$\mathrm{SD}(\tilde{c})/\mathrm{SD}(\tilde{y})$	.77	.96	.97	.98	1.085	1.08	.27
$\mathrm{SD}(\tilde{i})/\mathrm{SD}(\tilde{y})$	3.06	1.16	1.26	2.04	1.13	1.13	3.05
$\mathrm{SD}(\tilde{h}^{\mathrm{tot}})/\mathrm{SD}(\tilde{y})$	.81	.73	.90	.91	1.29	1.29	.41
$\mathrm{corr}(c, y)$	.83	.99	.97	.96	.96	.96	.94
$\mathrm{corr}(i, y)$	.91	.97	.92	.54	.87	.87	1.00
$\mathrm{corr}(h^{\mathrm{tot}}, y)$	.63	.98	.90	.85	.83	.79	.95
Labor market variable							
$\mathrm{SD}(\tilde{v})/\mathrm{SD}(\tilde{y})$	8.72	3.65	8.59	9.27	12.89	12.69	3.68
$\mathrm{SD}(\tilde{u})/\mathrm{SD}(\tilde{y})$	6.92	2.62	6.30	6.75	9.50	9.36	2.20
$\mathrm{SD}(\tilde{\theta})/\mathrm{SD}(\tilde{y})$	13.62	5.82	13.99	15.01	21.11	20.79	4.89
$\mathrm{corr}(\tilde{v}, \tilde{y})$	.91	.99	.99	.94	.87	.87	.85
$\mathrm{corr}(\tilde{u}, \tilde{y})$	$-.87$	$-.64$	$-.84$	$-.82$	$-.98$	$-.98$	$-.77$
$\mathrm{corr}(\tilde{\theta}, \tilde{y})$	.90	.91	.99	.95	.97	.97	.99
Labor income share							
$\mathrm{SD}(\tilde{\ell}^s)/\mathrm{SD}(\tilde{y})$	.69	.13	.89	.58	1.02	1.00	.24
$\mathrm{corr}(\tilde{\ell}^s, \tilde{y})$	$-.21$	$-.50$	$-.28$	$. - 28$	.10	.11	.99
Panel B: Financial Statistics							
Safe-asset ratio	.30	.30	.30	.30	.30		.30
Safe-asset rate							
$\mathbb{E}\tilde{r}^b$	.80	3.04	.62	$-.13$	-3.52	-3.00	4.00
$\mathrm{SD}\tilde{r}^b$	5.67	5.24	3.72	2.33	2.19	3.29	.36
Equity Premium							
$\mathbb{E}(\tilde{r}^e - \tilde{r}^b)$	6.18	1.96	3.17	3.80	3.86	3.30	0.00
Announcement-free Equity Premium[(iii)]							
$45\% \times \mathbb{E}(\tilde{r}^e - \tilde{r}^b)$	2.78	1.96	3.17	3.80	3.86	3.30	0.00
Equity Return Volatility							
$\mathrm{SD}\tilde{r}^e$	16.54	15.29	12.26	14..54	8.43	7.79	.98

Model Implications

As wealth inequality rises,

- low interest rates
- stable safe-asset ratio
- change in cyclical behavior in labor share from negative to positive

Table: **Labor Share Data**

	1970 – 2015	2008– 2015
$\mathrm{SD}(\tilde{\ell}^s)/\mathrm{SD}(\tilde{y})$	.73	1.15
$\mathrm{corr}(\tilde{\ell}^s, \tilde{y})$	$-.10$	.16

- increasing labor market volatility: resolution of the Shimer (2005) puzzle as a corollary argument

Addditional Statistics: Term Structure

Panel B: Various Wealth Inequalities

Maturity	Data		$\bar{G}^W = .83$		$\bar{G}^W = .80$		$\bar{G}^W = .70$	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
4	1.06	1.61	-3.75	1.92	.54	.64	3.19	2.56
8	1.39	1.37	-3.88	.67	.63	.56	3.27	1.90
12	1.69	1.23	-3.81	.63	.73	.53	3.32	1.62
16	1.95	1.15	-3.70	.83	.82	.50	3.37	1.44
20	2.16	1.09	-3.59	.84	.90	.47	3.41	1.31
40	–	–	-3.19	.65	1.19	.33	3.53	.89
Term Premium		–		-.19		.99		.49

Reality Bite: Term Structure (Not in the Paper)

PROPAGATION MECHANISM

	Near-Completeness $\bar{G}^W = .70$	Baseline $\bar{G}^W = .80$	Investment Shock $\bar{G}^W = .80$	Safety w/ $\gamma = 2.5$ $\bar{G}^W = .80$	Highest Wealth Inequality $\bar{G}^W = .83$	DMP-RBC $\bar{G}^W = .00$
A. Wage Asset[(i)]						
$\partial \log \widetilde{W}_t^{\text{pv}} / \partial \log \widetilde{X}_t$	.69	.72	.93	1.15	1.14	1.02
B. Distribution Risk						
$\text{SD}(\tilde{\phi})/\text{SD}(\tilde{y})$	2.62	8.16	8.72	13.23	13.02	.00
$\text{corr}(\tilde{\phi}, \tilde{y})$	−1.00	−.90	−.86	−.66	−.65	.00
C. Saving Behaviors						
Capital Owners						
$\partial \log(1+\widetilde{r}_{t,t+1}) / \partial \log \widetilde{b}_{t+1}^s$	−.06	−.22	−.11	−.40	−.37	.00
$\text{corr}\left(\widetilde{y}_t, \widetilde{b}_{t+1}^s\right)$	.78	.35	.24	−.41	−.36	.00
Workers						
$\partial \log \widetilde{c}_t^n / \partial \log \widetilde{W}_t^{\text{pv}}$	.88	.77	.45	.70	.71	2.23
$\text{corr}\left(\widetilde{y}_t, \widetilde{b}_{t+1}^n\right)$	−.78	−.35	−.24	.41	.36	.00
D. Consumption Heterogeneity[(ii)]						
$\text{SD}(\Delta \tilde{c}^s)$	2.07	1.97	2.07	2.06	2.13	–
$\text{SD}(\Delta \tilde{c}^n)$	2.16	1.14	1.25	2.49	2.50	–
$\text{SD}(\Delta \tilde{c}^s)/\text{SD}(\Delta \tilde{c}^n)$	.96	1.73	1.66	.83	.85	–
$\text{corr}(\Delta \tilde{c}^s, \Delta \tilde{c}^n)$	.94	.90	.88	.21	.27	–

[(i)] Elasticities are measured by regression coefficients with the first term as the dependent variable.

[(ii)] $\Delta \tilde{c}^s$ represents the annualized growth rate of shareholder consumption and analogously for $\Delta \tilde{c}^n$. Malloy et al. (2009) report $\text{SD}(\Delta \tilde{c}^s)/\text{SD}(\Delta \tilde{c}^n) = 1.63$ from the US data, while Mankiw and Zeldes (1989) report a figure of 1.60.

Economic Insights

As inequality increases, stockholders face higher financial and operating leverage risks, increasing their consumption volatility and "precautionary" demand for bonds. At the same time, greater wage instability raises workers' demand for safe assets. The resulting surge in "precautionary savings" from both groups depresses real returns and creates the appearance of a safe asset shortage, despite an unchanged supply. This outcome reflects a pecuniary externality: agents fail to internalize the aggregate constraint on safe assets, especially over the business cycle.

- the model economy is becoming "a place where they lend you an umbrella in fair weather and ask for it back when it begins to rain" ("cyclical safe-asset shortage"), compared with Caballlero and Farhi (2018).

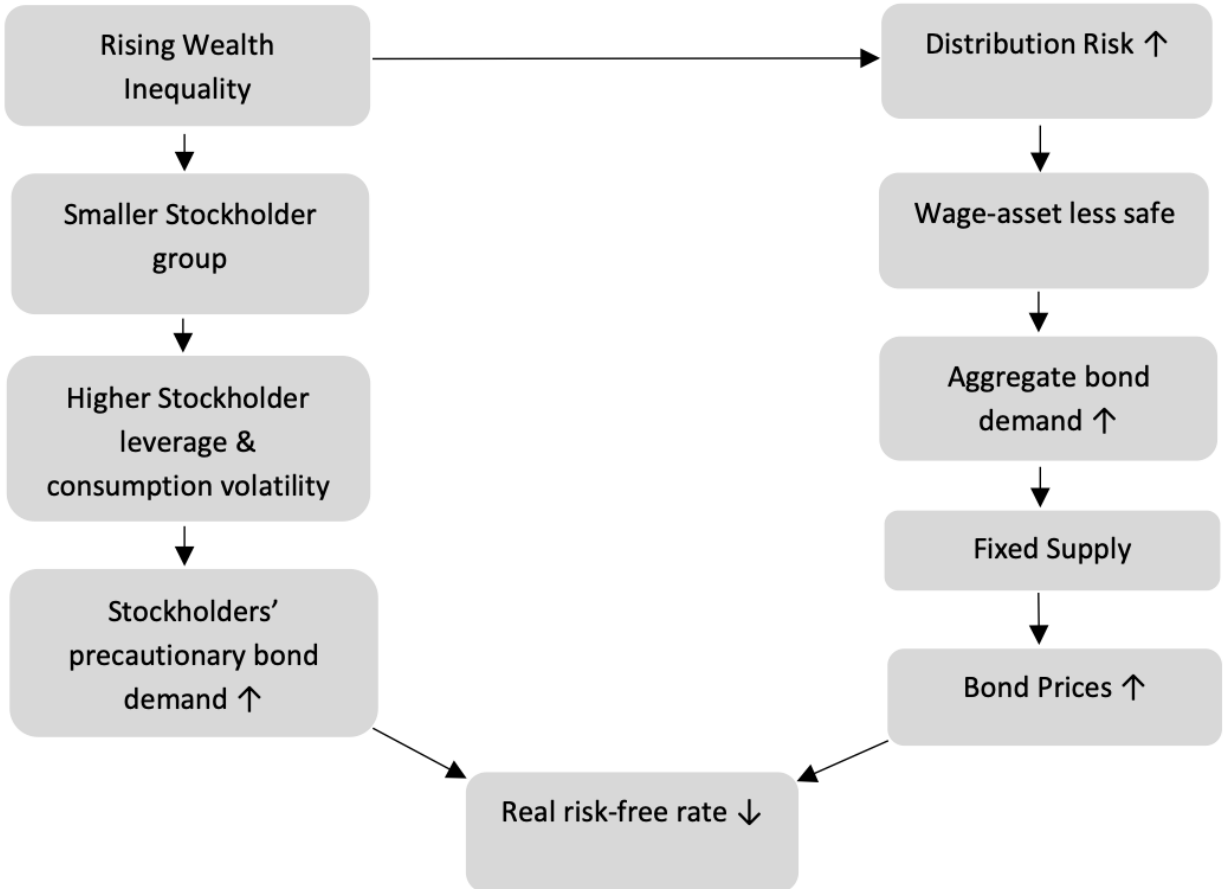


Figure: Mechanism linking rising wealth inequality to lower real risk-free rates through precautionary savings and bond demand.

Interpretation Attached

- A trade-off between both agents' demand for safe assets and the riskiness (smoothness) of wage assets, with the latter being characterized by Hall's (2017) PV elasticity measure

$$\partial \log \widetilde{W}_t^{\text{pv}} / \partial \log \widetilde{X}_t$$

- Equilibrium distribution risk, $\widetilde{\eta} \approx \widetilde{\phi}$, plays the role in the creation of such trade-off between the prior two: Critical to the creation of the wage asset, is the stability of bilateral pledgeability, $\widetilde{\eta}$ and its negative correlation with output.
- Bilateral uncertain pledgeability on both sides of the production process.
  - Workers' concern over pledgeability on the capital-owner side (pledeable cash flow)
  - Stockholders' concern over pledgeability on the worker's side (their human capital's inalienability).
- Increased distribution risk, greater contractual incompleteness (diminished pledgeability) as reflected in more volatile egalitarian bargaining, and reduced bond trading are causes and consequences of one another and thus different manifestations of the same phenomenon: as wealth inequality grows agents become economically more isolated from one another.

- As wealth inequality rises, however, this degree of contractual incompleteness gets more pronounced but in a "**non-linear (excessive)**" manner: the insurance provided by the wage asset deteriorates, reinforcing the shift to external risk-sharing through bond markets. The resulting pecuniary externality, in which stockholders do not internalize the aggregate effects of their portfolio decisions, leads to excessive bond demand and downward pressure on real interest rates.
- We can say all the model results, including the increase in $SD\left(\tilde{\phi}_t\right) / SD\left(\tilde{y}_t\right)$, are driven by a trade-off (conflict) between the creation of wage assets and the emergence of a "bubbly" (negative rate) safe asset due to declining pledgeability on the part of both parties as manifest in excessively increased equilibrium distribution risk.

The Term "Precautionary"

- Stockholders: characterized by their non-homothetic savings measure, $\partial \log\left(1+\widetilde{r}_{t,t+1}\right)/\partial \log \widetilde{b}^{s}_{t+1}$ (introduced by Mian et al., 2021)
- Workers: characterized by their marginal propensity to consume out of his permanent income (MPCPI), $\partial \log c^{n}_{t}/\partial \log W^{\text{pv}}_{t}$.
  - this elasticity is unambiguously less than one across all the cases of consideration, thus representing the degree of the worker's precautionary savings motive for buffer stock purposes.
  - Carroll (2009) demonstrates that the MPCPI will be between 0 and 1 provided that the worker's precautionary saving effects are substantial and an impatience condition preventing explosive savings is satisfied. In the present model framework, the χ^{n} parameter not only controls the worker's precautionary savings motive but also represents his relative impatience ($\chi^{s} > \chi^{n}$).
  - The textbook Permanent-Income-Hypothesis's MPCPI ≈ 4 (Carroll, 2009) ; we confirm that the standard RBC model *à la* Hansen (1985) is the case.

Empirics (Not in the Paper)

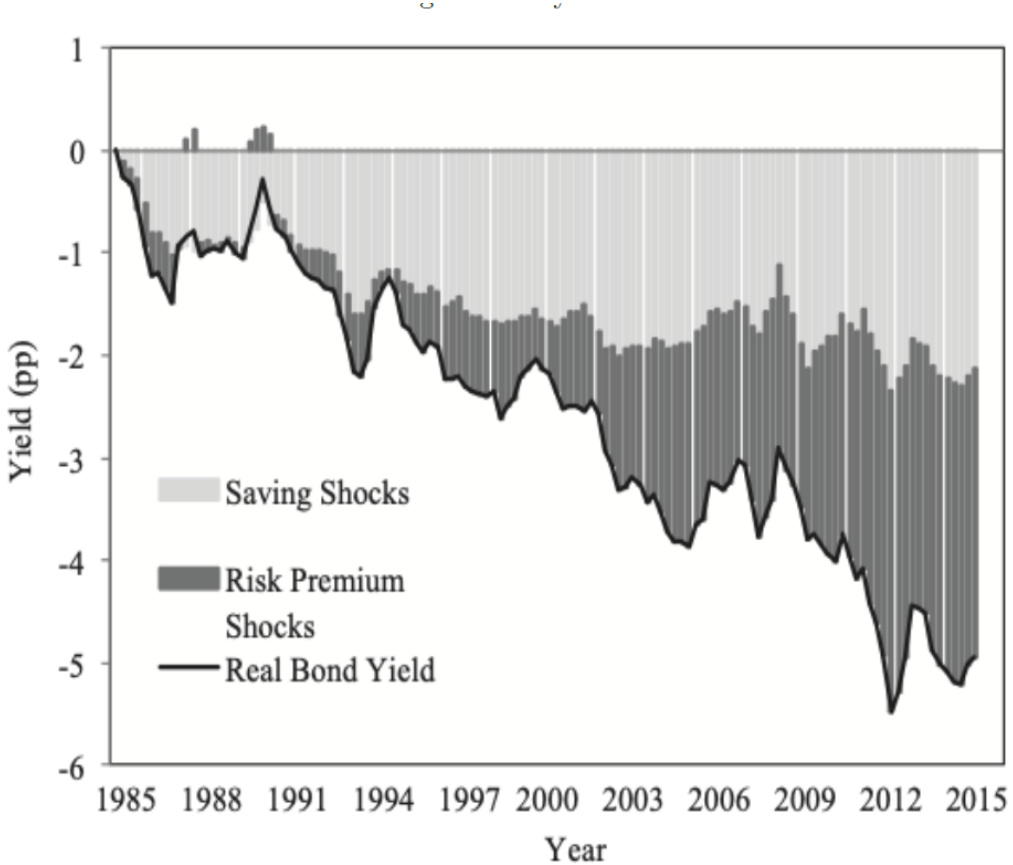


Figure: Daly (2016)

IDENTIFYING A COASIAN DECENTRALIZATION
(NOT TODAY)
The Macroeconomics of Stakeholder Equilibria

The Social Planner's Problem:

A Corresponding Constrained-Efficient Equilibrium

$$\max_{\{c_t^s, c_t^n, h_t^s, h_t^n, k_{t+1}, n_{t+1,}, i_t, v_t\}} \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\mu_s \cdot \tau^s \cdot u(c_t^s - \chi^s \mathbf{c}_{t-1}^s - H(h_t^s)) + \tau^n \cdot u(c_t^n - \chi^n \mathbf{c}_{t-1}^n - n_t H(h_t^n))\right] \tag{10}$$

subject to

$$\mu_s c_t^s + c_t^n + \frac{\kappa}{2}\left(\frac{q_t v_t}{n_t}\right)^2 n_t + i_t = f(k_t, \mu_s h_t^s, n_t h_t^n) z_t$$

$$k_{t+1} = (1-\delta)k_t + G(\frac{i_t}{k_t})k_t$$

$$m_t = m(v_t, 1-n_t) = \sigma_m (v_t)^{1-\sigma} (1-n_t)^{\sigma}$$

$$n_{t+1} = (1-\sigma)n_t + m(v_t, 1-n_t)$$

$$x_t = \frac{q_t v_t}{n_t} = \frac{m_t}{n_t}$$

for welfare weights τ^s, τ^n, where $\tau^s + \tau^n \equiv 1$ and $\tau^n/\tau^s = \overline{\phi}$.

The Coase Theorem

Proposition

(a "Coasian result") the decentralized model economy achieves the constrained-efficient steady-state capital stock, investment, individual agent consumption, employment and hiring rate provided

a. $$\overline{\eta} = \frac{\eta}{(1-\eta)(1/\overline{\phi}) + \eta}, \text{ where } \overline{\phi} = \frac{u_1^s(\overline{c}^s - \chi^s \overline{\mathbf{c}}^s - H(\overline{h}^s))}{u_1^n(\overline{c}^n - \chi^n \overline{\mathbf{c}}^n - \overline{n}L(\overline{h}^n))}, \text{ and}$$

b. *the Negishi weight τ^s, τ^n are chosen to satisfy $\frac{\tau^n}{\tau^s} = \overline{\phi}$.*

c. *$(1-\overline{\eta})$ equals the elasticity of the matching technology with respect to vacancies, $(1-\sigma)$; i.e.,*

$$\sigma = \overline{\eta}.$$

Corollary

The steady-state egalitarian bargained wage is efficient; that is, it is consistent with a constrained efficient allocation of resources in the steady state.

Unexpected feature of A stakeholder economy: Growth

$$\bar{Y} = \bar{z}A\bar{k}^{\alpha}\left(\left(\mu_s \bar{h}^{s}\right)^{\mu}\left(\bar{h}^{n}\bar{n}\right)^{1-\mu}\right)^{1-\alpha}$$

where $\mu = \dfrac{\mu_s}{1+\mu_s}$

$$= \bar{z}A\bar{k}^{\alpha}\bar{H}^{1-\alpha}$$

as μ_s declines $\bar{H} \uparrow$

- The engine of growth thus arises from the declining measure of highly productive owner-managers. Somewhat lightly, we describe this phenomenon as the "Musk-Tesla superstar" effect: a shrinking measure of very capable people become increasingly productive.
- Accordingly, the economy is growing as wealth inequality rises; combined with the prior theorem, the economy's growth is constrained-efficient.

Constrained-inefficient Fluctuations

due to the Pecuniary Externality

Proposition

Let $H_t = (\mu_s h_t^s)^{\mu} (h_t^n n_t)^{1-\mu}$ *represent the aggregate labor input for the economy presented in the postivistic experiment. Then, in response to business cycle variation, the aggregate marginal products of capital and labor, respectively,*

$$\alpha \frac{y_t}{k_t} \quad \textit{and} \quad (1-\alpha)\frac{y_t}{H_t}$$

do not support an efficient allocation away from the steady state in the stakeholder economy.

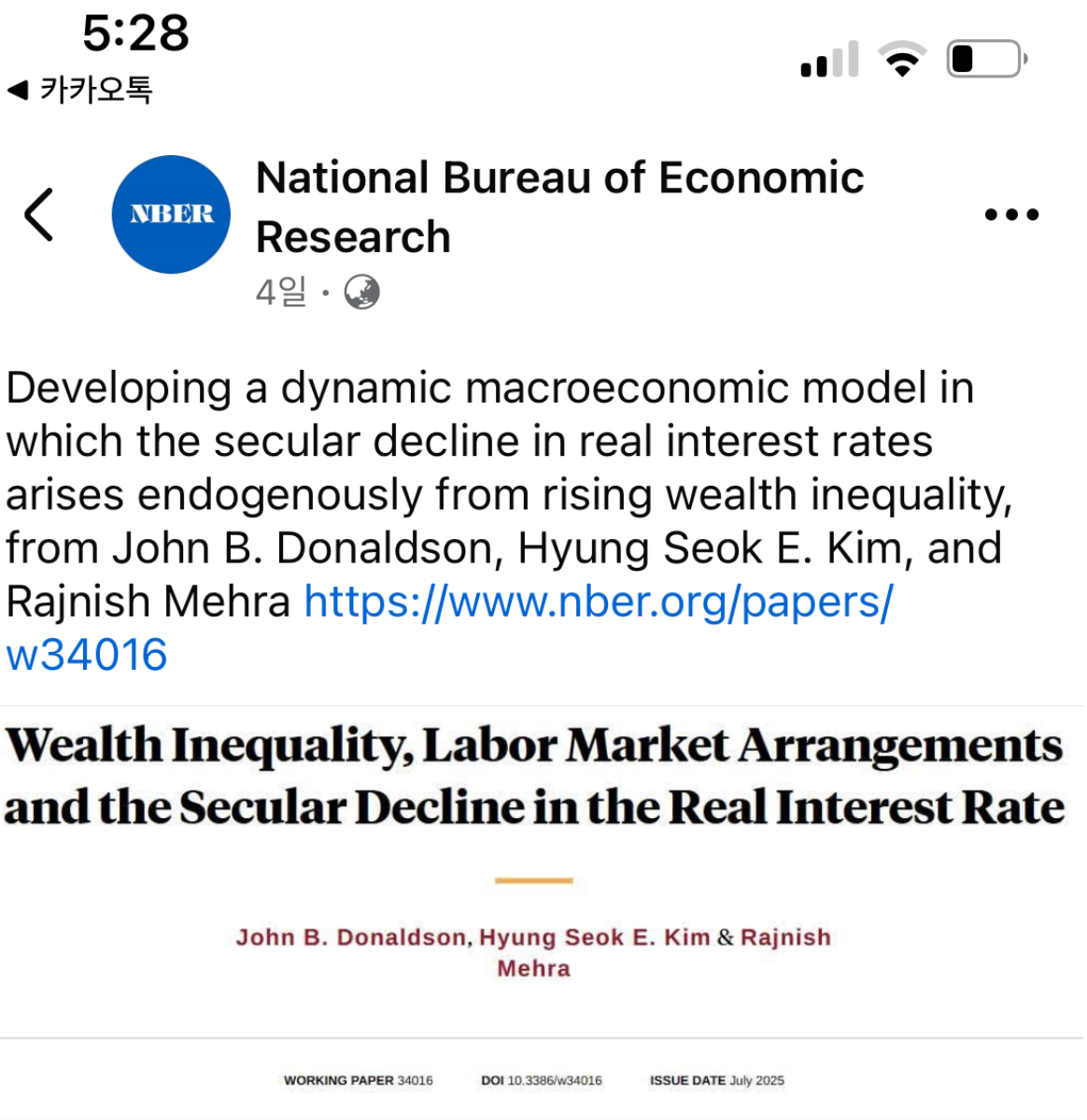
Partial Internalization

Table: **Coasian Decentralization**

	Efficient Scenario	Baseline Scenario	Polarization Trap
safe-asset rates			
$\mathbb{E}\tilde{r}^b$	3.32	$-.22$	-5.16
Distribution Risk ϕ			
$\mathrm{SD}(\tilde{\phi})/\mathrm{SD}(\tilde{y})$	.00	9.28	15.68
$\mathrm{corr}(\tilde{\phi},\tilde{y})$	.00	$-.86$	$-.46$
Partial Internalization$^{(v)}$			
$(\mathrm{SD}\tilde{W}^{pv}/\mathbb{E}\tilde{W}^{pv})/(\mathrm{SD}\tilde{W}^{pv}_{efficient}/\mathbb{E}\tilde{W}^{pv}_{efficient})$	100%	60%	50%

CONCLUSION

(Positive) Perspective



Normative Perspective (Not Today)

- *Limited financial market participation (wealth concentration) leads to a large pecuniary externality*: workers have no influence over the firm's investment plan, yet they may be deeply affected by it.
- The present essay asks, in the spirit of a stakeholder economy, to what extent can egalitarian wage bargaining resolve this externality using only private market-based Coasian mechanisms.
  - no wealth redistribution
  - no government bonds (only private bonds)
  - no taxes etc.
  - subject to egalitarian wage bargaining, firm value maximization
  - How much of the pecuniary externality can be resolved? Answer: 60% of it.
- Egalitarian bargaining endogenously creates a wage asset that assists workers in insuring themselves, in the process having a large impact on the bond market.
- The present thesis's key contribution is the idea that once a salary has been negotiated, firms might securitize the wages — turning them from a series of ongoing, possibly unsteady, paychecks into a "fixed-income-like wage asset." That way, an ongoing stream of income can be made more stable for the worker, smoothing out the ups and downs of the business cycle. Firms, in return, possess both low financial and productivity risk, the former feature presenting itself as a financial-discount-protected safe wage asset for the firm to "hire."

A Zoo of Externalities

- The *safe-asset-ratio externality* (The present essay)
- The *stakeholder externality* ("The Macroeconomics of Stakeholder Equilibria")
- The *balanced wage growth externality* ("Demand Shock Puzzle")