Employment Protection, Investment in Job-Specific Skills, and Inequality Trends in the United States and Europe

Matthias Doepke and Ruben Gaetani

Explaining Trends in College Wage Premium

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  - Large rise in college wage premium since 1980s in the United States, but not in continental Europe.
  - What explains the difference?

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  - What explains the difference?
- Our conjecture:
  - Differences in labor market regulation are (in part) responsible.
  - Firing restrictions affect incentive to invest in relationship-specific capital.
  - Restrictions for firing older workers particularly relevant, which is where US-Europe differences are the largest.

Employment Protection and Change in College Wage Premium

OECD index of employment protection versus change in college premium, 1980–2006:

Overview of Mechanism

- Focus on workers' decisions on investment in skills and firms' decisions to create jobs that allow for accumulation of skills.
- Model features:
  - Jobs that may or may not allow for skill accumulation.
  - Workers decide on investment in skills.
  - Worker-firm matches subject to productivity shocks.
  - Skills of college-educated workers are transferable.
  - Skills of less-educated workers are job specific.

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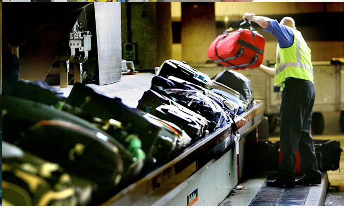
- Low turbulence:
  - Low probability of separation even without firing restrictions.
  - Many skilled jobs, most workers invest in skills regardless of regulation.
- High turbulence:
  - No firing restrictions (U.S.): Few skilled vacancies for less-educated workers; only educated workers invest in skills; high wage premium.
  - Firing restrictions (Europe): More skilled vacancies; most workers continue to invest; low wage premia.

United States



Germany

Germany

Related Literature

1. Vast literature on changes in inequality, skill-biased technical change, capital-skill complementarity . . . .
2. Some closely related work:
   - Skills of workers with less education: Alon (2017).
   - Acquisition of skills on the job and changes in inequality: Guvenen, Kuruscu, and Ozcan (2014).
   - Labor protection and investment in skills: Delacroix and Wasmer (2007).
   - Effect of turbulence on labor market: Ljunqvist and Sargent (1998), Kitao, Ljunqvist, and Sargent (2017).

Outline

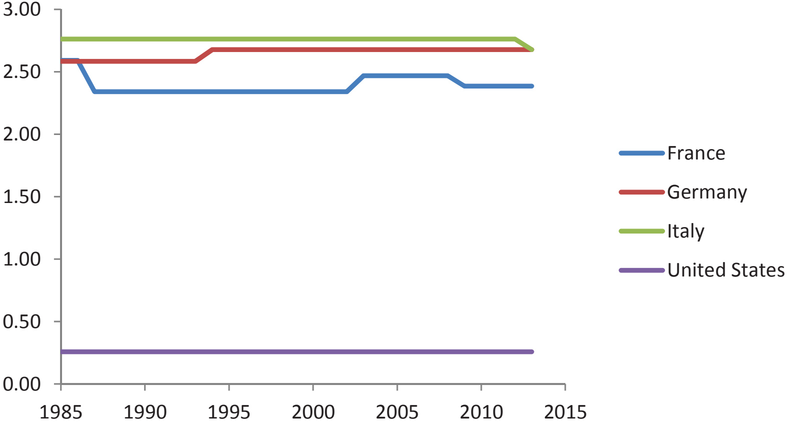
1. Facts on employment protection, college premium, and worker tenure, US versus Germany.
2. Model of investment in job-specific skills.
3. Effect of rise in turbulence on college premium.
4. Role of employment protection.

1. Facts

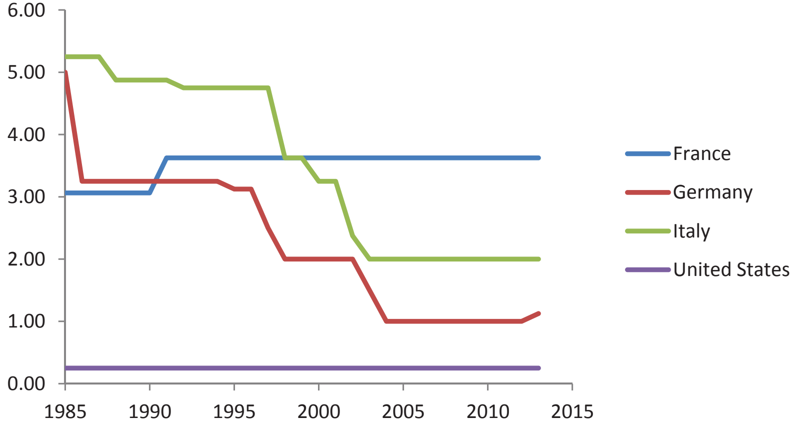
Labor Market Regulation

- European labor markets more regulated.
- In many cases, explicit or implicit age discrimination:
  - Distinction between regular and temporary contracts.
  - Features like “Sozialauswahl” in Germany for layoffs.
- Protection for older/experienced workers particularly relevant for mechanism.

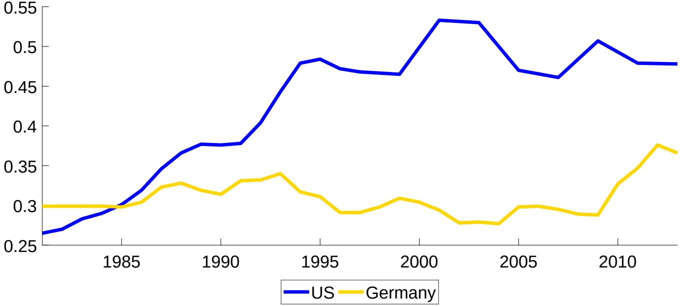
OECD Index of Employment Protection for Regular Employees



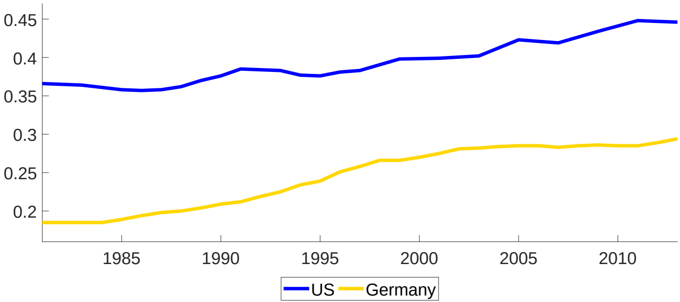
OECD Index of Employment Protection for Temporary Employees



College Premium, US versus Germany

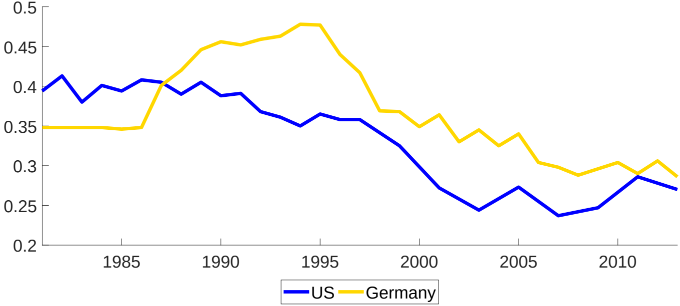


Share of College Graduates (25–64), US versus Germany



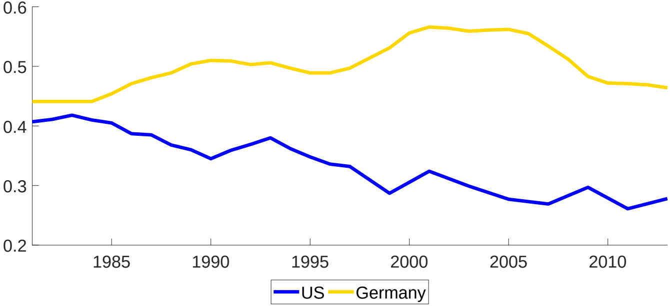
Worker Tenure, US versus Germany

Fraction of college-educated workers 45–55 with 20+ years of tenure (PSID/SOEP)



Worker Tenure, US versus Germany

Fraction of less-educated workers 45–55 with 20+ years of tenure (PSID/SOEP)



Education and Transferability of Skills

	Log of hourly wage, age 45-54 USA (PSID)			
	1981-1995		1996-2013	
Tenure >= 20, High-school	.235***		.236***	
	(.045)		(.033)	
Tenure >= 20, College		.129***		.156***
		(.061)		(.044)
Exper. 3rd degree pol.	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
# Obs.	1,875	1,278	2,561	1,961
R^2	0.10	0.04	0.06	0.05

Education and Transferability of Skills

	Log of hourly wage, age 45-54 Germany (SOEP)			
	1984-1995		1996-2013	
Tenure >= 20, High-school	.098***		.143***	
	(.021)		(.022)	
Tenure >= 20, College		-.035		-.075*
		(.051)		(.041)
Exper. 3rd degree pol.	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
# Obs.	4,008	1,066	3,817	1,247
R^2	0.11	0.13	0.10	0.07

2. Model

A Model of the Impact of Labor Market Turbulence on Skill Acquisition

- Life cycle model, ages 25 to 64.
- Two education types $s \in \{H, L\}$:
  - H acquire (mostly) general skills.
  - L acquire (mostly) job-specific skills.
- Two types of jobs:
  - All jobs for educated workers allow accumulation of skill.
  - For less-educated workers, only fraction v_A of jobs does.

Investment in Relationship-Specific Capital

- Young workers $s \in \{H, L\}$ draw initial productivity $h \in \{h_1, \dots, h_n\}$ from $F^s(h)$.
- If on job allows for skill accumulation, can exert costly effort e at cost to upgrade skill with probability $p(e)$.
- Potential for skill loss after separation.

Labor Market

- Separate labor markets by education; matching function in market $s \in \{H, L\}$ is $m^s(u^s, v^s)$.
- Vacancy posting cost k^s.
- In L market, firms also draw heterogeneous cost k_A for posting accumulation-type vacancy.
- Firm opens accumulation-type vacancy if:

$$k_A \leq E\left[J_A^L\right] - E\left[J_N^L\right].$$

- Wages determined via Nash bargaining with downward wage rigidity: wage cannot fall below fraction $\delta < 1$ of "prevailing wage" for worker with education s and skill h.

Labor Market in Calibrated Model

- Impose fixed job finding rate λ^s (implicitly, through choosing parameters of matching function).
- Uniform distribution for cost k_A, so that fraction of accumulation-type vacancies is given by:

$$v_A^L = \min\left\{\max\left\{\frac{E\left[J_A^L\right] - E\left[J_N^L\right]}{(c_1 - c_0)E\left[J_N^L\right]} - \frac{c_0}{c_1 - c_0}, 0\right\}, 1\right\}.$$

Turbulence and Skill Loss

- Match output in regular times:

$$y^s(h, x) = a^s(x)\ h.$$

- With probability γ^s, turbulence shock reduces productivity by factor $\epsilon \sim \text{Uniform}\,(0, \bar{\epsilon})$.
- Productivity returns to normal with probability ϵ.
- Separation if continuation value of firm is lower than firing cost f^s.
- Skill loss upon separation: For $j < i$, transition probability $Q^s(i, j)$ defined by:

$$Q^s(i, j) = \sigma^s Q^s(i, j + 1), \quad \sum_{j=1}^{i} Q^s(i, j) = 1.$$

- Set $\sigma^H < \sigma^L$: skill loss more severe for less-educated workers.

Bellman Equations for Employed Workers

$$V_N^s(x,h) = w_N^s(x,h) + \beta\left[(1-\gamma^s)V_N^s(x+1,h) + \gamma^s E\left(\tilde{V}_N^s(x+1,h',\epsilon)\right)\right]$$

$$\begin{aligned} V_A^s(x,h) = \max_e \Big\{ & w_A^s(x,h) - a^s(x)he^2 \\ & + \beta\left[(1-\gamma^s)E\left(V_A^s(x+1,h')\right) + \gamma^s E\left(\tilde{V}_A^s(x+1,h',\epsilon)\right)\right] \Big\} \end{aligned}$$

Bellman Equation for Firm Experiencing Turbulence

$$\tilde{J}_p^s(x,h,\epsilon) = \max\Big\{a^s(x)h\epsilon - \delta w_p^s(x,h) + \beta\Big[\gamma^s E\left(\tilde{J}_p^s(x+1,h,\epsilon')\right) + (1-\gamma^s)(1-\pi^s)\tilde{J}_p^s(x+1,h,\epsilon) + (1-\gamma^s)\pi^s J_p^s(x+1,h)\Big], -f^s\Big\}$$

Bellman Equation for Unemployed Worker

$$U^s(x,h) = a^s(x)h\bar{b}$$
$$+\beta\Big\{\lambda^s\left[v^s_A V^s_A(x+1,h) + (1-v^s_A)V^s_N(x+1,h)\right] + (1-\lambda^s)U^s(x+1,h)\Big\}$$

3. Quantitative Evaluation

Calibration Exercise for the United States

- Parameterize model to match college premium, tenure premium, and share of high-tenure workers in 1980.
- Choose change in overall skill bias and turbulence shock to match college premium, tenure premium, and share of high-tenure workers in 2010.
- Examine role of investment in relationship-specific capital for the impact of these change on college wage premium in 2010.

Preset Parameters

	Parameter	Value	Target
Discount rate	β	0.95	Yearly $r = 5.25\%$
Job finding rate	λ	0.8	Av. unempl. spell 3 mo.
Bargaining weight	α	0.5	Gertler and Trigari (2009)
Non-market prod.	b	0.2	.5 $\times$ 40% replacement rate
Wage rigidity	δ	0.8	20% wage cut

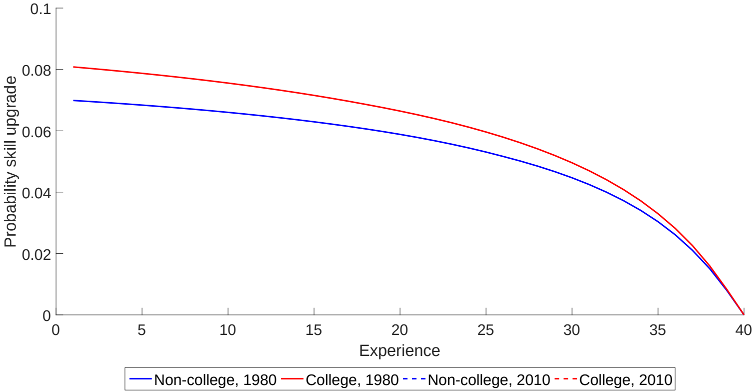
1980 US Calibration

	Param.	Value	Moment	Data	Model
L skill specificity	σ^L	0.44	L Tenure premium	0.27	0.27
H skill specificity	σ^H	0.15	H Tenure premium	0.11	0.11
Prob. skill upgrade	$\bar{e}$	0.34	H Exp. premium	0.36	0.36
Skill-biased tech.	A^H_{80}	1.12	1980 College premium	0.28	0.28
L turbulence	γ^L_{80}	0.095	L long tenure	0.36	0.36
H turbulence	γ^H_{80}	0.079	H long tenure	0.40	0.40
Pareto initial skills	η	1.67	SD log-wage age 25	0.30	0.30
Productivity loss	$\bar{\epsilon}$	0.6	Var. of match prod.	0.05	0.05

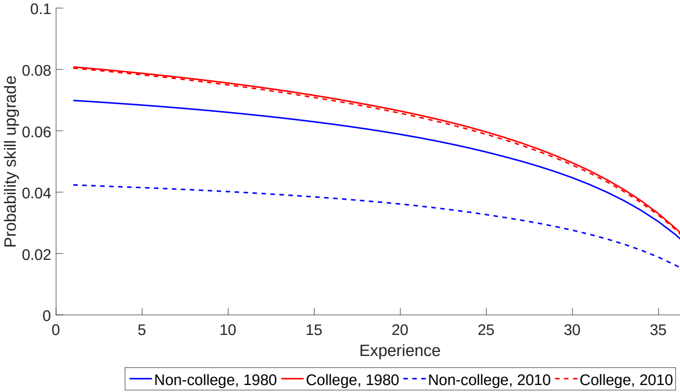
2010 US Calibration

	Parameter	Value	Moment	Data	Model
L turbulence	γ_{10}^{L}	0.128	*L* long tenure, 2010	0.23	0.23
H turbulence	γ_{10}^{H}	0.115	*H* long tenure, 2010	0.25	0.25
Fraction of *A* jobs	$v_{A,10}^{L}$	0.63	*L* Exp. premium	-0.02	-0.02
SBTC	A_{10}^{H}	1.24	2010 College premium	0.48	0.48
Return to exp.	g_{10}	0.005	*H* Exp. premium	0.08	0.08

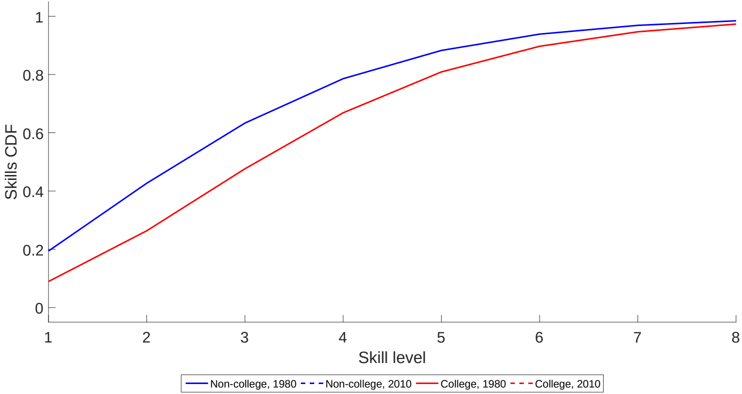
Investment in Skill Upgrading



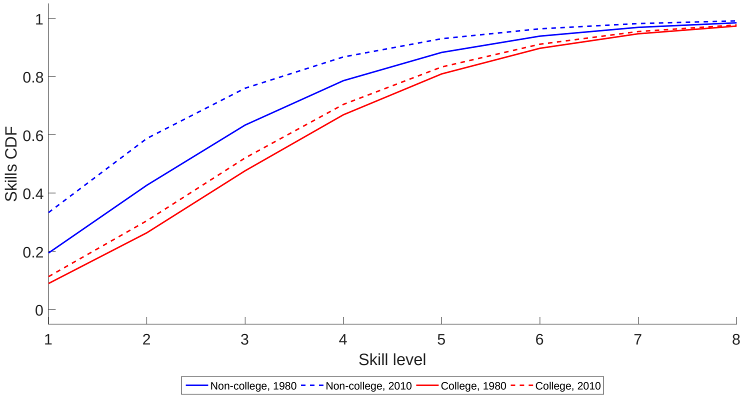
Investment in Skill Upgrading: Impact of Turbulence



Skill Distribution



Skill Distribution: Impact of Turbulence



Impact of Turbulence on College Premium

Setting	College Premium
1980 data/model	0.287
2010 data/model with turbulence, SBTC	0.485
2010 model with turbulence	0.378
2010 model with turbulence (fixed job composition)	0.293

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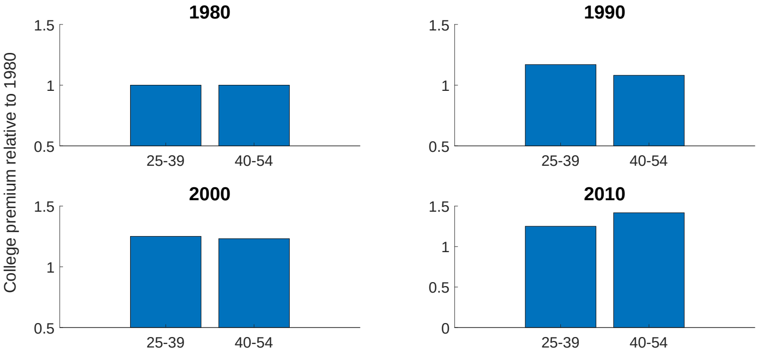
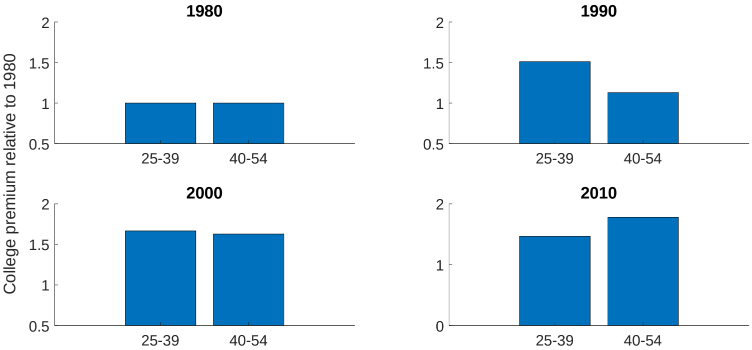
→ Turbulence accounts for 46 percent of rise in college premium.

→ Primarily because fewer jobs allow for skill accumulation.

Cohort Effects in the Model



Cohort Effects in the Data

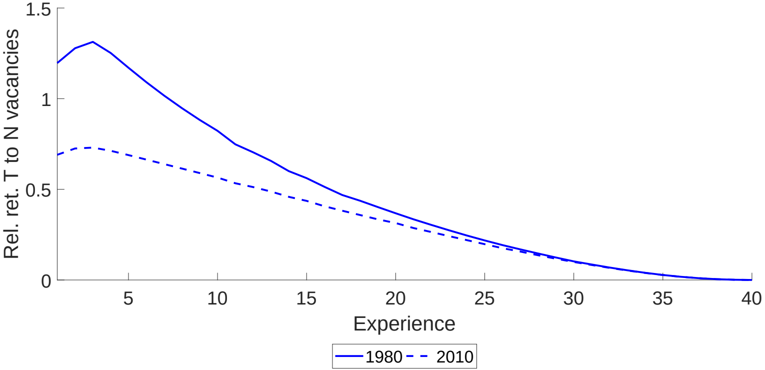


4. Role of Employment Protection

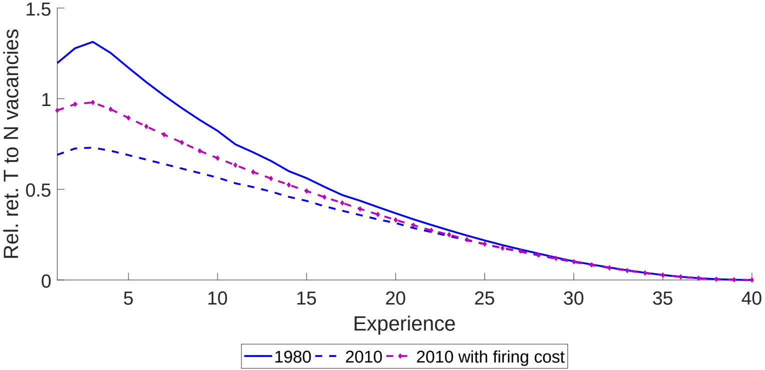
Effect of Turbulence with Employment Protection

- Introduce a firing cost.
- Calibrated to match long term tenure in Germany with same turbulence shock as in the US.
- Result: Increase in college premium 40% smaller.

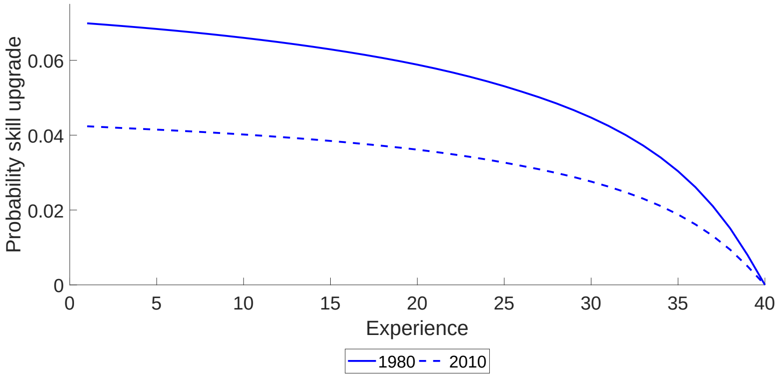
Relative Return to Accumulation Vacancy



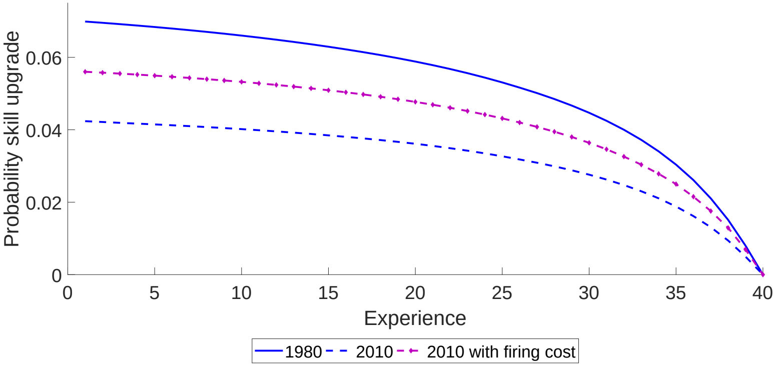
Relative Return to Accumulation Vacancy with Firing Cost



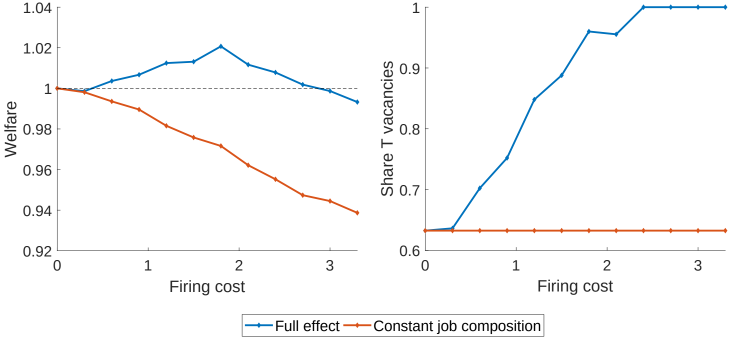
Investment in Skill Upgrading



Investment in Skill Upgrading with Firing Cost



Welfare as a Function of Firing Cost



Conclusion

- Employment protection matters for investment in relationship-specific capital.
- Without protection, rise in turbulence erodes supply of skill-intensive jobs and raises education premium.
- Helps explain cross-country differences in inequality trends.