

INCOME INEQUALITY AND JOB CREATION

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The views expressed here are those of the authors only, and not necessarily those of the BIS or NY Fed.

MOTIVATION

- ▶ US top 10% income share increased from around 30% in 1970 to 50% today
- ▶ Long-standing debate: how does inequality affect the economy?
- ▶ Recent macroeconomic research ([Auclert and Rognlie, 2020](#), [Mian et al., 2020](#)):
Inequality \Rightarrow household savings behavior \Rightarrow aggregate demand \Rightarrow output
- ▶ New angle of this paper:
Inequality \Rightarrow household savings behavior \Rightarrow **firm financing** \Rightarrow **job creation**

THIS PAPER

- ▶ More inequality reduces job creation by small firms, relative to large firms
- ▶ Motivating observations:
 1. Higher income earners hold relatively fewer bank deposits, more stocks, bonds, etc.
 2. Small firms bank-dependent, banks' access to deposits affects ability to make loans
- ▶ Novel economic mechanism:
 - ▶ If relatively more income accrues to top earners . . .
 - ▶ . . . relatively more savings flow into stock/bonds, channeling funds to large firms . . .
 - ▶ . . . but fewer flow into deposits, negatively affecting banks' ability to grant loans . . .
 - ▶ . . . tightening financing conditions for small firms, and hindering their job growth

OVERVIEW

1. Motivating observations → propose new mechanism

- ▶ Exploit variation in top income shares across US states from 1980 to 2015
- ▶ Develop new instrumental variable strategy (Bartik approach)
- ▶ Study net job creation across firm sizes
- ▶ Examine bank outcome variables and exploit industry variation in bank dependence
 - 10 p.p. increase in the top 10% income share reduces net job creation by small firms by 1.6 p.p. relative to large firms
 - 1/5 of effect through lower entry and exit

3. Quantitative macroeconomic model

- ▶ Heterogeneous households: nonhomothetic preferences over different savings types
 - ▶ Heterogeneous firms: pre-finance wages with bank credit
 - ▶ Deposit market connects HH and firm side in general equilibrium
 - ▶ Experiment: increase top 10% income share from 30% to 50%
-
- Small firm employment share declines (18% of data), labor share falls (5-10%)
 - Moderate decrease in aggregate employment and output: around 1%
 - Shutting off portfolio heterogeneity leads to underestimation of welfare effects

CONTRIBUTION TO THE LITERATURE

- ▶ **Empirical work on effects of inequality on the economy:** Barro (2000), Forbes (2000), Banerjee and Duflo (2003), Coibion et al. (2020), Braggion et al. (2021)
 - ▶ We provide well-identified evidence for a novel channel
- ▶ **Macroeconomic effects of inequality through HH's intertemporal decisions:** Auclert and Rognlie (2017, 2020), Mian, Straub, and Sufi (2020, 2021)
 - ▶ We show inequality affects the economy through changes in firms' financing conditions, as households adjust the allocation of their savings
- ▶ **Declining business dynamism and the rising footprint of large firms:** Decker, Haltiwanger, Jarmin, and Miranda (2016), Autor et al. (2020), ...
 - ▶ We suggest rising top income shares may be another driver behind these trends
- ▶ **Methodology:** (1) New IV for inequality (2) Model useful for other questions

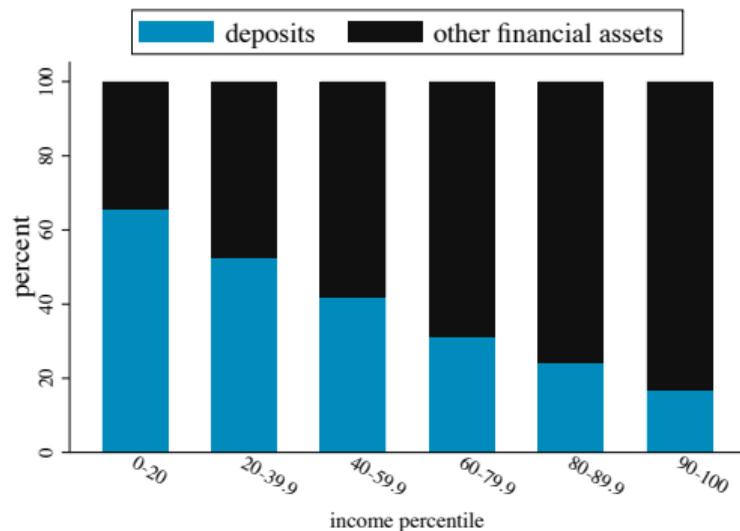
STRUCTURE OF THE PRESENTATION

1. Motivating observations and proposed channel
2. Empirical analysis
3. Structural model
4. Conclusion

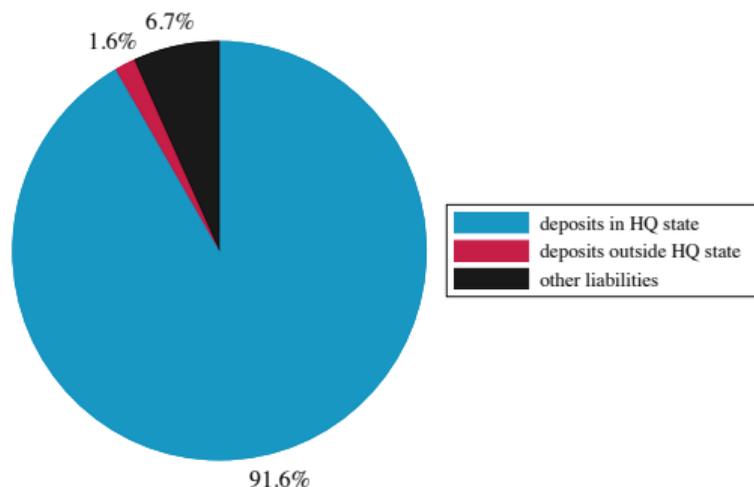
MOTIVATING OBSERVATIONS AND PROPOSED CHANNEL

PORTFOLIO HETEROGENEITY AND BANK FUNDING

SOURCE: SURVEY OF CONSUMER FINANCE AND FEDERAL DEPOSIT INSURANCE CORPORATION



(A) Deposit shares across income groups



(B) Deposits held inside banks' HQ state

- ▶ Deposit share in households' portfolio decrease in income [More SCF patterns](#)
- ▶ Deposits, in particular in headquarter state, major source of bank funding [Distribution](#)

DEPOSITS, BANKS, AND SMALL FIRMS

- ▶ Importance of deposits for US banking system
 - ▶ Banks' access to deposits (= cheap and stable) affects their cost of funds and ability to grant loans: Ivashina and Scharfstein (2010), Gilje, Loutskina, and Strahan (2016), Drechsler, Savov, and Schnabl (2017), ...
- ▶ Importance of bank funding for small firms
 - ▶ Banks have a comparative advantage in screening and monitoring borrowers
 - ▶ Small firms more affected by changes in credit supply than large firms: Becker and Ivashina (2014), Chodorow-Reich (2014), Liberti and Petersen (2019), ...

THE MECHANISM

- ▶ Taking stock:
 - ▶ Low-income households hold absolutely fewer, but relatively more deposits
 - ▶ Banks' access to deposits affects ability to fund small firms
- ▶ Based on observations, hypothesis:
 - ▶ *As top income shares rise, a smaller share of total financial savings is intermediated via banks. This leads to a relative decline in financing for small firms, while funds get channeled to large firms. In turn, small firms create fewer jobs than large firms.*

Aggregate patterns

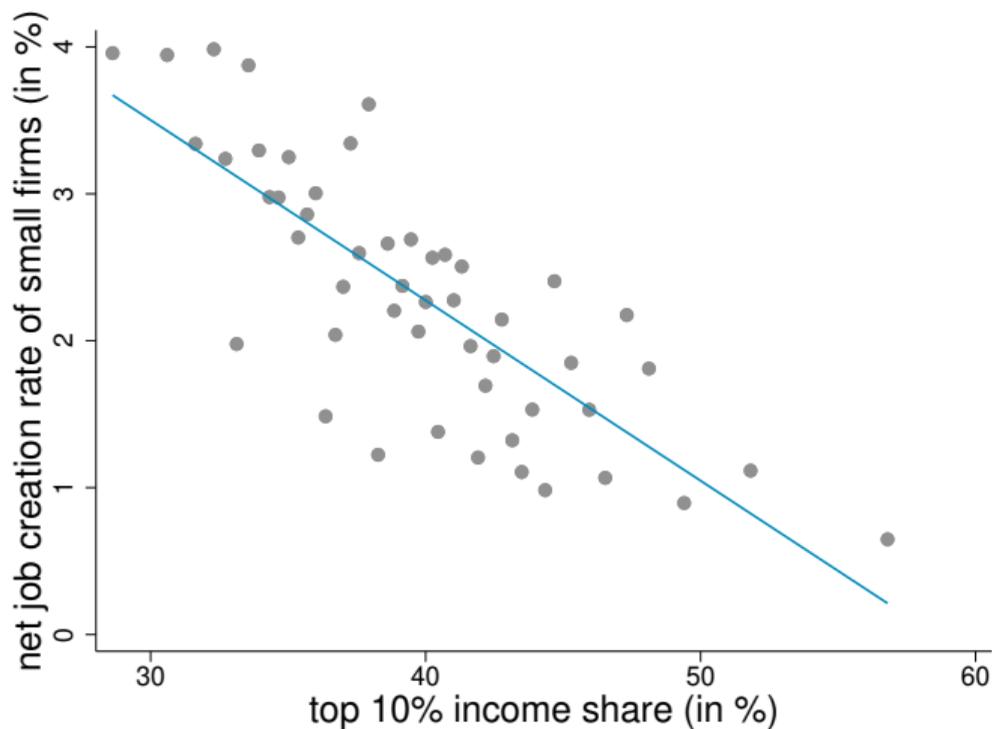
EMPIRICAL ANALYSIS

DATA

- ▶ **Business Dynamics Statistics:** net job creation rate by state-firm size-year cell
- ▶ **Frank (2009):** annual state-level top 10%, 5%, 1%, and 0.1% income shares
 - ▶ Merged sample: 19,176 state-firm size-year obs for 47 states from 1981 to 2015
- ▶ **Call Reports:** bank-level income statement and balance sheet data

Summary stats

PREVIEW OF STATE-TIME VARIATION IN THE DATA



EMPIRICAL STRATEGY: BASELINE SPECIFICATION

$$njc_{s,f,t} = \beta_1 \text{top } 10\%_{s,t-1} + \beta_2 \text{small firm}_f \\ + \beta_3 \text{top } 10\% \times \text{small firm}_{s,f,t-1} + \text{ctrls}_{s,t-1} + \theta_{s,f} + \tau_{s,t} + \epsilon_{s,f,t}$$

- ▶ njc : annual net job creation rate in state (s), firm size (f), year (t)
- ▶ $\text{top } 10\%$: top 10% income share
- ▶ small firm_f : dummy for firms with 1 to 499 employees
- ▶ controls : log pop, unemployment rate, average income per capita growth, share of pop. aged 60 and above, share of black pop.
- ▶ $\theta_{s,f}$: state or state*firm size fixed effect
- ▶ $\tau_{s,t}$: time or state*time fixed effects

IDENTIFICATION STRATEGY: FIXED EFFECTS

- ▶ Include state*time FE to absorb a range of omitted variables
 - ▶ Globalization, skill-biased technical change, ...
- ▶ Reverse causality would need to occur within state-firm size-year cells
 - ▶ Lag top income share by one year and interact controls with 'very small firm' dummy
 - ▶ Members of the top 10% are not only CEOs, but physicians, lawyers, ... Occupations
- ▶ In addition, develop IV approach

IDENTIFICATION STRATEGY: INSTRUMENTAL VARIABLES

- ▶ **First IV:** based on pre-determined top income share of each state
 - ▶ Predict evolution in state-level top income shares based on each state's 1970 top income share adjusted for the 'leave-one-out' national trend
 - ▶ Use predicted shares as IV for actual ones
- ▶ **Second IV (Bartik):** based on pre-determined industry exposure of each state
 - ▶ A small number of industries account for most of the rise in US income inequality (Haltiwanger, Hyatt, and Spletzer, 2022)
 - ▶ Use beginning-of-period employment share corresponding to these industries in each state, interacted with nationwide employment evolution in these industries
- ▶ First IV feasible over longer time sample and for different top income shares

More info on IVs

MAIN RESULTS

VARIABLES	(1) net JCR	(2) net JCR	(3) extensive net JCR	(4) intensive net JCR	(5) net JCR	(6) low BD net JCR	(7) high BD net JCR
top 10% income share	-0.017 (0.129)						
small firm (1-499)	0.056*** (0.009)						
top 10% × small firm (1-499)	-0.124*** (0.021)	-0.161*** (0.022)	-0.027** (0.011)	-0.133*** (0.016)		-0.255*** (0.034)	-0.348*** (0.033)
top 10% × firms with 1-9 emp					-0.315*** (0.037)		
top 10% × firms with 10-99 emp					-0.098*** (0.023)		
top 10% × firms with 100-499 emp					-0.049*** (0.017)		
Observations	16,435	16,435	16,435	16,435	16,435	60,372	63,823
Controls	✓	-	-	-	-	-	-
State FE	✓	-	-	-	-	-	-
Year FE	✓	-	-	-	-	-	-
State*Size FE	-	✓	✓	✓	✓	✓	✓
State*Year FE	-	✓	✓	✓	✓	-	-
State*Industry*Year FE	-	-	-	-	-	✓	✓
F-stat	95.43	300.8	300.8	300.8	128.4	282.1	275.9

► Top 10% share up by 10pp ⇒ relative decline in net JCR by small firms ≈ 1.6pp

EVIDENCE ON MECHANISM

1. Firm size and income thresholds: effect is decreasing in firm size and increasing in income threshold
2. Industry level regressions and bank dependence: effect is stronger for firms in more bank-dependent industries

$$y_{b,t} = \delta \text{ top } 10\% \text{ income share}_{s,t-1} \\ + \text{controls}_{b,t-1} + \text{controls}_{s,t-1} + \theta_b + \tau_t + \epsilon_{b,t}.$$

- ▶ $y_{b,t}$: log amount of total deposits or the ratio of deposit expenses to total deposits of bank b headquartered in state s in year t (from Call Report data)
- ▶ Also look at C&I loan supply and interest rate income (for subset of banks)

BANK-LEVEL RESULTS

VARIABLES	(1) log(dep)	(2) log(dep)	(3) dep rate	(4) dep rate	(5) log(CI)	(6) CI rate
top 10% income share	-2.436*** (0.588)		2.639*** (0.653)		-2.364*** (0.638)	12.283*** (4.651)
top 1% income share		-4.928*** (1.134)		2.942*** (1.077)		
Observations	242,651	242,651	242,651	242,651	112,393	112,393
Bank FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
F-stat	117.1	89.52	117.1	89.52	77.45	77.45

- ▶ Results consistent with deposit supply reduction driven by higher top incomes
- ▶ Effects stronger for higher top income thresholds
- ▶ Higher top incomes also reduce banks' C&I lending, increase interest income

TAKING STOCK

- ▶ Main result:
 - ▶ Rising top income shares reduce net job creation by small vs. large firms
- ▶ Evidence on mechanism:
 - ▶ Effect arises at the extensive and intensive margin
 - ▶ Effect is declining in firm size (reflecting lower informational frictions)
 - ▶ Effect stronger for small firms in sectors with higher bank dependence
 - ▶ Rising top income shares reduce deposits, increase deposit expenses

FURTHER RESULTS AND ROBUSTNESS

- ▶ Adding the second instrument gives similar results [details](#)
- ▶ More bank related results
 - ▶ Main results stronger in states where median bank smaller, more banks per capita
 - ▶ Effects on deposits and loans significantly less pronounced for larger banks [details](#)
- ▶ Alternative channels
 - ▶ Collateral, VC funding, education spending, excl. nontradables, ... [details](#)
- ▶ Decomposing net job creation
 - ▶ Decline in job creation by entrants accounts for 50% of fall in gross job creation
 - ▶ Lower reallocation rate [details](#)

GENERAL EQUILIBRIUM MODEL

MODEL SETUP

- ▶ Infinite horizon economy
- ▶ Agents:
 - ▶ Heterogeneous households
 - ▶ Representative 'public' firm
 - ▶ Access to frictionless capital market
 - ▶ Heterogeneous 'private' firms
 - ▶ Bank-dependent, working capital constraint
 - ▶ Representative bank

HOUSEHOLDS

- ▶ Based on ideas from [Straub \(2019\)](#), generate a decreasing deposit share with

$$u(c_i, l_{i,l}) + v(d_i) = \frac{\bar{u}(c_i, l_{i,l})^{1-\sigma}}{1-\sigma} + \psi_d \frac{d_i^{1-\eta}}{1-\eta}$$

- ▶ $\eta > \sigma$ generates nonhomotheticity in preferences: deposits are *necessity good*
 - ▶ Captures e.g. liquidity services disproportionately important for low-income HHs
- ▶ Budget constraint

$$c_{i,t} + d_{i,t+1} + k_{i,t+1} = s_{i,t}(w_t n_{i,t} + \tilde{w}_t \tilde{n}_{i,t}) + R_{k,t} k_{i,t} + R_{d,t} d_{i,t} + \Pi_{i,t} - T_{i,t},$$

where $d_{i,t+1}, k_{i,t+1} \geq 0$

REPRESENTATIVE PUBLIC FIRM

- ▶ Representative firm
- ▶ 'Public' → frictionless access to capital markets
- ▶ Produces according to

$$Y_t = ZK_t^\theta N_t^{\gamma-\theta}$$

- ▶ Pins down return for household and wage for public firm employment

$$\begin{aligned}R_{k,t} &= \theta Z(K_t)^{\theta-1} (N_t)^{\gamma-\theta} + 1 - \delta \\w_t &= (\gamma - \theta) Z(K_t)^\theta (N_t)^{\gamma-\theta}\end{aligned}$$

SECTOR OF PRIVATE FIRMS

- ▶ 'Private' → cannot access public capital markets
- ▶ Solve the following static problem

$$\max \tilde{z}_j \tilde{n}_{j,t}^\alpha - \tilde{f} - \tilde{w}_t \tilde{n}_{j,t} - (R_{\ell,t} - 1) [\tilde{f} + \phi \tilde{w}_t \tilde{n}_{j,t}]$$

where ϕ_j is the fraction of the wage bill covered through a bank loan

- ▶ Entry cutoff \tilde{z} determined by $\tilde{\pi}_{j,t}[\tilde{n}_{j,t}^*(\tilde{z})] = 0$
- ▶ $n_{j,t}^*$ is optimal employment choice conditional on entering

$$n_{j,t}^* = \left[\frac{\alpha z_{j,t}}{\{1 + (R_t^l - 1)\phi_j\} w_{2,t}} \right]^{\frac{1}{1-\alpha}}$$

PRIVATE FIRMS

- ▶ Setting allows us to derive various analytical results

$\frac{\partial n_{j,t}^*}{\partial R_{\ell,t}} < 0$: higher loans rates reduce labor demand by active private firms

$\frac{\partial \tilde{z}}{\partial R_{\ell,t}} > 0$: higher loans rates deter private firms from starting production

$\frac{\partial n_{j,t}^*}{\partial R_{\ell,t} \partial \phi} < 0$: higher loans rates reduce labor demand more strongly for more bank-dependent firms

$\frac{\partial \tilde{z}}{\partial R_{\ell,t} \partial \phi} > 0$: higher loans rates deter firms from starting production more strongly when bank dependence is more severe

BANK

- ▶ Representative bank takes deposits from households, makes loans to private firms
- ▶ Assume that the bank pays a fixed cost to intermediate funds
- ▶ The zero profit condition is given by

$$R_t^d D_t + \Xi = R_t^l L_t$$

where $D_t = \int_i d_{i,t}$ and $L_t = \int_j \phi_j w_t n_{j,t}$

- ▶ Implies the following relationship between the loan rate and deposit rate

$$R_t^l = R_t^d + \frac{\Xi}{D_t}$$

- Calibrate model to stylized facts and estimates obtained from empirical analysis

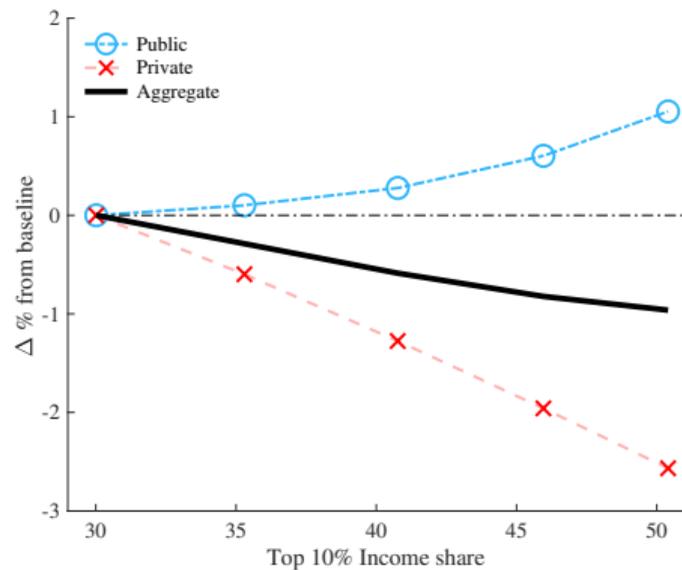
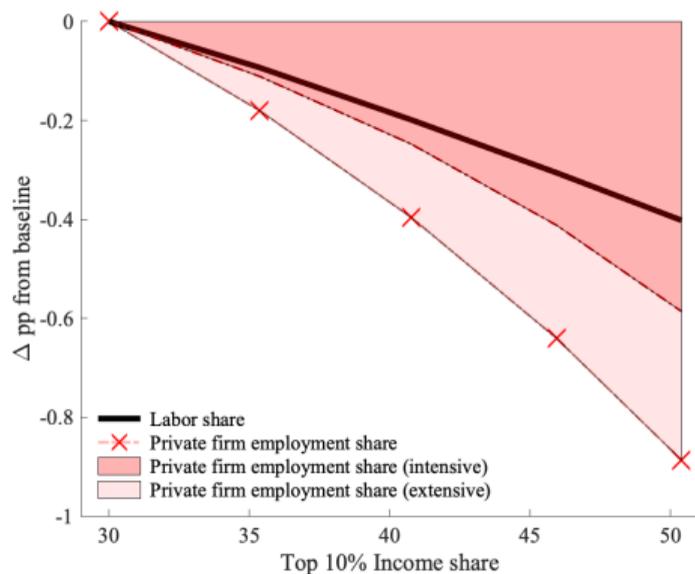
Parameter and description	Target (source)	Value	Model	Data
ψ_n Labor disutility (public)	Labor supply share 500+ (BDS)	1.2871	0.469	0.469
$\tilde{\psi}_n$ Labor disutility (private)	Labor supply share 1-499 (BDS)	1.2349	0.531	0.531
ψ_d Deposit utility scale	Deposit share in middle quintile (SCF)	0.0642	0.45	0.45
η Elasticity of deposit utility	Top 10% deposit share (SCF)	3.14	0.22	0.22
β Household discount factor	Mean return US stock market	0.9184	1.08	1.08
s_H Productivity scale H vs. L	Top 10% income share	3.6828	0.30	0.30
Z Public firm TFP	Labor demand share 500+ (BDS)	1.1651	0.469	0.469
θ Public firm capital share	Capital depreciation rate (NIPA)	0.16	0.06	0.06
\tilde{z}_{min} Lower bound private firm TFP	Employment at smallest private firm	0.6386	1	1
\tilde{z}_{max} Upper bound private firm TFP	Employment at largest private firm	1.1905	500	500
$\tilde{\mu}$ Mass private firm sector	Labor supply share 1-499 (BDS)	36.8	0.531	0.531
ϕ Private firm bank dependence	Int. margin estimate	0.981	-0.133	-0.133
\tilde{f} Private firm fixed cost	Ext. margin estimate	0.0021	-0.027	-0.027
Ξ Banking sector fixed cost	Mean of US deposit rates	0.2173	1.04	1.04

GENERAL EQUILIBRIUM EXPERIMENT

- ▶ Calibration of initial equilibrium mimics US economy in early 1980's
- ▶ Increase top 10% income share from 30% to 50%
 - ▶ Preserve mean income level prior to GE responses
 - ▶ Income includes capital income, labor income and transfers
 - ▶ Achieve this by using net zero transfers T_i

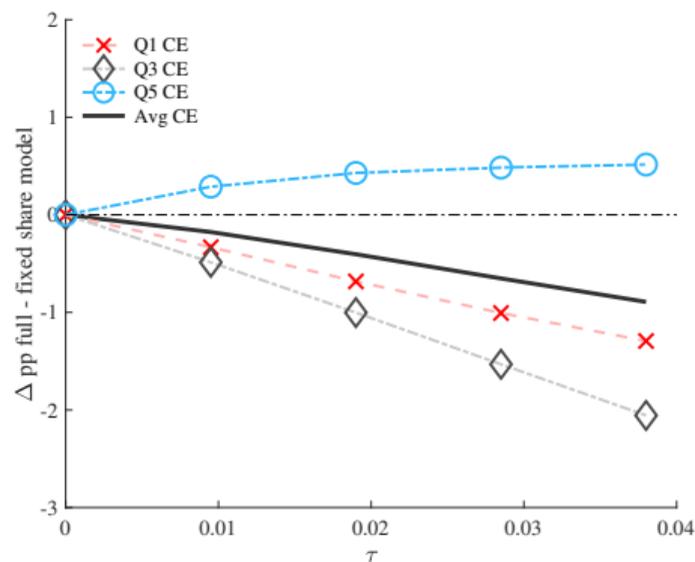
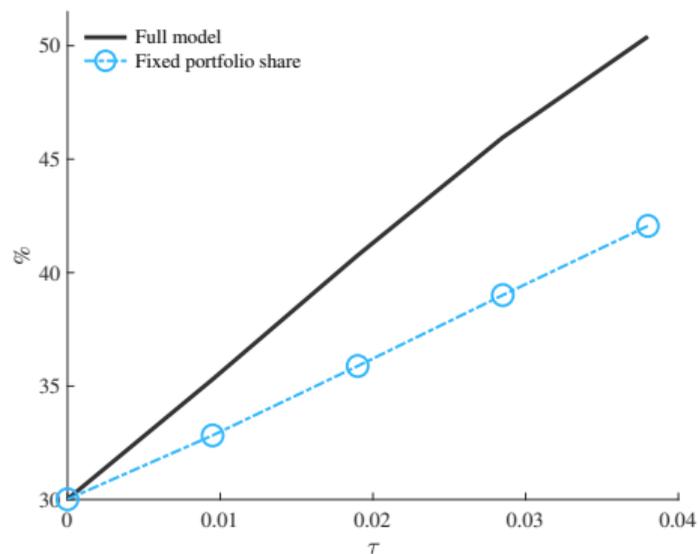
LABOR MARKET AND AGGREGATE OUTPUT EFFECTS

MORE



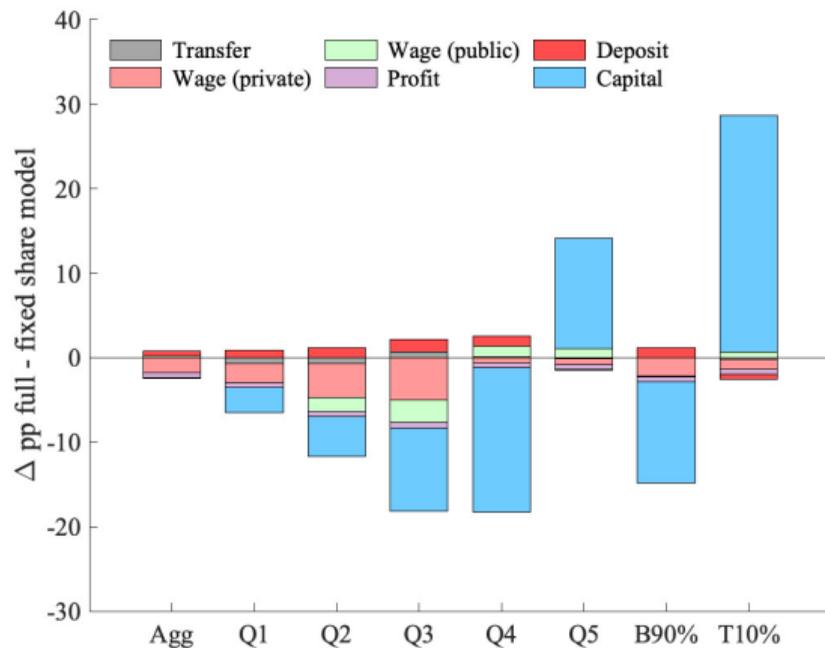
- ▶ Small firm employment share decreases by 0.9pp (18% of actual decline)
- ▶ Labor share decreases by 0.4pp (5-10% of actual decline)
- ▶ More output at large, less at small firms, modest reduction in aggregate output

GENERAL EQUILIBRIUM EXPERIMENT: WELFARE



- ▶ Shutting down our channel leads to a smaller increase in top income shares for a given redistribution scheme
- ▶ With our channel switched on, welfare increases more at the top and declines more at the bottom of the income distribution

GENERAL EQUILIBRIUM EXPERIMENT: WELFARE COMPARISON



- ▶ Without portfolio heterogeneity, rich can invest less in high-return public firm, and wages at the private firm are higher

GE EXPERIMENT: CONTRIBUTION OF OUR MECHANISM TO WELFARE

- ▶ Wage income matters for low-income HHs, capital income for high-income HHs
- ▶ With portfolio heterogeneity, redistribution causes:
 - ▶ Top income earners invest more in the high-return public firm
 - ▶ Labor demand and hence wages among small firms fall, hurting low-income HH
- ▶ Result: Eliminating the portfolio heterogeneity channel leads to an underestimation of the negative effects of higher top income shares on welfare

CONCLUSION

CONCLUSION

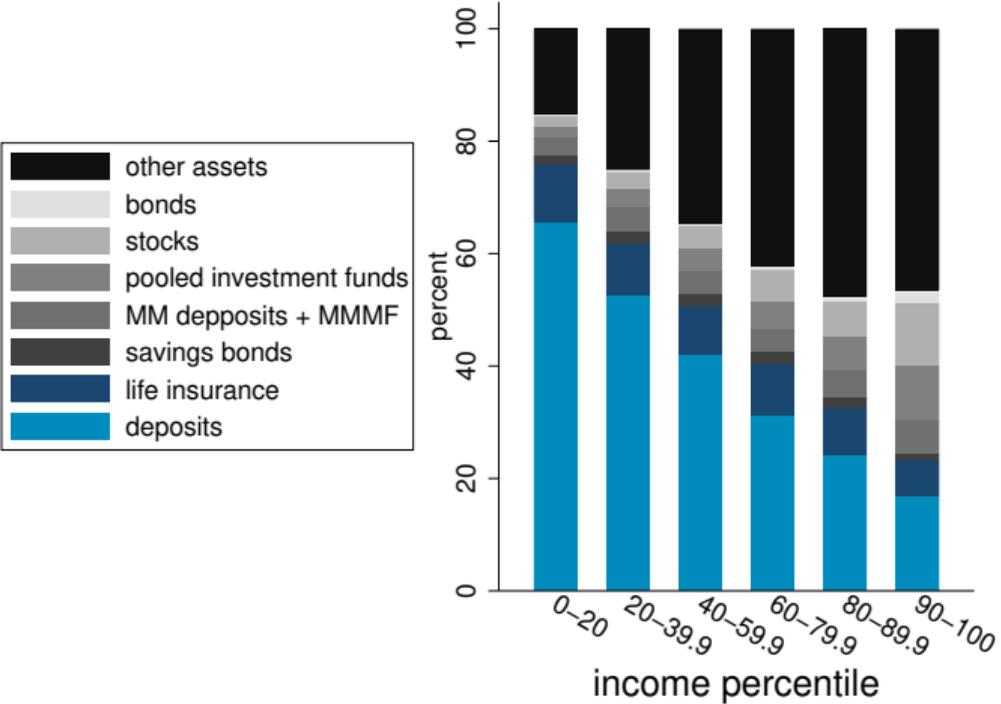
- ▶ The secular rise in inequality has repercussions for the real economy
- ▶ Through changes in the portfolio allocation of households, rising top incomes hinder small firms' job creation while benefiting large firms
- ▶ Quantitative experiments suggest that these effects matter in the aggregate:
 - ▶ The rise in top incomes explains a sizeable share of the overall decline in small business employment as well as the labor share
 - ▶ Ignoring portfolio heterogeneity leads to overestimation of the effects of rising income inequality on aggregate outcomes

REFERENCES

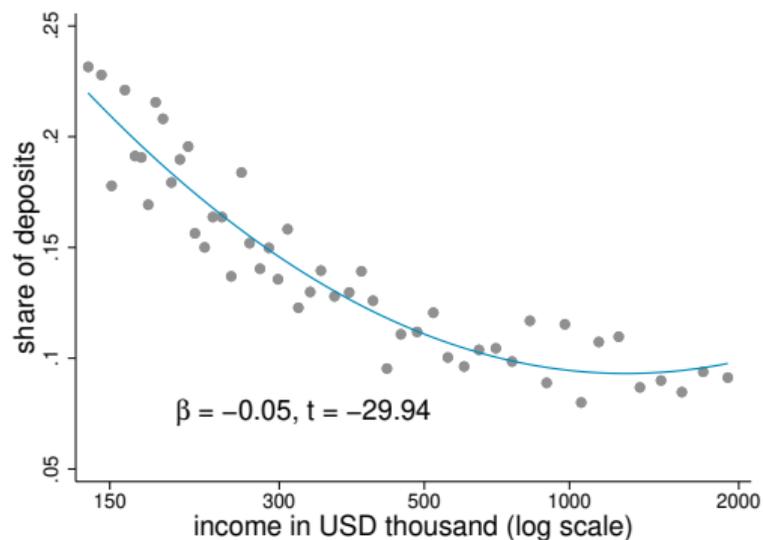
- AUCLERT, A. AND M. ROGNLIE (2017): "Aggregate Demand and the Top 1 Percent," *American Economic Review: Papers & Proceedings*, 107, 588–592.
- (2020): "Inequality and Aggregate Demand," *Working Paper*.
- AUTOR, D., D. DORN, L. F. KATZ, C. PATTERSON, AND J. VAN REENEN (2020): "The fall of the labor share and the rise of superstar firms," *The Quarterly Journal of Economics*, 135, 645–709.
- BANERJEE, A. V. AND E. DUFLO (2003): "Inequality and Growth: What Can the Data Say?" *Journal of Economic Growth*, 8, 267–299.
- BARRO, R. J. (2000): "Inequality and Growth in a Panel of Countries," *Journal of Economic Growth*, 5, 5–32.
- BECKER, B. AND V. IVASHINA (2014): "Cyclicality of credit supply: Firm level evidence," *Journal of Monetary Economics*, 62, 76–93.
- BRAGGION, F., M. DWARKASING, AND S. ONGENA (2021): "Household inequality, entrepreneurial dynamism, and corporate financing," *The Review of Financial Studies*, 34, 2448–2507.
- CHODOROW-REICH, G. (2014): "The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis," *The Quarterly Journal of Economics*, 129, 1–59.
- COIBION, O., Y. GORODNICHENKO, M. KUDLYAK, AND J. MONDRAGON (2020): "Greater Inequality and Household Borrowing: New Evidence from Household Data," *Journal of the European Economic Association*, 18.
- DECKER, R. A., J. HALTIWANGER, R. JARMIN, AND J. MIRANDA (2016): "Declining Business Dynamism: What We Know and the Way Forward," *American Economic Review P&P*, 106, 203–07.
- DRECHSLER, I., A. SAVOV, AND P. SCHNABL (2017): "The Deposits Channel of Monetary Policy," *Quarterly Journal of Economics*, 132, 1819–1876.
- FORBES, K. (2000): "A reassessment of the relationship between inequality and growth," *American Economic Review*, 90, 869–887.
- FRANK, M. W. (2009): "Inequality and Growth in the United States: Evidence from a New State-Level Panel of Income Inequality Measure," *Economic Inquiry*, 47, 55–68.
- GILJE, E. P., E. LOUTSKINA, AND P. E. STRAHAN (2016): "Exporting Liquidity: Branch Banking and Financial Integration," *Journal of Finance*, 71, 1159–1184.
- HALTIWANGER, J. C., H. R. HYATT, AND J. SPLETZER (2022): "Industries, Mega Firms, and Increasing Inequality," *NBER Working Paper*, 29920.
- IVASHINA, V. AND D. SCHARFSTEIN (2010): "Bank lending during the financial crisis of 2008," *Journal of Financial Economics*, 97, 319–338.
- LIBERTI, J. M. AND M. A. PETERSEN (2019): "Information: Hard and Soft," *Review of Corporate Finance Studies*, 8, 1–44.
- MIAN, A., L. STRAUB, AND A. SUFI (2020): "The saving glut of the rich," *NBER Working Paper*.
- (2021): "Indebted demand," *The Quarterly Journal of Economics*, 136, 2243–2307.
- STRAUB, L. (2019): "Consumption, savings, and the distribution of permanent income," *Unpublished manuscript, Harvard University*.

APPENDIX SLIDES

MORE DETAILED BREAKDOWN OF FINANCIAL ASSETS



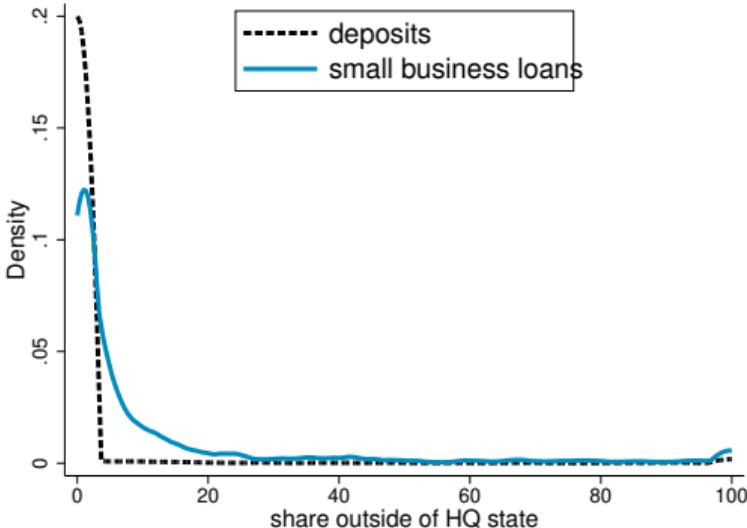
WITHIN TOP 10% AND RESPONSIVENESS



(A) Deposit share by income within top 10%

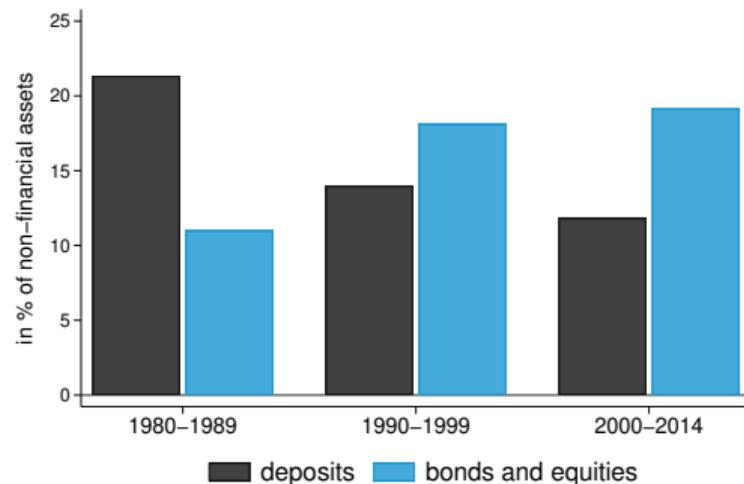
- ▶ Main pattern holds also within top 10% ...
- ▶ ... but deposit amount more responsive for lower income groups

DISTRIBUTION OF BANKS

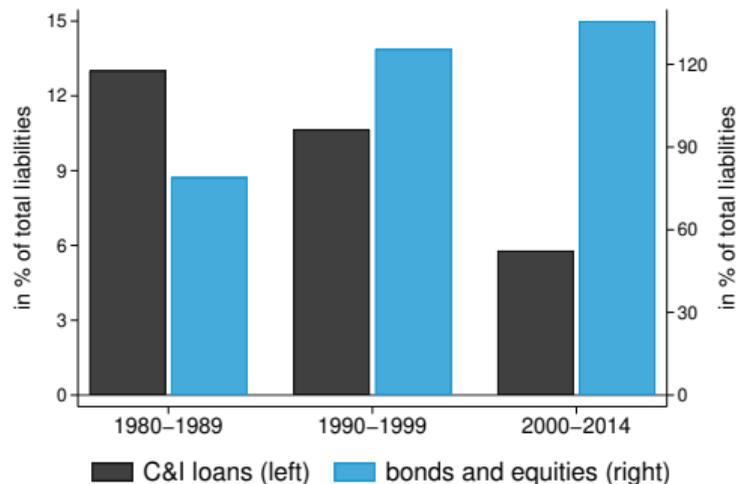


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AGGREGATE PATTERNS



(A) Households



(B) Firms

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SUMMARY STATISTICS: STATE LEVEL

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
top 10% income share	1645	.407	.054	.252	.615	.369	.403	.438
top 1% income share	1645	.15	.044	.061	.353	.119	.143	.167
Gini index	1645	.569	.047	.459	.711	.543	.567	.597
net job creation rate	1645	.013	.022	-.053	.066	.002	.018	.028
net job creation rate, extensive	1645	.007	.006	-.005	.023	.002	.006	.011
net job creation rate, intensive	1645	.006	.018	-.048	.043	-.001	.011	.019
net job creation rate, small firms	1645	.02	.032	-.129	.151	.004	.022	.038
net job creation rate, large firms	1645	.007	.029	-.153	.107	-.009	.01	.025
income per capita (in th)	1645	27.642	12.121	7.958	73.834	17.644	25.962	36.092
population (in th)	1645	5567.107	6203.077	418.493	39032.44	1340.372	3668.976	6480.591
% old population	1645	.125	.021	.029	.19	.115	.127	.137
% black population	1645	.119	.12	.002	.705	.028	.082	.163
Δ income p.c.	1645	.047	.031	-.104	.262	.031	.047	.063
unemployment rate	1645	.061	.021	.023	.154	.045	.057	.073

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SUMMARY STATISTICS: BANK LEVEL

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
log(deposits)	243674	11.093	1.317	0	16.647	10.206	10.966	11.826
deposit expense (in %)	243674	.935	.511	.013	3.254	.547	.931	1.291
log(C&I loans)	112884	9.535	1.712	0	14.787	8.421	9.446	10.575
C&I interest (in %)	112884	2.049	.991	0	22.463	1.469	1.859	2.378
log(assets)	243674	11.437	1.373	6.878	21.423	10.515	11.289	12.163
non-interest income (in %)	243674	10.564	8.172	.327	62.203	5.628	8.679	13.023
return on assets (in %)	243674	2.137	2.6	-13.984	8.015	1.531	2.504	3.353
deposits/liabilities	243674	.946	.085	0	1	.934	.978	.99
capital/liabilities	243424	.1	.044	0	.999	.078	.092	.112

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WHO ARE THE TOP EARNERS?

SOURCE: IPUMS

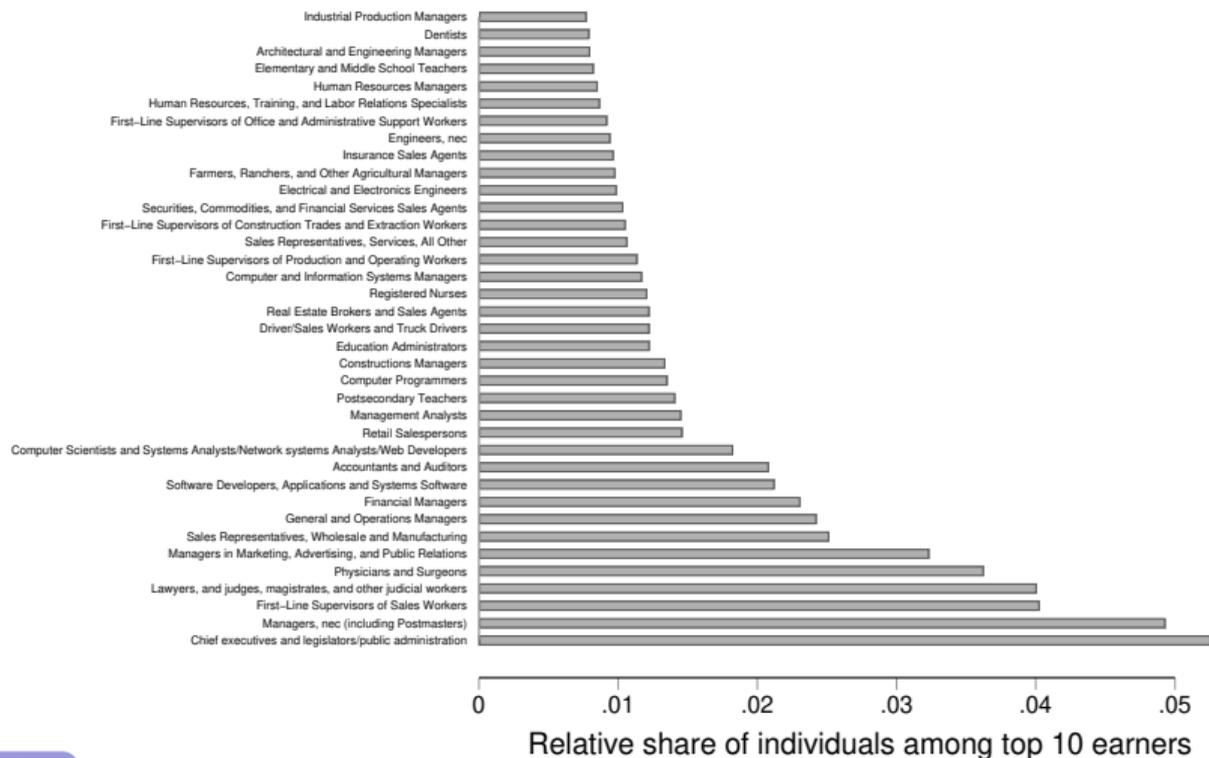
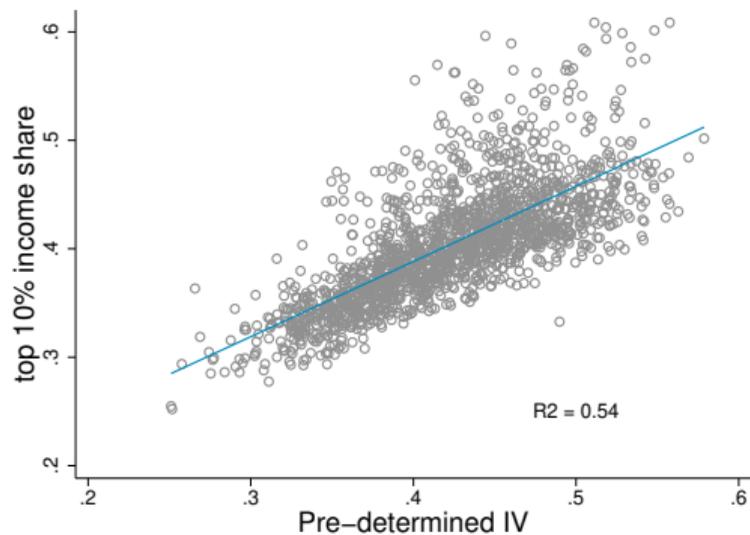
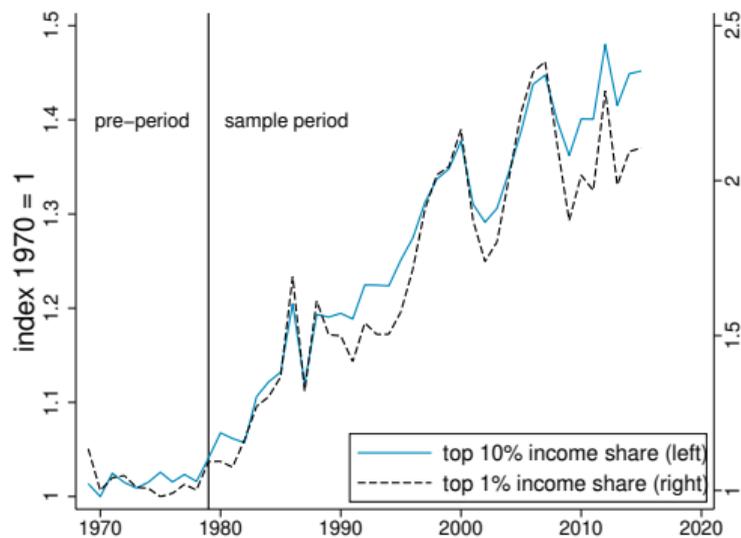


ILLUSTRATION OF PRE-DETERMINED SHARE IV

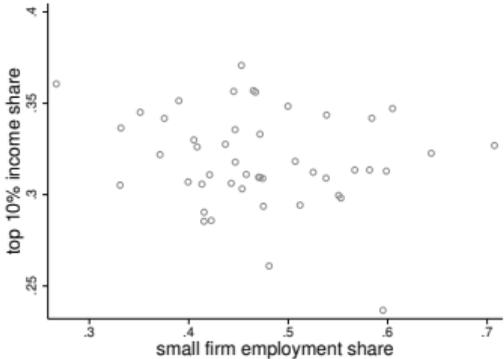


(C) First stage correlation

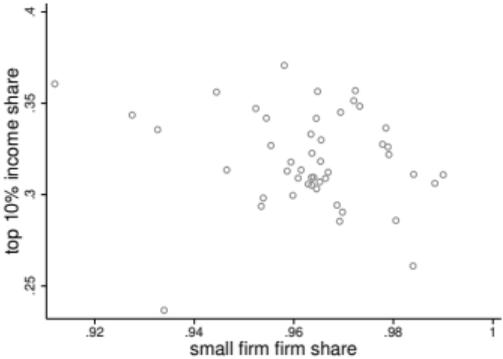


(D) Aggregate trends

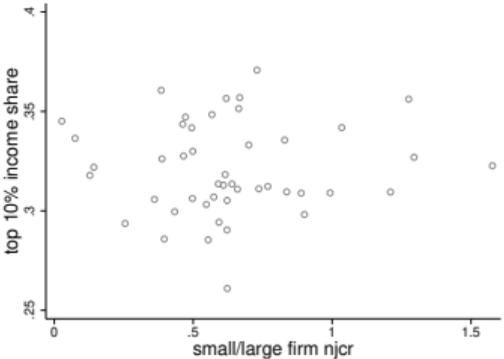
VALIDITY OF PRE-DETERMINED SHARE IV



(E) employment



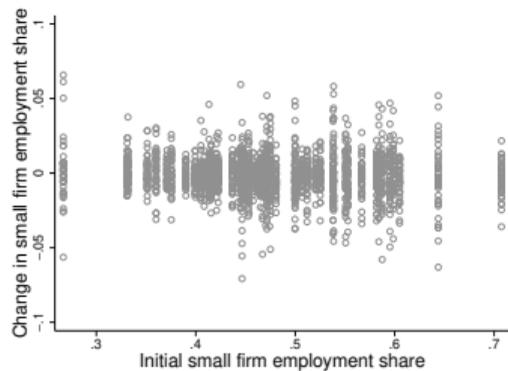
(F) firms



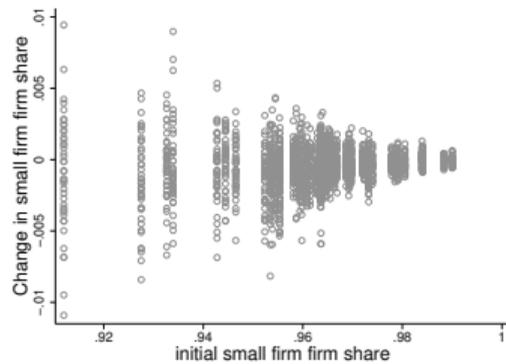
(G) net jcr

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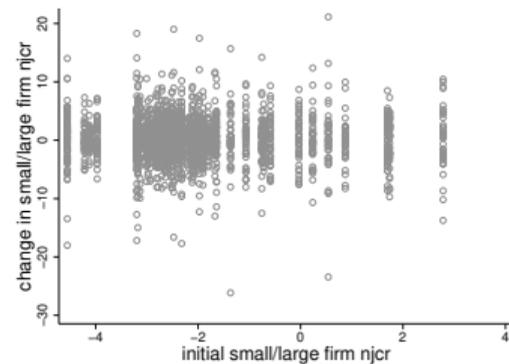
VALIDITY OF PRE-DETERMINED SHARE IV



(H) employment



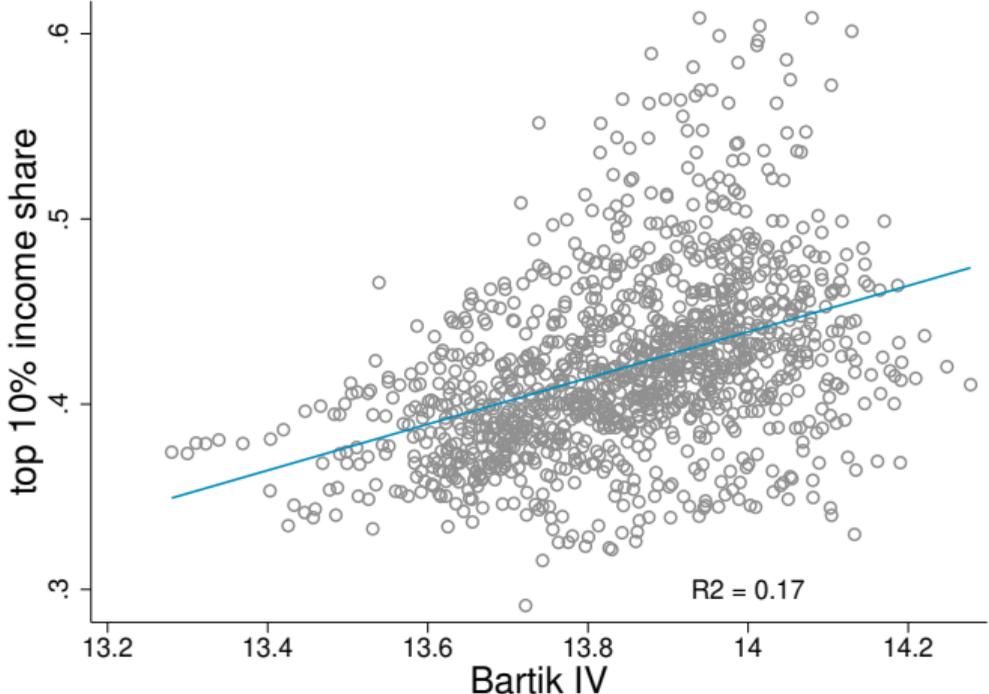
(I) firms



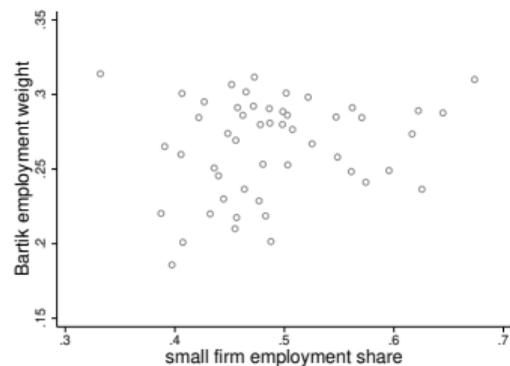
(J) net jcr

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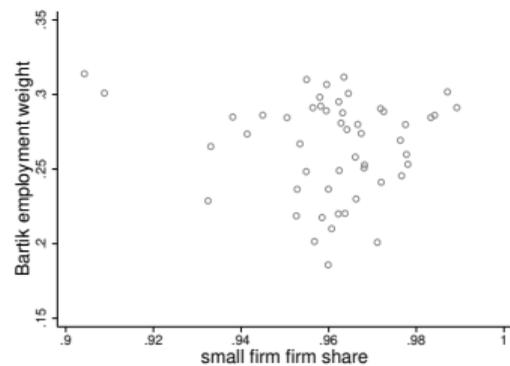
ILLUSTRATION OF BARTIK IV (FIRST STAGE)



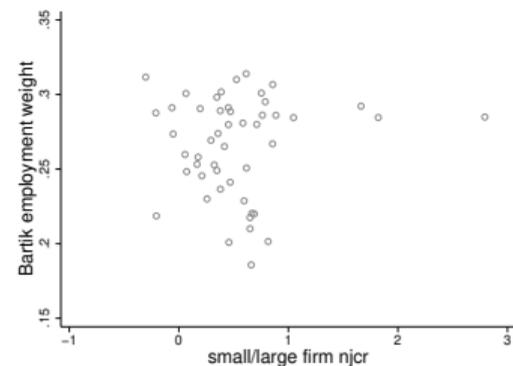
VALIDITY OF BARTIK IV



(K) employment



(L) firms



(M) net jcr

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VALIDITY OF BARTIK IV

TABLE: Initial employment shares

Variable	Obs	Mean	Std. Dev.	P1	P5	P50	P95	P99
emp share of s-i cell in i	1528	.02	.031	0	.001	.01	.067	.148
emp share of s-i cell in s	1528	.011	.015	0	0	.006	.04	.072

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VALIDITY OF PREDETERMINED SHARE IV

TABLE: Rising top incomes and job creation – pre-determined IV tests

	(1)	(2)	(3)	(4)	(5)	(6)
	baseline	<10k	<5k	baseline	FE	FE
VARIABLES	net JCR	drop i net JCR				
top 10% × small firm (1-499)	-0.161*** (0.022)	-0.149*** (0.023)	-0.138*** (0.023)	-0.213*** (0.022)	-0.225*** (0.023)	-0.258*** (0.026)
Observations	16,435	14,790	13,148	192,968	192,968	142,945
State*Size FE	✓	✓	✓	✓	✓	✓
State*Year FE	✓	✓	✓	✓	-	-
State*Industry*Year FE	-	-	-	-	✓	✓

VALIDITY OF BARTIK IV

TABLE: Rising top incomes and job creation – Bartik IV tests

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	baseline net JCR	<10k net JCR	<5k net JCR	baseline net JCR	FE net JCR	FE drop i net JCR
top 10% × small firm (1-499)	-0.108*** (0.024)	-0.089*** (0.026)	-0.083*** (0.025)	-0.146*** (0.029)	-0.139*** (0.028)	-0.142*** (0.033)
Observations	12,218	10,996	9,774	146,266	146,266	108,376
State*Size FE	✓	✓	✓	✓	✓	✓
State*Year FE	✓	✓	✓	✓	-	-
State*Industry*Year FE	-	-	-	-	✓	✓

OLS RESULTS

TABLE: Rising top incomes reduce small firm job creation – OLS results

VARIABLES	(1) net JCR	(2) net JCR	(3) ext net JCR	(4) int net JCR	(5) net JCR	(6) low BD net JCR	(7) high BD net JCR
top 10% income share	0.031 (0.022)						
small firm (1-499)	0.036*** (0.006)						
top 10% × small firm (1-499)	-0.073*** (0.014)	-0.116*** (0.018)	-0.021** (0.008)	-0.096*** (0.013)		-0.193*** (0.030)	-0.245*** (0.028)
top 10% × very small firm (1-9)					-0.239*** (0.030)		
top 10% × small firm (10-99)					-0.066*** (0.021)		
top 10% × medium firm (100-499)					-0.027 (0.016)		
Observations	16,435	16,435	16,435	16,435	16,435	60,372	63,823
Controls	✓	-	-	-	-	-	-
State FE	✓	-	-	-	-	-	-
Year FE	✓	-	-	-	-	-	-
State*Year FE	-	✓	✓	✓	✓	-	-
State*Size FE		✓	✓	✓	✓	✓	✓

ADDING SECOND INSTRUMENT

VARIABLES	(1) net JCR	(2) net JCR	(3) ext net JCR	(4) int net JCR	(5) net JCR	(6) low BD net JCR	(7) high BD net JCR
top 10% income share	-0.010 (0.122)						
small firm (1-499)	0.060*** (0.009)	0.000 (0.000)					
top 10% × small firm (1-499)	-0.134*** (0.021)	-0.161*** (0.023)	-0.026** (0.011)	-0.134*** (0.016)		-0.252*** (0.034)	-0.354*** (0.034)
top 10% × very small firm (1-9)					-0.316*** (0.037)		
top 10% × small firm (10-99)					-0.107*** (0.030)		
top 10% × medium firm (100-499)					-0.056** (0.023)		
Observations	16,435	16,435	16,435	16,435	16,435	60,372	63,823
Controls	✓	-	-	-	-	-	-
State FE	✓	-	-	-	-	-	-
Year FE	✓	-	-	-	-	-	-
State*Year FE	-	✓	✓	✓	✓	-	-
State*Size FE	-	✓	✓	✓	✓	✓	✓
State*Industry*Year FE	-	-	-	-	-	✓	✓
F-stat	56.89	165.1	165.1	165.1	106.9	282.1	275.9

CALL REPORTS – BANK SIZE

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	log(dep)	dep rate	log(CI)	CI rate	state-level net JCR	state-level net JCR
top 10% income share	-13.331*** (0.919)	-12.971*** (0.827)	-20.017*** (2.459)	-43.645*** (3.523)		
top 10% × log(assets)	1.352*** (0.033)	1.269*** (0.038)	1.783*** (0.087)	4.175*** (0.138)		
top 10% × very small firm (1-9)					0.854** (0.403)	-0.396*** (0.042)
very small firm (1-9) × log(median assets)					0.052*** (0.017)	
top 10% × very small firm (1-9) × log(median assets)					-0.109*** (0.038)	
very small firm (1-9) × log(banks pc)						-0.911*** (0.194)
top 10% × very small firm (1-9) × log(banks pc)						2.361*** (0.586)
Observations	242,651	242,651	112,393	112,393	16,086	16,086
Bank FE	✓	✓	✓	✓	-	-
Year FE	✓	✓	✓	✓	-	-
State*Size FE	-	-	-	-	✓	✓
State*Year FE	-	-	-	-	✓	✓

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ALTERNATIVE CHANNELS

TABLE: Collateral, venture capital, public goods, and local demand

VARIABLES	(1) net JCR	(2) no boom states net JCR	(3) no VC net JCR	(4) net JCR	(5) edu sample net JCR	(6) net JCR	(7) net JCR	(8) tradable net JCR
top 10% × small firm (1-499)	-0.136*** (0.020)	-0.143*** (0.023)	-0.163*** (0.023)	-0.292*** (0.038)	-0.593*** (0.077)	-0.213*** (0.022)	-0.225*** (0.023)	-0.291*** (0.027)
house price growth × small firm (1-499)	0.100*** (0.015)							
log(VC deals) × small firm (1-499)				0.003** (0.001)				
education exp. × small firm (1-499)					0.025*** (0.006)			
Observations	16,435	13,291	15,035	9,450	10,120	192,968	192,968	155,589
State*Size FE	✓	✓	✓	✓	✓	✓	✓	✓
State*Year FE	✓	✓	✓	✓	✓	✓	-	-
State*Naics*Year FE	-	-	-	-	-	-	✓	✓

DIFFERENT OUTCOME VARIABLES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	JCR	births JCR	cont JCR	JDR	deaths JDR	cont JDR	RAR	ln(emp)	ln(firms)	Δ JC	Δ firms
top 10% \times small firm (1-499)	-0.402*** (0.027)	-0.189*** (0.014)	-0.214*** (0.017)	-0.240*** (0.017)	-0.158*** (0.013)	-0.085*** (0.011)	-0.639*** (0.044)	-2.696*** (0.301)	-2.158*** (0.192)		
top 10% \times young (0-5)										-0.240*** (0.039)	-0.371*** (0.032)
Observations	16,435	16,435	16,435	16,435	16,435	16,435	16,435	16,435	16,435	3,196	3,196
State*Size FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
State*Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
State*Age FE	-	-	-	-	-	-	-	-	-	✓	✓

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ROBUSTNESS CHECKS: STATE-YEAR LEVEL

VARIABLES	(1) top 1% net JCR	(2) no recession net JCR	(3) no GFC net JCR	(4) pre 2008 net JCR	(5) no boom years net JCR	(6) net JCR
top 10% × small firm (1-499)		-0.166*** (0.023)	-0.136*** (0.021)	-0.106*** (0.026)	-0.179*** (0.023)	-0.139*** (0.031)
top 1% × small firm (1-499)	-0.201*** (0.025)					
Observations	16,435	14,678	15,495	12,675	12,675	16,435
State*Size FE	✓	✓	✓	✓	✓	✓
State*Year FE	✓	✓	✓	✓	✓	✓
Controls	-	-	-	-	-	× small

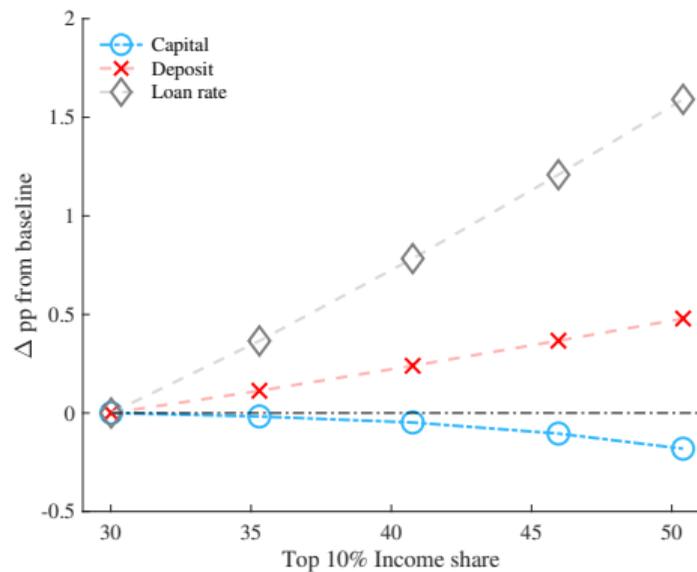
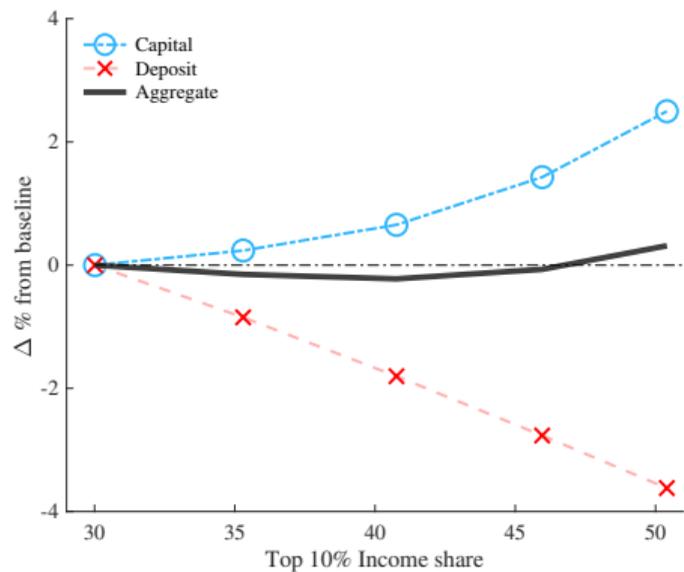
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EXTERNALLY CALIBRATED PARAMETERS

Panel (a): externally calibrated parameters

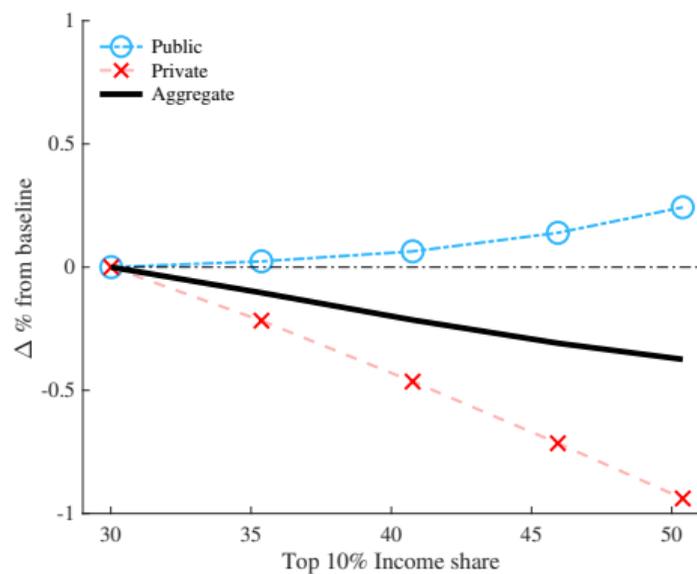
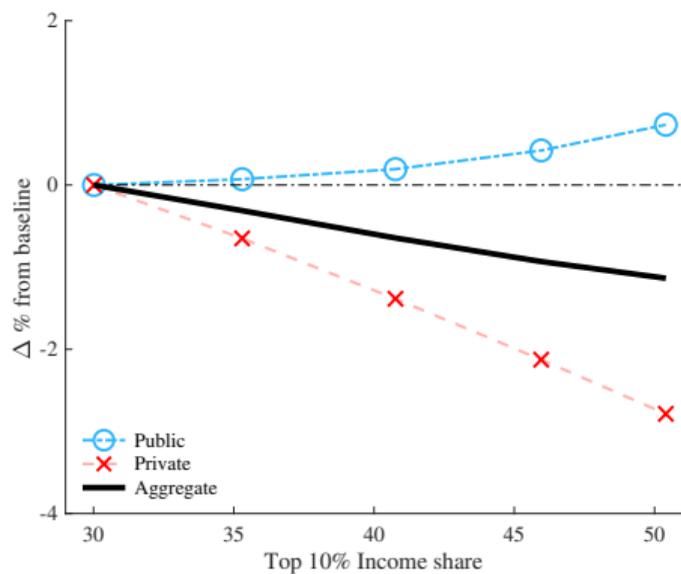
Parameter and description	Value
σ Relative risk aversion	1.50
ν Frisch elasticity of labor supply	3
ρ Persistence of productivity	0.92
σ_ϵ Std. dev. of productivity	0.12
μ_L Mass of L type households	0.9
μ_H Mass of H type households	0.1
α Private firm returns to scale	0.9
γ Public firm returns to scale	0.9

GENERAL EQUILIBRIUM EXPERIMENT: PORTFOLIO CHANGES



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GENERAL EQUILIBRIUM EXPERIMENT: EMPLOYMENT AND WAGES



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