Technological Change and Demand for Redistribution: Micro Evidence and Macro Implications

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Abstract & Introduction

Abstract: I study the role of technological change (TC) in explaining rising income inequality and non-increasing progressive taxes from 1978 to 2018. Linking occupation-level data with individual responses on preferences for the redistribution of income, I document that occupations that increasingly required computer-related work experienced substantially reduced preferences for the redistribution of income, even when current earnings of individuals are accounted for. To rationalize this finding, I develop a tractable quantitative model embedding technological change and voting for redistribution, in which workers who are more exposed to computerization have more to gain from skill investment, and thus are more hurt by more distortive progressive taxes. Therefore, they are more opposed to progressive taxation. A decline in equipment prices leads to an increase in earnings inequality, while the tax progressivity is non-increasing. If workers' skill acquisition were not allowed or a policymaking process is of equal weight across voters during the technological change, the model generates a higher level of tax-and-transfer progressivity and inequality.

Introduction: Empirical papers have documented that progressivity has not gone up despite rising income inequality (Slemrod and Bakjia, 2017; Heathcote et al., 2020). While there are several empirical and theoretical attempts (Benabou and Ok, 2001; Benabou, 2005; Karabarbounis, 2011; Kuziemko et al., 2015), quantitative work that incorporates multiple motives is extremely rare.

In this paper, I ask two related research questions:

1. Did computerization since the late 1970s reduce preferences for redistribution? If so, what is mechanism behind this link? I focus on the role of skill investment.

2. Can the skill investment channel rationalize the empirical finding using micro data and the trend of rising inequality but non-increasing tax progressivity?

Empirical Strategy

Data link occupational data and individual political preferences

General Social Survey (GSS, 1972-2018): political attitudes, social characters
Skill contents data (O*NET, Atalay et al. (2020)'s data): context, requirement
Decennial Census-ACS, CPS, OES: earnings, hours worked, employment

Figure 1: Computer tasks, redistribution preferences, earnings by occupation
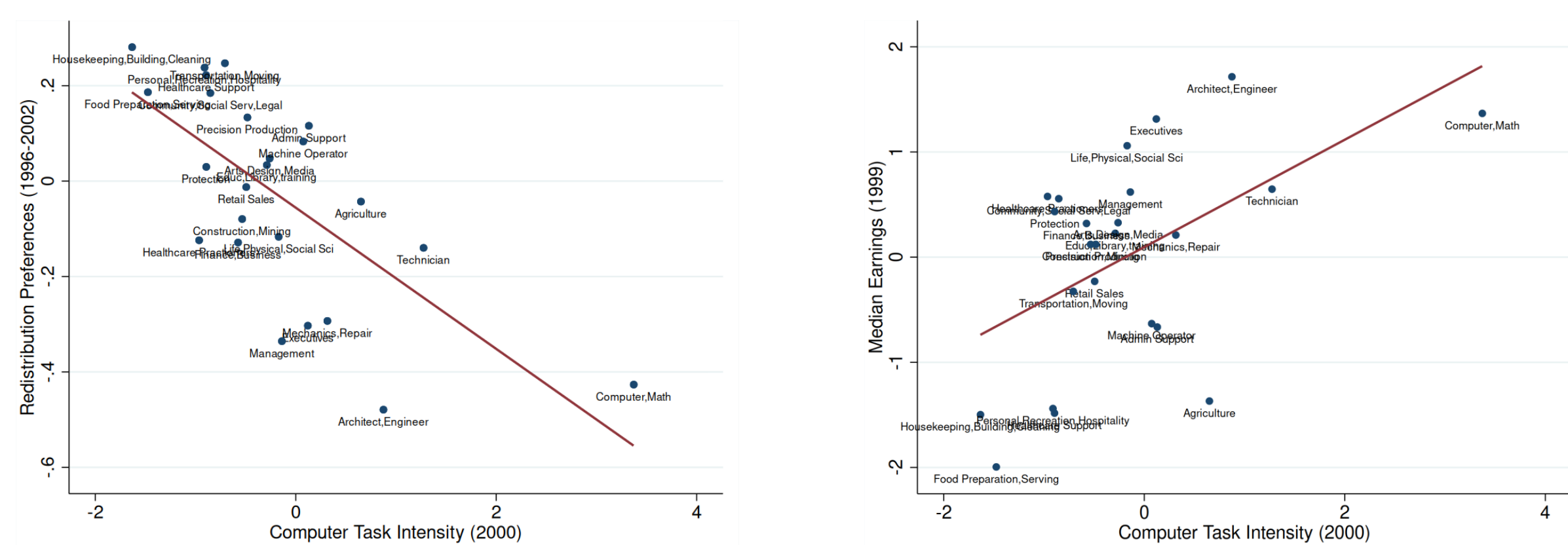
Regression specification (i: individual, o: occupation, t: time)

$$Redist_{iot} = \alpha + \beta \log(Earnings_{it}) + \gamma \, Tasks\ Intensity_{ot} + X'_{it}\Gamma + X'_{ot}\Omega + \epsilon_{iot}$$

$Redist_{iot}$: stated redistribution preferences ("should the gov reduce income differences between the rich and the poor?"), voting behavior ("Voted for a Democrat candidate?")

$Tasks\ Intensity_{ot}$: tasks intensity of computer, social skills, manual, routine cognitive. Computer TI combines (1) Computers and Electronics Knowledge Requirement and (2) Working with Computers. Others follow the literature.

OLS: Estimate the impact of computerization (γ_{OLS}) controlling for current earnings to examine whether computer technology affects redistribution preferences beyond current earnings, possibly due to skill investment motive.
2SLS: underestimation bias in OLS if current and future earnings are correlated due to skill investment, but future earnings are not observed in cross-sectional data. To address it, instrument earnings (β_{2SLS}) by tasks intensity.

Empirical Result

The OLS estimate of computerization impact (γ_{OLS}) is negative and statistically significant, even controlling for current earnings. The 2SLS estimate of current earnings (β_{2SLS}) corrects underestimation bias due to skill investment.

Table 1: Redistribution Preferences and Occupational Exposure to Computerization

|	1975-2000		2002-2018	
	(1)	(2)	(3)	(4)
	OLS	2SLS	OLS	2SLS
	Dependent Variable: Voted for Democratic Candidate			
Earnings	-0.017**	-0.125***	-0.015*	-0.050**
	[-0.033, -0.002]	[-0.177, -0.073]	[-0.031, 0.001]	[-0.087, -0.012]
Computer	-0.024**		-0.013	
	[-0.060, -0.002]		[-0.046, 0.003]	
Occupation def.	DD-2	DD-2	DD-2	DD-2
KP wald F-stat	N/A	96.231	N/A	119.063
Control FE	Yes	Yes	Yes	Yes
R-Squared	0.169	0.144	0.269	0.263
Observations	13216	13216	8321	8321

Quantitative Model

Model features: tractable macro political economy model that synthesizes:
(1) standard task-based assignment based on comparative advantage,
(2) canonical political economy (a la probabilistic voting),
(3) progressive tax and transfer system.

Taking the model to data: match time use, employment share, disposable earnings by demographic group, occupation, and equipment, and estimate political weight to discipline key parameters of economic and political blocks.

Figure 2: Model validation
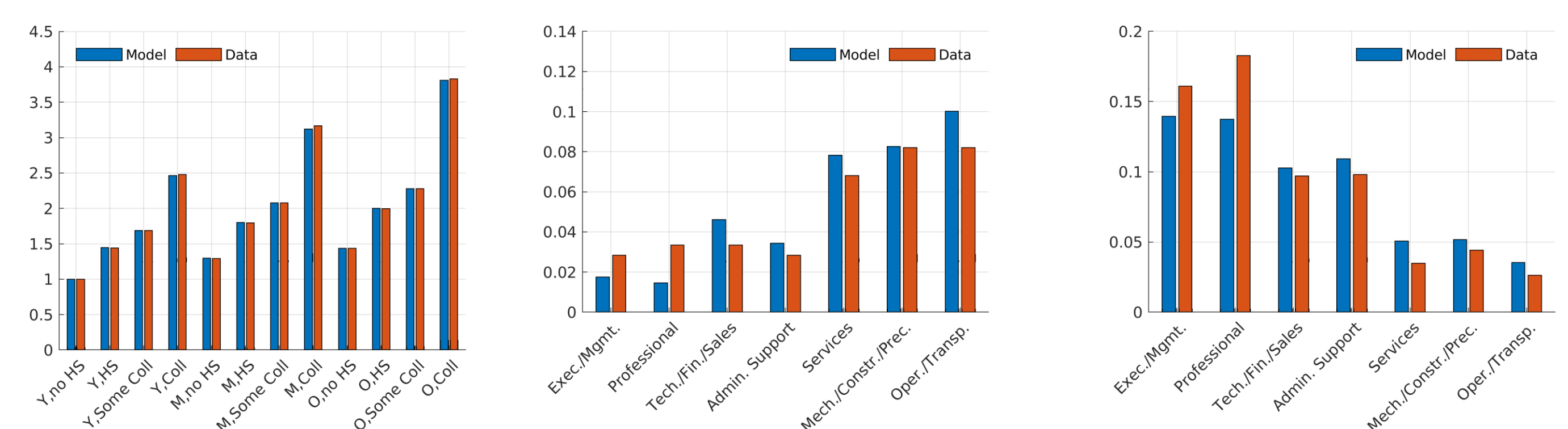
Key model mechanism: (1) net gains from redistribution, impact on skill investment choices ("equity-efficiency trade-offs") and (2) Political policymaking process.

Figure 3: Model mechanism
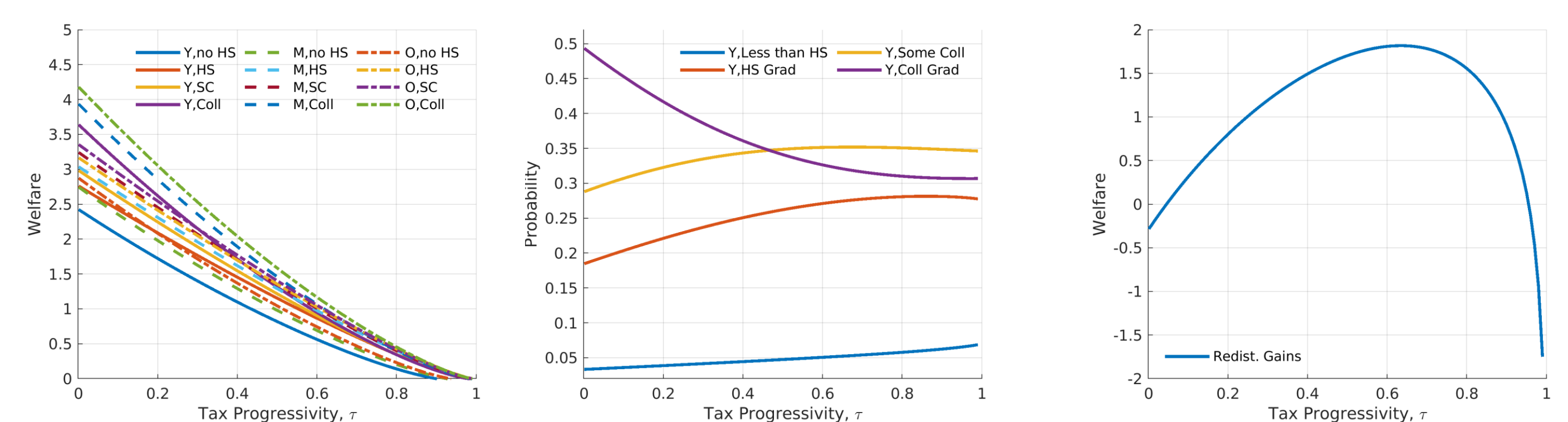
Quantitative result: (1) TC increases inequality but non-increasing tax progressivity, (2) when skill acquisition is shut down, less inequality with similar tax progressivity, (3) when political bias is shut down, less inequality and higher tax progressivity.

Conclusion

- Using microdata, computerization reduced individual preferences for redistribution, even when current earnings are accounted for.
- Develop a first tractable macro political economy model embedding technological progress and voting for redistribution, in which workers make skill investment choices and vote for redistribution policy.
- Through the lens of the estimated model, skill investment and political process account for rising inequality but non-increasing tax progressivity.

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