Finance and Inequality:
A Tale of Two Tails

Alexander Ludwig[a]   Alexander Monge-Naranjo[b]
Ctirad Slavík[c]   Faisal Sohail[d]

[a]Goethe University, [b]St. Louis FED,

[c]CERGE-EI, [d]University of Melbourne

Virtual EWMES

Introduction

Since the 1970s in the U.S.:

1. Finance & Insurance (FI): liberalized and growing

2. Large changes in income inequality:

   - top income inequality ↑

   - bottom income inequality ↓

▸ FI Share   ▸ Inequality

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This Paper

Study the relationship between FI policy and income inequality:

1. **Empirically**: Different reforms have differential impact.

   • consider three episodes of FI deregulation

2. **Theoretically**: Interpret facts, run counterfactual analyses.

   • incorporate household choices (financial products, occupations)

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Empirical Results
Deregulation and Income Inequality

(i) Three episodes of FI deregulation:

- Bottom incomes ↑, inequality ↓, driven by Non-FI

  - Removal of bank-branching restrictions (RBR) in 70s & 80s

  - Removal of interest rate ceilings (RSC) in 1980

- top incomes ↑, inequality ↑, driven by FI

  - Repeal of the Glass-Steagall Act (RGS) in 1999

Reconcile conflicting evidence on financial deregulation in the literature

Theory

(ii) Construct a GE model:

Key Contribution: Study household sorting in occupations and financial markets

- Factor complementarities (KORV, 2000) + financial markets:

  1. KORV (2000) useful benchmark for RGS $\Rightarrow$ top incomes $\uparrow$

  2. Extend it with financial markets and a menu of financial contracts to account for other reforms $\Rightarrow$ bottom incomes $\uparrow$

- Interpret facts and run counterfactual analyses
  (repeal of Dodd-Frank Act in 2018, sectoral tax ...)

This Talk

1. Empirical Analysis

2. Model

3. Conclusions

Data

Use Current Population Survey (CPS):

- March Supplement CPS 1977 - 2017.

- Income is total pre-tax annual earnings.

- Employees between the ages of 25 and 55 with positive earnings, not in armed forces.

- Trim top/bottom 1% of income earners in each year

- Exclude South Dakota and Delaware.

Financial Reforms

1. Removal of bank-branching restrictions (RBR) in 70s & 80s

   - **Identification:** variation in timing across states

2. Removal of interest rate ceilings (RSC) in 1980

   - **Identification:** variation in ceiling binding across states

3. Repeal of the Glass-Steagall Act (RGS) in 1999

   - **Identification:** variation in FI employer share in 1999 across states

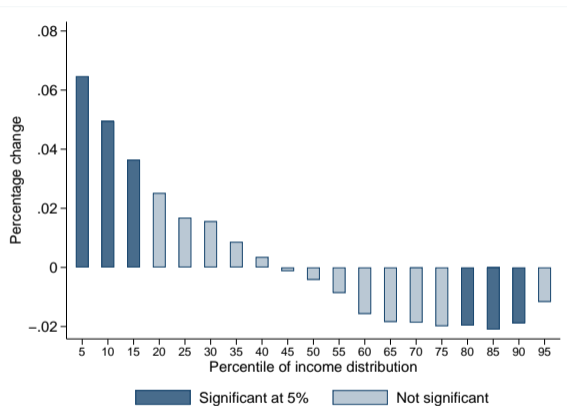**Today**: Financial deregulation benchmark results

▸ Identification and Variation

State Level Identification

- Follow Beck, Levine, and Levkov (2010):

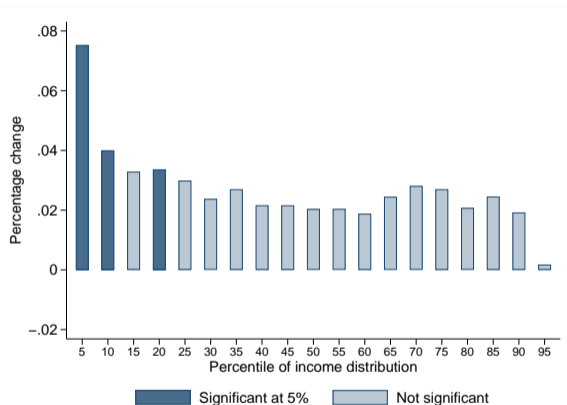$$\ln(y_{st}) = \alpha + \Sigma_i \beta^i D_{st}^i + \delta X_{st} + A_s + B_t + \epsilon_{st}$$

- y_{st}: income/inequality measure in state s, year t

- D_{st}^i: reform dummy

- X_{st}: GSP, unemployment, education, demographics

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Branching Deregulation: Reduced Inequality

	log(Gini)	log(Theil)	log(90/10)	log(25/10)	log(90/75)
Branching	-0.020***	-0.038***	-0.067***	-0.030***	-0.002
	(0.004)	(0.007)	(0.012)	(0.008)	(0.005)

Removing Interest Rate Ceilings: Reduced Inequality

	log(Gini)	log(Theil)	log(90/10)	log(25/10)	log(90/75)
Ceilings	-0.014	-0.030*	-0.027	-0.012	-0.011
	(0.008)	(0.016)	(0.019)	(0.013)	(0.009)

Repeal of Glass-Steagall: Increased Inequality
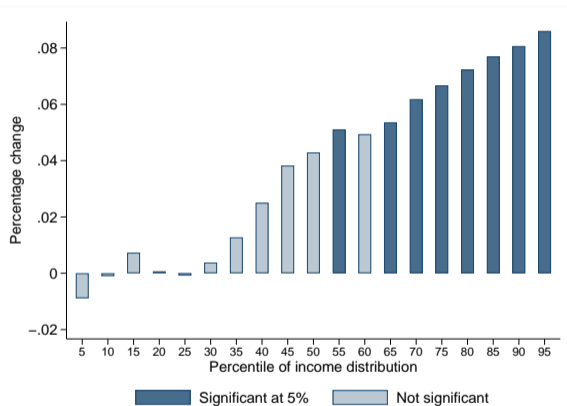
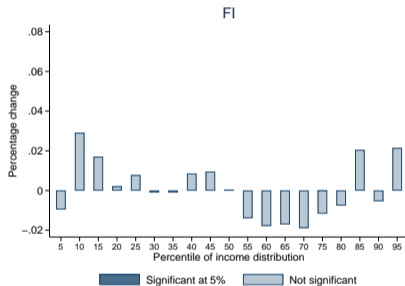|	log(Gini)	log(Theil)	log(90/10)	log(25/10)	log(90/75)
Glass–Steagall	0.033*	0.063*	0.071*	-0.002	0.011
	(0.017)	(0.033)	(0.042)	(0.013)	(0.011)

Summary

- RBR (branching): incomes ↑ in lower percentiles,
  confirms Beck, Levine, and Levkov (2010)

- RSC (ceilings): incomes ↑, significant for lowest percentiles

- RGS (repeal): incomes ↑ in higher percentiles,
  as highlighted by (Philippon and Reshef 2012)
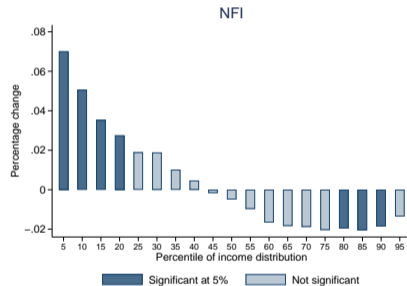
Additional Exercises

- **Inequality changes driven by FI or non-FI?** (Philippon and Reshef (2012))

- Heterogeneity across ages

- Medium-run impact of reforms, incomes in $t + 5$

- Transitions in/out of Finance and Insurance sector

- Impact on incomes of "near" Finance and Insurance workers

Branching Deregulation: Impact on NFI
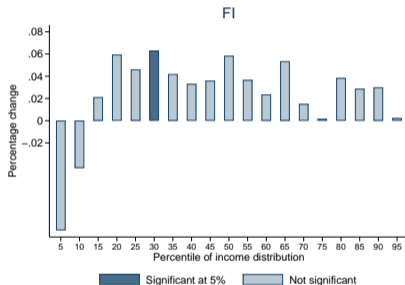
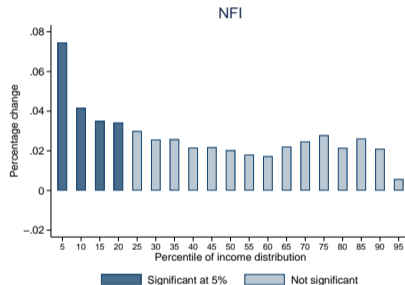(a) Bank Branching FI

(b) Bank Branching NFI

	Average Income		log(Theil)	
	Non-FI	FI	Non-FI	FI
RBR	-0.007	0.001	-0.038***	0.000
	(0.010)	(0.018)	(0.009)	(0.036)

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Removing Interest Rate Ceilings: Impact on NFI

(c) Ceilings FI

(d) Ceilings NFI

	Average Income		log(Theil)	
	Non-FI	FI	Non-FI	FI
RSC	0.020	0.026	-0.028*	0.006
	(0.014)	(0.038)	(0.016)	(0.050)

Repeal of Glass-Steagall: Impact on FI

(e) Glass-Steagall FI
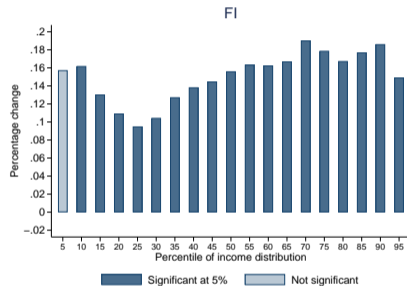
(f) Glass-Steagall NFI
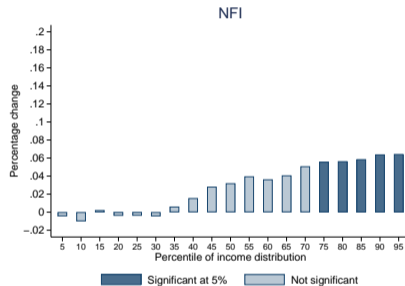
	Average Income		log(Theil)	
	Non-FI	FI	Non-FI	FI
RGS	0.0422*	0.1546***	0.0658**	-0.0121
	(0.0222)	(0.0356)	(0.0320)	(0.0526)

Interpretation

Bank Branching and Ceilings

- FI not affected much

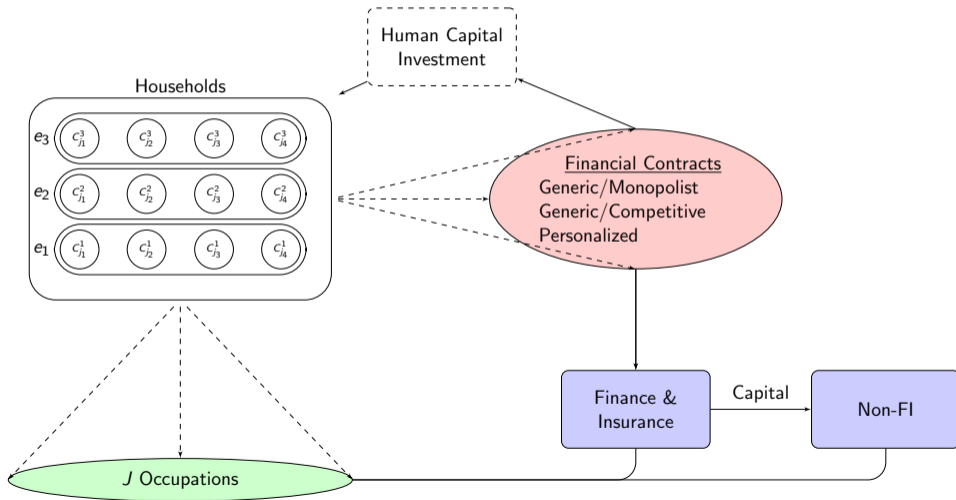- Suggests responses of NFI employees: labor supply, effort, human capital investment

Removal of Glass-Steagall

- FI affected substantially, high income NFI also affected

- Suggests direct labor demand effects for FI

- Indirect labor demand effect: spillovers from FI to NFI?

▸ Decomposition

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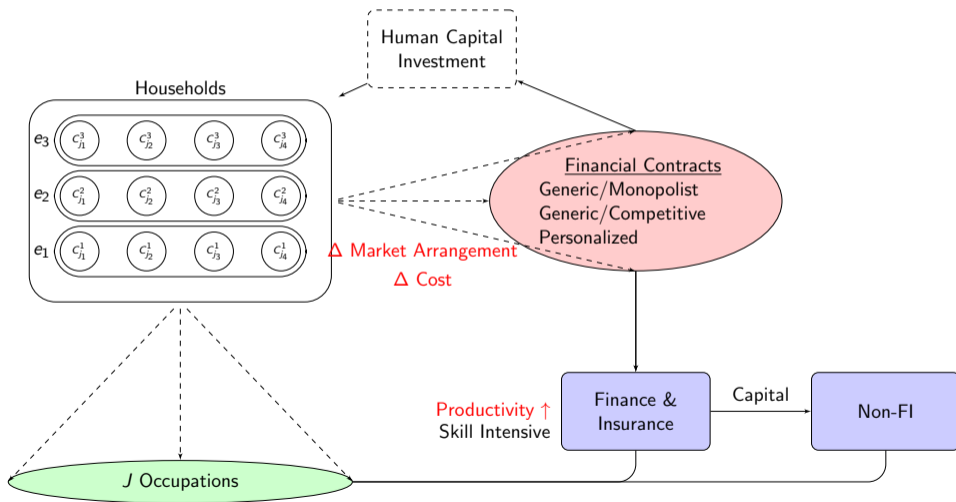
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A General Equilibrium Model Overview

- **Household Side:** Workers heterogeneous in absolute and comparative advantage
  - Sort in J occupations and work in FI and NFI
  - Sort into financial contracts
  - Consume and borrow to invest in human capital

- **Financial Contracts:**
  - Autarky vs. Generic contract vs. Personalized - different costs
  - Monopolist lenders vs. Competitive lenders - market arrangements

- **Production Side:** Two sectors: FI provides capital to NFI
  - Both FI and NFI nested CES structure; extending KORV:
  - Expansion of skill-intensive FI $\Rightarrow$ top incomes $\uparrow$

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Model Summary

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Model Summary: Impacts of Reforms

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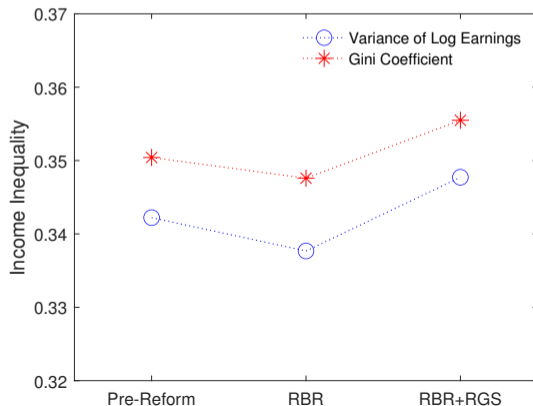
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Impact of Reforms

Preliminary Results

Consider two policy experiments:

1. Shift from Monopolist to Competitive Lenders (RBR)
2. Lower cost of Personalized Contracts (RGS)

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Impact of Reforms

Preliminary Results

Reform impact due to investments in human capital

(a) RBR

(b) RBR + RGS
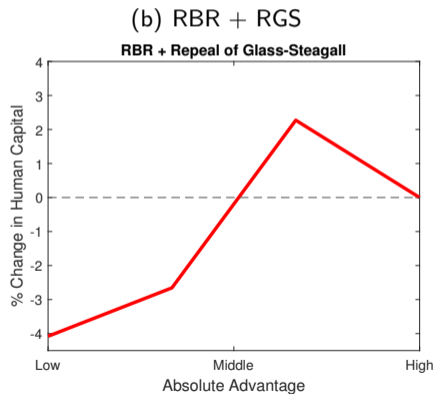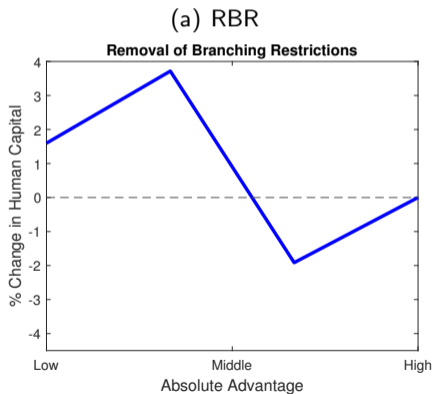
Conclusion

Study the impact of financial regulation on income inequality.

- **Empirical**: Heterogeneous impact of financial deregulation:

  - Different types of reform have different impacts

- **Theory:** Model which can account for the empirical facts

  - Incorporate HH's sorting into occupations $+$ financial contracts

- **Next**: Quantitative Analysis with a calibrated version of model
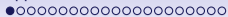
Share of Finance and Insurance
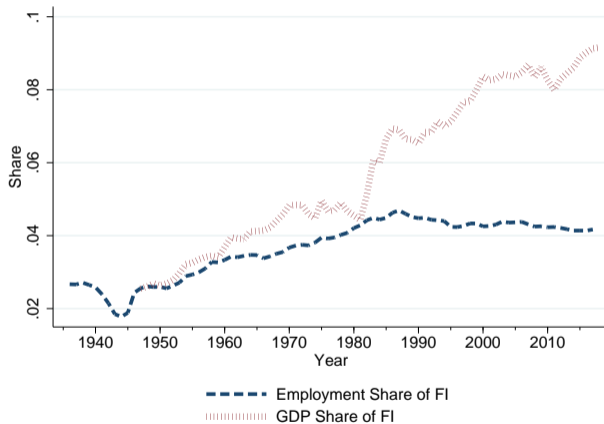
Income Inequality
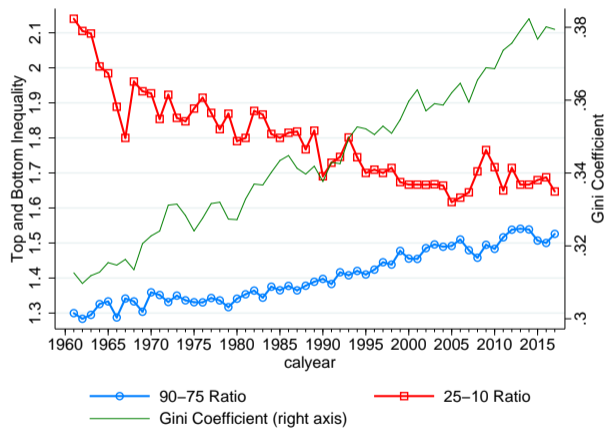
Banks and Branches Over Time

Number of Bank Branches
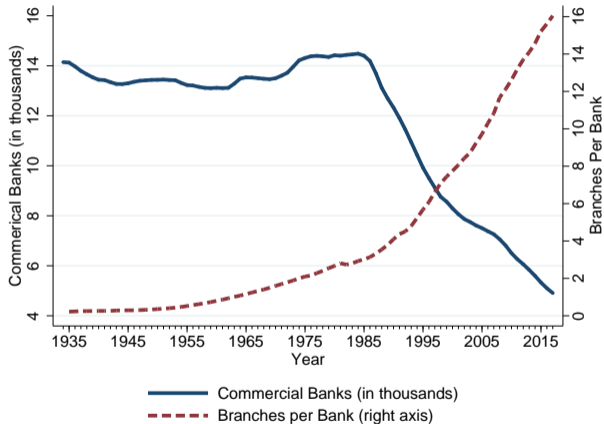
Reform (i)

(i) RBR - Removal of (Intrastate) Bank Branching Restrictions

- Restrictions response to bank failures in 1920s
- RBR: Allowed intrastate branching, followed later by interstate branching. Federal reform in 1994.
- Follow BLL (2010): focus on intrastate branching
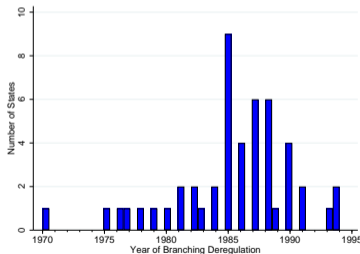
Source: Strahan (2003)

Reform (ii)

(ii) RSC - Removal of State Level Interest Rate Ceilings

- RSC: Maximum rates on loans varied across states, compare to U.S. wide loan rates $\rightarrow$

  determine whether ceiling binding

- Federal removal of interest rate ceilings in 1980
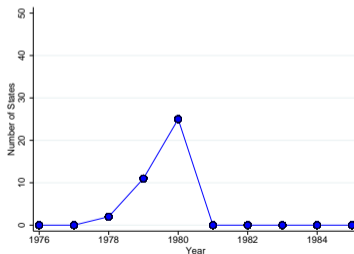
Source: Vandenbrink (1982), mortgage loans

Reform (iii)

(iii) Repeal of Glass-Steagall U.S. wide in 1999

- Ends separation of commercial and investment banks
- State level identification:
    1. assume impact depends on FI employment share in 1999,
    2. interact reform dummy with FI share (rescale by U.S. FI share)

Source: CPS

Identification - Testing Exogeneity

- Timing of RBR could be endogeneous

- Regress policy (dummy) variable on prior inequality measures

- Similar for RSC and RGS

- No significant effects

Decomposition: Within and Between Groups

Decomposition of the Theil index:

| | Total | Between Group | Within Group | Sector Groups | |
				Not in FI	FI
Branching	-0.0074***	-0.0005	-0.0069***	-0.0073***	-0.0009
	(0.0021)	(0.0003)	(0.0019)	(0.0019)	(0.0051)
Ceilings	-0.0049	0.0001	-0.0049*	-0.0050*	-0.0007
	(0.0029)	(0.0003)	(0.0029)	(0.0029)	(0.0075)
Repeal	0.0147**	0.0032***	0.0115*	0.0130*	-0.0045
	(0.0068)	(0.0007)	(0.0064)	(0.0068)	(0.0056)

Identification - Testing Exogeneity

	Levels				
	Gini	Theil	90/10	90/75	25/10
Branching	-0.26	-0.27	-0.13	0.99	-0.43
Ceilings	0.90	0.89	0.42	-0.10	0.02
Repeal	-1.61	-1.68	-1.50	-0.25	0.38
	Growth Rates				
	Gini	Theil	90/10	90/75	25/10
Branching	-0.94	-0.84	-0.64	0.57	-1.21
Ceilings	1.23	1.35	0.67	0.33	-0.44
Repeal	0.14	-0.12	0.44	0.34	-0.21

t-statistics, RHS variables are *logs* of 3 year averages

Decomposition: Within and Between Groups

- Decompose Theil index and find (in line with above):

    1. RGS increased between group inequality;
       less than within group inequality.

    2. RBR and RSC only affect within group inequality.

    3. Inequality changes larger in non-FI sector.

Decomposition: Within and Between Groups

Decomposition of the Theil index:

	Total	Between Group	Within Group	Sector Groups Not in FI	FI
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	(0.0068)	(0.0007)	(0.0064)	(0.0068)	(0.0056)

Model (Details)

Production

- FI distributes capital K_D (costs R) to NFI

- Uses capital and labor to do that:

$$Y_F = \min \left\{ K_D, \zeta_F F_F \left[H_F, K_F \right] \right\}.$$

- Output in NFI is produced employing capital and labor:

$$Y_N = \zeta_N F_N \left[H_N, K_N \right].$$

Production Functions

- Workers are of J occupation types

- Y in each sector $i \in \{F, N\}$:

$$F_i\left[G_1\left(H_1, K_1\right), ..., G_1\left(H_J, K_J\right)\right] = \left[\sum_{j=1}^{J} \lambda_j^F G_j\left(H_j, K_j\right)^{\rho_i}\right]^{\frac{1}{\rho_i}}, \ \sum_{j=1}^{J} \lambda_j^i = 1.$$

$$G_j\left(H_j, K_j\right) = \left[\mu_j\left(H_j\right)^{\rho_j} + \left(1 - \mu_j\right)\left(K_j\right)^{\rho_j}\right]^{\frac{1}{\rho_j}}.$$

- CES structure implies tractable expressions for CE prices

Workers

- Choose how much to consume, invest in human capital and borrow in period 0, choose occupation j in period 1

$$\max \frac{(c_0)^{1-\sigma}}{1-\sigma} + \beta E \left[\frac{(c_1)^{1-\sigma}}{1-\sigma} \right], \text{ s.t.}$$
$$c_0 = y_0 (1-h) + d, c_1 = y_1 - R \cdot d,$$
$$y_1 = y_0 h^\alpha \max_j \left\{ C(e,j) \cdot w_j \cdot \eta_j \right\}.$$

- $C(e,j)$ type e occupation j specific productivities
- $\eta_j \sim$ Frechet with parameters θ (curvature) and T_j (scale)
- Frechet implies tractable expression for expected earnings

Financial Markets

- Lenders discount at rate β.

- Workers chose:

    1. autarky, $d = 0$,

    2. personalized contract (limited commitment),

    3. generic contract (limited commitment).

- Market for generic contract:

    1. monopolistic (prior to RBR),

    2. competitive (after RBR).

Personalized Contracts

- Repayment conditional on state y (workers' max income).

- Limited commitment: workers can renege and consume fraction $(1 - \gamma)$ of their income y_1.

- ∞ many participation constraints of the form

$$c_1(y) \geq (1 - \gamma) y_0 h^\alpha y, \text{ for all } y.$$

- (Competitive) lenders get nothing upon default.

- Contract setup costs F decreases after RGS.

- F high: selected by rich and productive workers.

Generic (Simple Debt) Contracts

- Contract setup costs f, $0 < f < F$.
- Selected by poorer/less productive workers.
- Repayment D unconditional: default possible.
- Monopolist lenders pre RBR:

$$\max_{d,D,h} P_G\left(d, D; h, y_0, e, w\right)$$
$$\text{s.t.} \quad U_G\left(d, D; h, y_0, e, w\right) \geq U^{\text{aut}}\left(y_0, e, w\right).$$

- Competitive lenders post RBR:

$$\max_{d,D,h} U_G\left(d, D; h, y_0, e, w\right)$$
$$\text{s.t.} \quad P_G\left(d, D; h, y_0, e, w\right) \geq 0.$$

Generic (Simple Debt) Contracts

- Interest rate $\frac{D}{d}$ might exceed ceiling rate:

    1. workers borrow less,

    2. workers borrow nothing at all: autarky.

- RSC increases borrowing on extensive and intensive margin.

Summary: Household Side
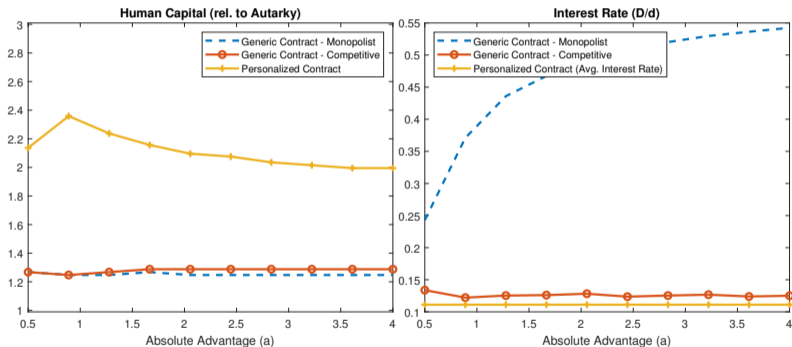
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