

Faculty Unions and Academic Labor Markets

Evidence from U.S. Higher Education

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The academic labor market is restructuring

Fact 1: Contingent faculty have surged

Share of instruction by non-tenure-track faculty:

- ~20% in 1970
- ~70% today [AAUP]

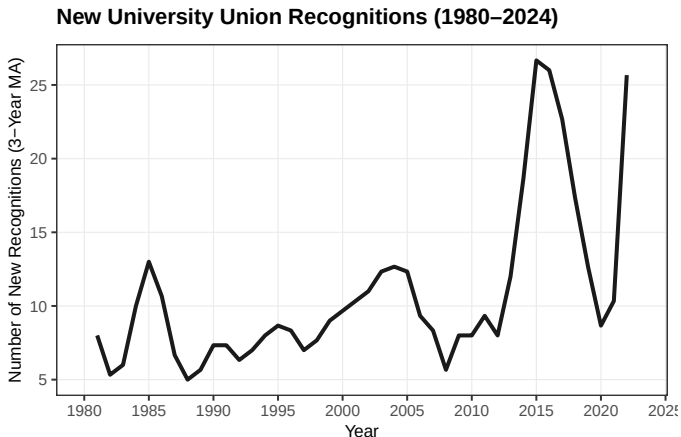
Fact 2: Faculty unions are growing

New organizing activity has accelerated since 2012, including at 4-year and research institutions.

Does unionization reshape the academic workforce?

And what does that mean for who produces research?

Academic unionization has grown sharply since 2010



All academic bargaining unit types shown. This paper focuses on faculty (TT/NTT) bargaining units specifically.

Collective bargaining reshapes academic labor—and that matters for science

Research question

How does collective bargaining reshape the academic labor market—wages, employment, and the composition of faculty?

Why this matters beyond worker welfare:

- Universities produce science. Tenure-track researchers do research; contingent instructors largely do not.
- If unionization shifts composition away from TT toward contingent, downstream effects on knowledge production are a first-order concern.

What we do

Today: Institution-level panel (IPEDS, 1984–2023)

- Staggered difference-in-differences exploiting variation in faculty union recognition timing
- Outcomes: average faculty salary and employment composition by rank

Full paper: Individual-level analysis (NCSES SDR/SED)

- Restricted-use microdata on U.S.-trained scientists and engineers
- Identifies individual wage, productivity, and career trajectory effects

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Prior literature

1. Faculty unionization: wages and research productivity

- U.S. cross-sections: small/negative salary effects (Rees 1993; Hedrick et al. 2011); negative research output (Meador and Walters 1994)
- Canada: small positive wages (Hosios and Siow 2004; Baker et al. 2024)
- **Gap:** no modern U.S. causal evidence on wages, employment composition, or research productivity

2. Contingent faculty: trends and consequences

- Zhang et al. (2015): documents the TT → contingent shift
- Ehrenberg and Zhang (2005), Xiaotao Ran and Xu (2019), Bettinger and Long (2010): consequences for student outcomes
- **We contribute:** consequences for research

3. Academic labor market institutions and research productivity

- Governance (Aghion et al. 2010), incentive design (Azoulay et al. 2011), tenure-track systems (Huang et al. 2026) shape research output
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What we find

1. Small and negative aggregate effects on salary and employment

- Consistent with prior work
- But the aggregate conceals rank-level heterogeneity

2. Tenure-track salaries and employment fall; contingent ranks are unaffected

- Largest effects: Professors under TT unions; Assistant Professors under both union types
- Instructor and Lecturer outcomes flat throughout

3. Treated institutions become more likely to employ contingent ranks

- Headcounts of contingent faculty do not rise above control institutions
- Suggests TT contraction — not NTT expansion — as the primary margin of adjustment

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Faculty Unions: Legal Landscape in the U.S.

Public institutions: governed by state law

About half of states have public-sector bargaining statutes covering higher education. In the rest, public faculty cannot organize regardless of preferences. This creates hard cross-state variation that is not a university choice.

Private institutions: governed by federal NLRA, subject to *Yeshiva* (1980)

Tenure-track faculty who exercise significant academic governance may be classified as managerial employees and excluded from NLRA coverage. This constrained private TT organizing even where faculty want a union.

Right-to-work laws: affect union security once formed

26 states have RTW laws limiting mandatory dues/fees, reducing the financial strength of unions that do form.

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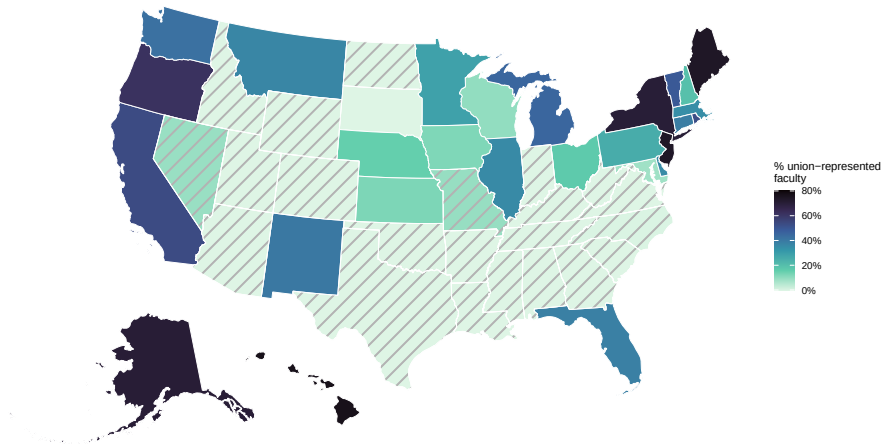
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Union representation is concentrated where it is legal



Source: 2024 Directory of Bargaining Agents, Figure 2. Hatched: states without a public-sector bargaining statute.

Data

Source	Variable	Coverage
Directory of Bargaining Agents (2024)	Recognition year	
IPEDS Instructional Staff Salary	Log avg. real salary by rank	1984–2023
IPEDS Instructional Staff Salary	Faculty headcount by rank	1984–2023

Sample

4,793 institutions; 101,761
institution-years.
Private for-profit excluded.

Treatment groups

- In-window: 229 institutions
- Always-treated (<1984): 512
- Never-treated: 4,052

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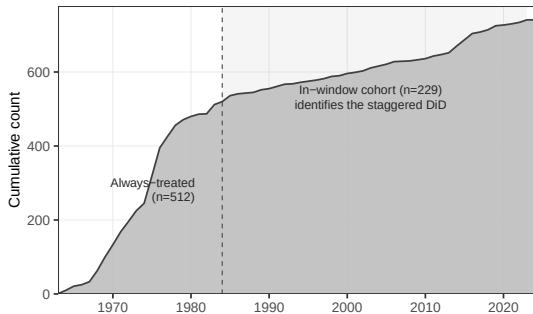
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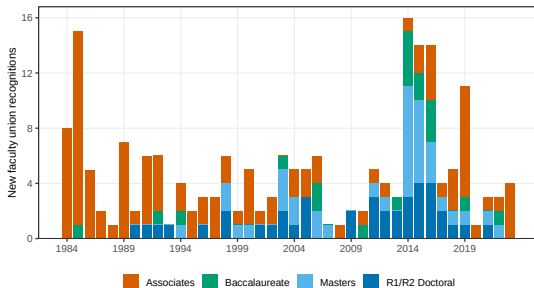
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Variation in timing of union recognition

Stock of unionized institutions



New union recognitions



Faculty bargaining units (TT/NTT) only. Carnegie classification assigned from most recent IPEDS HD record per institution. Sample restricted to IPEDS salary analysis window (1984–2023).

Early wave (pre-1984): Associates-dominated. Post-2005: R1/R2 Doctoral uptick.

Who unionizes?

Characteristic	Treated in-window	Never-treated
Institutions	229	4,052
Public	0.659	0.365
Private NFP	0.341	0.635
<i>Degree level</i>		
4-year	0.655	0.702
2-year	0.345	0.260
<i>Carnegie classification</i>		
R1/R2 Doctoral	0.175	0.044
Masters	0.162	0.116
Baccalaureate	0.083	0.136
Associates	0.445	0.190
Specialized/Other	0.096	0.157
Median enrollment size	2	2

INSTSIZE: 1 = <1,000; 2 = 1,000–4,999; 3 = 5,000–9,999; 4 = 10,000–19,999; 5 = $\geq$ 20,000 students.

Matching

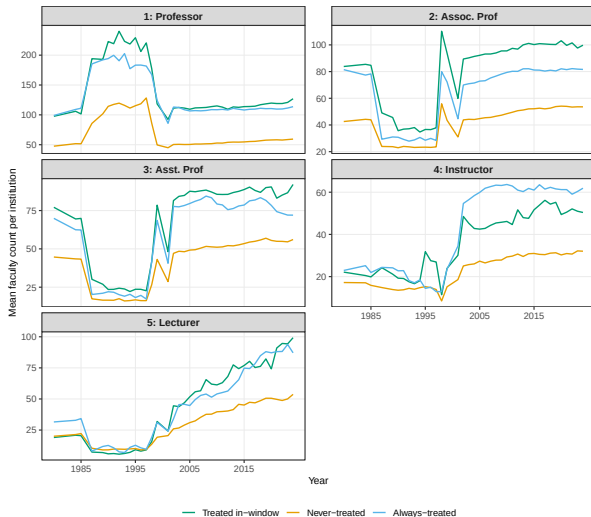
Problem: never-treated pool is 63% private NFP; treated group is 66% public. These groups are very different from each other.

Solution: exact matching on sector $\times$ degree level $\times$ Carnegie class $\times$ enrollment size; matched controls reweighted and weights passed to CS estimator

229 treated institutions matched to 2,467 never-treated; 1,585 structurally dissimilar institutions dropped. Effective control size after reweighting: 1,222.

► Balance plot

Limitation: IPEDS data quality



IPEDS reporting is irregular
1986–2001 across *all* treatment
groups.

Preferred spec: drop 1986–2001 data.

Empirical Strategy: DiD

Setup

- Treatment: first faculty union recognition year (absorbing indicator)
- Estimator: Callaway & Sant'Anna (2021)—clean group-time ATTs, no contaminated comparisons
- Event window: ± 10 years around recognition
- Control: never-treated (main); drop always treated

$$\hat{\tau} = \sum_g \sum_t w_{gt} \cdot \widehat{\text{ATT}}(g, t)$$

Summary Statistics

Mean pre-recognition salary (2019 \$) per institution

	Treated	Unmatched control	Matched control
All	74,960 (16,022)	63,265 (21,273)	70,748 (19,890)
Professor	86,637 (23,679)	72,978 (28,978)	84,010 (31,347)
Assoc. Professor	85,690 (22,810)	71,991 (23,952)	79,507 (23,266)
Asst. Professor	72,366 (16,765)	62,705 (18,041)	68,453 (18,091)
Instructor	58,813 (11,254)	53,494 (16,100)	59,018 (15,941)
Lecturer	58,191 (14,228)	52,999 (17,424)	57,825 (17,278)

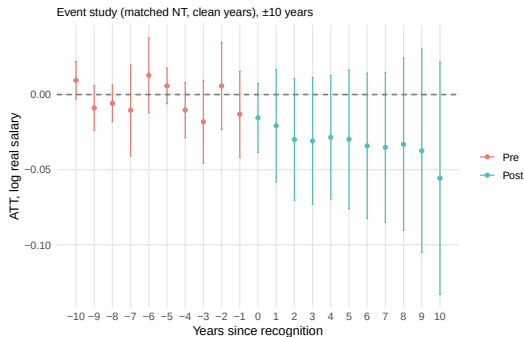
Effect of faculty unionization on wages and headcounts

	Unmatched	Matched
<i>Panel A: Log salary</i>		
ATT	-3.6%* (2.1%)	-3.5%* (2.1%)
<i>Panel B: Log faculty count</i>		
ATT	-7.8% (9.6%)	-24.1%** (10.4%)
<i>N</i> (inst.-years)	69,131	51,262

► All specs

Effect of faculty unionization on wages and headcounts

Salary



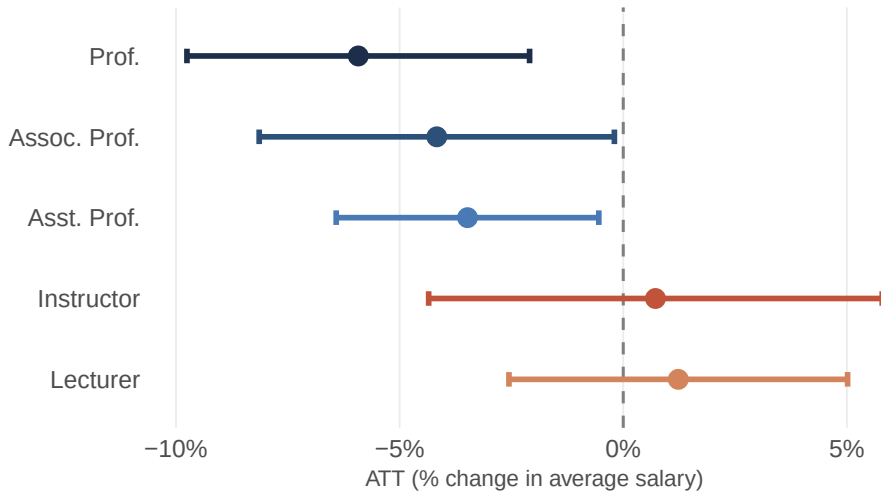
Faculty count



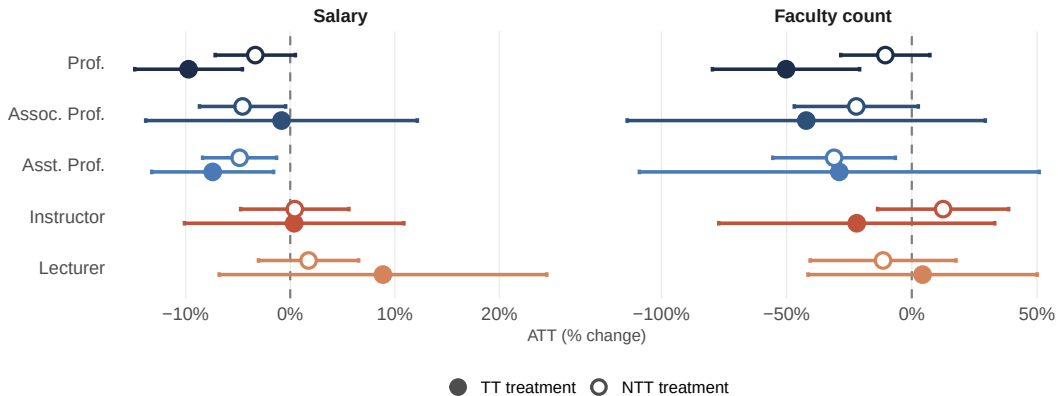
► Salary by rank

► Count by rank

Tenure-track faculty drive aggregate results



Effect of TT vs NTT unions

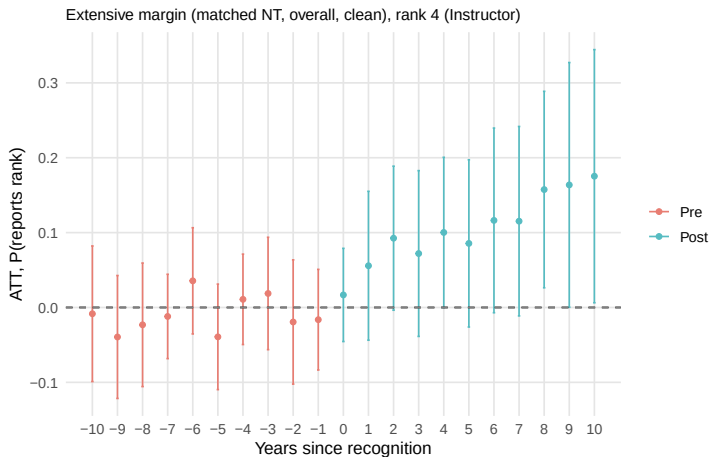


▸ Salary table

▸ Count table

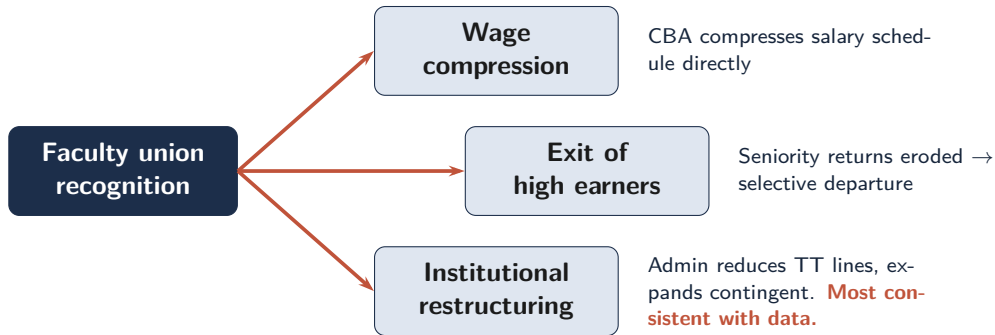
▸ Prof. event studies

Institutions expand contingent hiring after recognition



CS ATT: $P(\text{institution employs Instructor})$. Aggregate ATT = +18.1 pp*** (SE 3.7 pp)

Possible Mechanisms



SDR/SED restricted microdata will distinguish the channels

SDR (Survey of Doctorate Recipients)

Individual-level panel of scientists:

- Do individual wages fall post-union?
- Do high-earners selectively exit academia?
- Does publication or grant output change?

SED (Survey of Earned Doctorates)

Near-census of all U.S. doctoral graduates, every year:

- Does unionization affect the composition of who enters doctoral programs?

IV strategy (planned)

RTW $\times$ PELRA instruments address selection into recognition timing.

Today's result motivate future results

Institution-level DiD establishes the labor market facts. SDR/SED will determine which channel dominates and whether research output is affected.

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Takeaways from today

1. **Aggregate nulls in prior work likely reflect compositional cancellation.**
Rank-level heterogeneity is large enough that institution-level averages obscure it entirely — motivating the individual-level analysis to come.
2. **Unions compress the tenure-track, not the contingent workforce.** Both TT and NTT unions reduce junior TT salaries and employment; TT unions additionally hit senior ranks. Consistent with institutions limiting exposure to the unionized workforce by reducing TT lines.
3. **Adjunctification at treated institutions operates through TT exit, not NTT expansion.** The sector-wide shift toward contingent faculty continues in treated and control institutions alike; unionization accelerates the TT contraction specifically.

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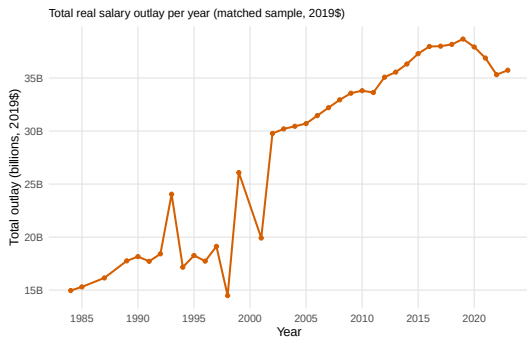
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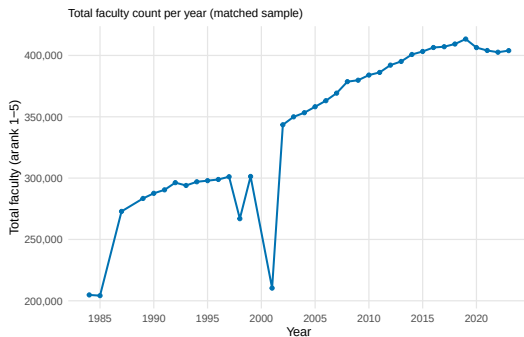
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Overall salary and faculty count (matched sample)

Salary outlay

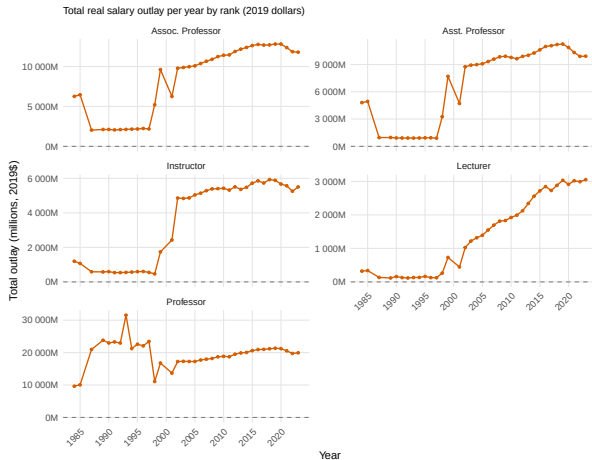


Faculty count

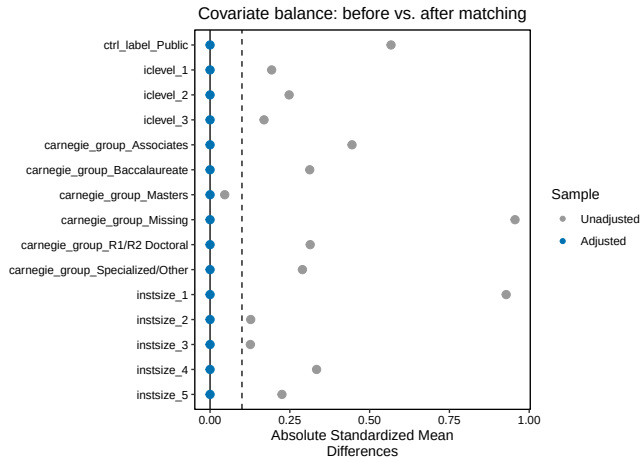


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Total salary outlay by rank



Covariate balance after exact matching



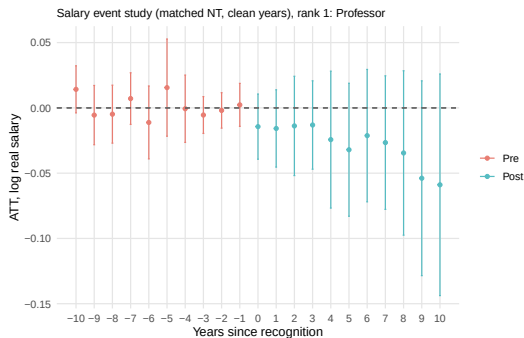
Robustness: four specifications

	Never-treated (full sample)		Matched NT	
	Full sample	Clean years	Full sample	Clean years
<i>Panel A: Log average real salary (2019\$)</i>				
ATT	-0.020 (0.033)	-0.036* (0.021)	-0.039 (0.037)	-0.035* (0.019)
<i>Panel B: Log faculty count</i>				
ATT	-0.007 (0.078)	-0.078 (0.096)	-0.091 (0.074)	-0.241** (0.098)
<i>N</i> (inst.-years)	101,761	69,131	74,984	51,262

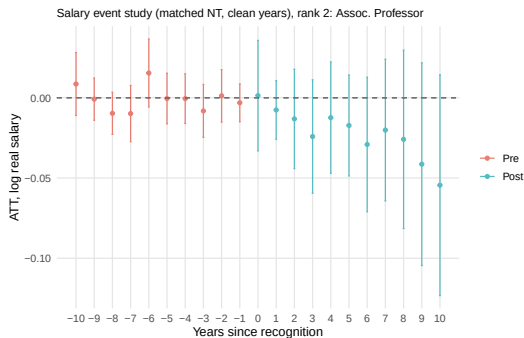
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Salary event studies by rank — Professors and Associate Professors

Professor



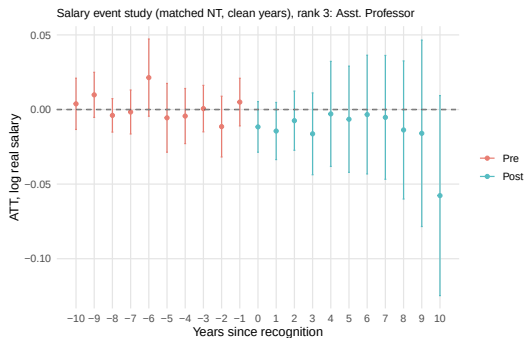
Associate Professor



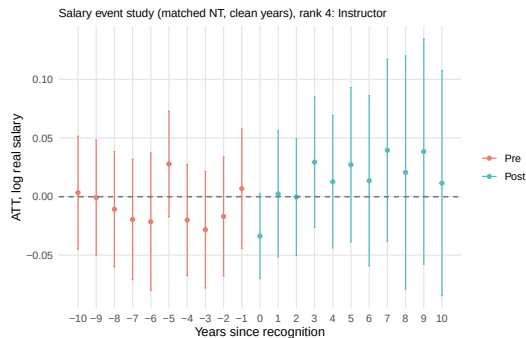
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Salary event studies by rank — Assistant Professor and Instructor

Assistant Professor



Instructor

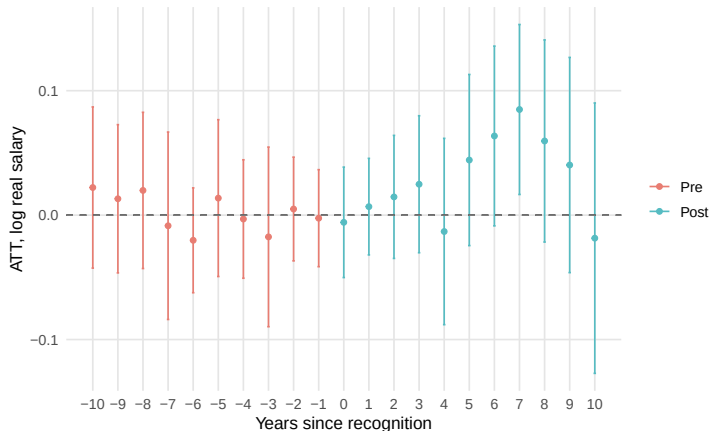


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Salary event studies by rank — Lecturer

Lecturer

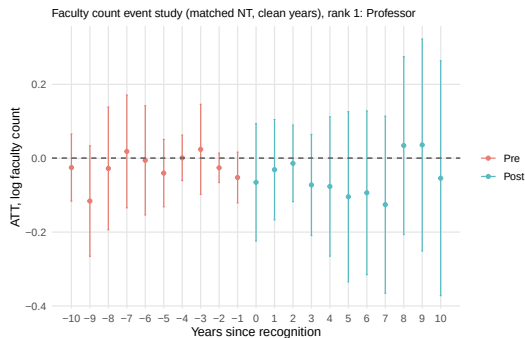
Salary event study (matched NT, clean years), rank 5: Lecturer



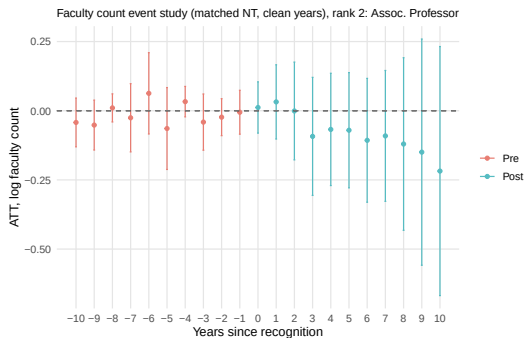
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Count event studies by rank — Professors and Associate Professors

Professor



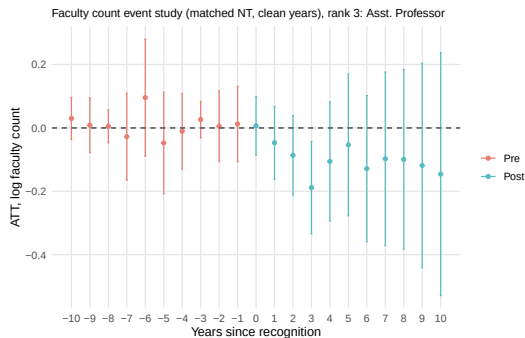
Associate Professor



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Count event studies by rank — Assistant Professor and Instructor

Assistant Professor



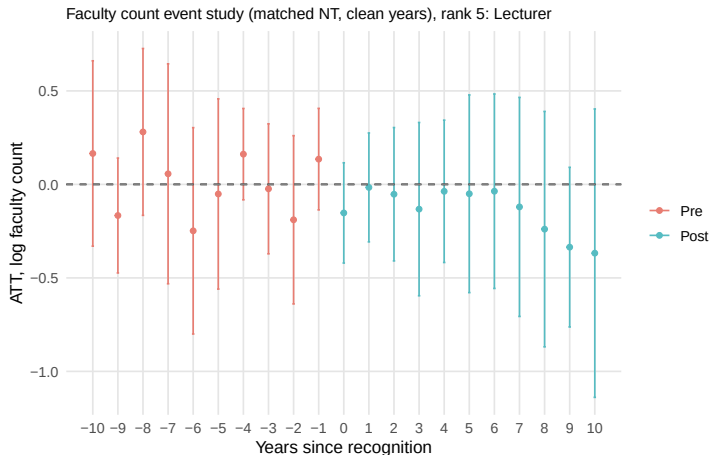
Instructor



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Count event studies by rank — Lecturer

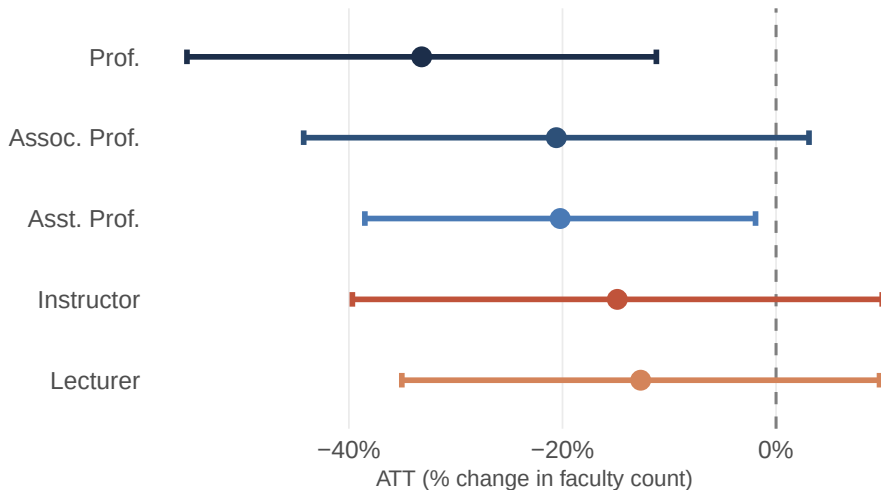
Lecturer

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Salary ATT by rank — full specification table

	Never-treated (full sample)		Matched NT	
	Full sample	Clean years	Full sample	Clean years
<i>Log average real salary (2019\$)</i>				
Professor	-0.041*** (0.016)	-0.051*** (0.020)	-0.052*** (0.016)	-0.059*** (0.020)
<i>N</i>	83,103	55,379	62,769	42,876
Assoc. Professor	-0.067*** (0.026)	-0.046** (0.019)	-0.052** (0.023)	-0.042** (0.020)
<i>N</i>	66,087	53,865	51,340	41,902
Asst. Professor	-0.076*** (0.018)	-0.035** (0.015)	-0.072*** (0.019)	-0.035** (0.015)
<i>N</i>	64,644	53,544	50,320	41,642
Instructor	-0.040 (0.028)	0.014 (0.025)	-0.041* (0.025)	0.007 (0.026)
<i>N</i>	62,054	53,348	46,609	39,860
Lecturer	0.012 (0.017)	0.014 (0.019)	0.013 (0.018)	0.012 (0.019)
<i>N</i>	19,511	16,252	14,749	12,231

Faculty count ATT by rank — combined treatment, matched, clean years



Faculty count ATT by rank — full specification table

	Never-treated (full sample)		Matched NT	
	Full sample	Clean years	Full sample	Clean years
<i>Log faculty count</i>				
Professor	-0.225*** (0.087)	-0.260** (0.107)	-0.253*** (0.089)	-0.332*** (0.112)
<i>N</i>	83,103	55,379	62,769	42,876
Assoc. Professor	-0.083 (0.122)	-0.159 (0.117)	-0.136 (0.122)	-0.206* (0.121)
<i>N</i>	66,087	53,865	51,340	41,902
Asst. Professor	-0.430*** (0.107)	-0.181* (0.096)	-0.463*** (0.114)	-0.202** (0.093)
<i>N</i>	64,644	53,544	50,320	41,642
Instructor	-0.043 (0.113)	0.022 (0.130)	-0.167 (0.118)	-0.149 (0.127)
<i>N</i>	62,054	53,348	46,609	39,860
Lecturer	0.282* (0.160)	-0.096 (0.112)	0.194 (0.135)	-0.127 (0.114)
<i>N</i>	19,511	16,252	14,749	12,231

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Salary ATT by rank: TT vs. NTT union treatment

	Unmatched (NT control)		Matched NT control	
	TT treatment	NTT treatment	TT treatment	NTT treatment
<i>Log average real salary (2019\$)</i>				
Professor	-0.074*** (0.028)	-0.016 (0.019)	-0.097*** (0.026)	-0.033* (0.020)
<i>N</i>	69,772	70,988	61,025	61,139
Assoc. Professor	-0.006 (0.063)	-0.039* (0.021)	-0.008 (0.066)	-0.046** (0.021)
<i>N</i>	55,846	56,732	49,731	49,812
Asst. Professor	-0.049** (0.025)	-0.042*** (0.016)	-0.074*** (0.030)	-0.048*** (0.018)
<i>N</i>	54,620	55,528	48,711	48,778
Instructor	0.014 (0.058)	0.016 (0.021)	0.004 (0.054)	0.004 (0.026)
<i>N</i>	51,978	52,722	45,146	45,252
Lecturer	0.099 (0.085)	0.018 (0.024)	0.089 (0.080)	0.018 (0.024)
<i>N</i>	16,085	16,150	14,210	13,958

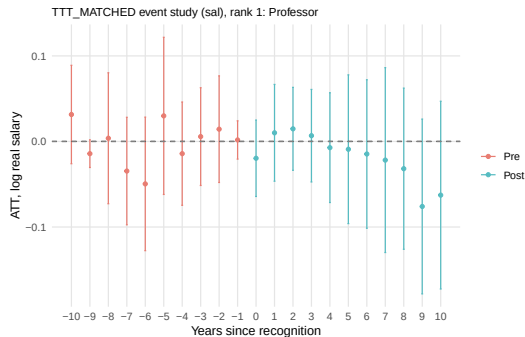
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Count ATT by rank: TT vs. NTT union treatment

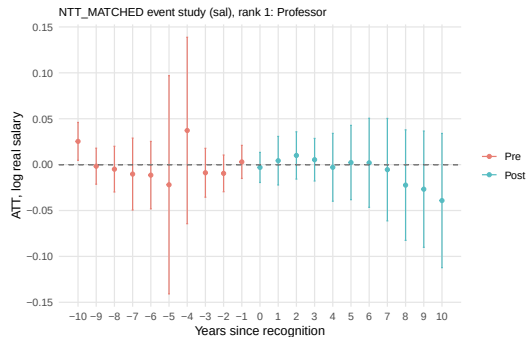
	Unmatched (NT control)		Matched NT control	
	TT treatment	NTT treatment	TT treatment	NTT treatment
<i>Log faculty count</i>				
Professor	-0.557*** (0.138)	-0.079 (0.083)	-0.502*** (0.150)	-0.106 (0.091)
<i>N</i>	69,772	70,988	61,025	61,139
Assoc. Professor	-0.327 (0.327)	-0.136 (0.108)	-0.422 (0.365)	-0.222* (0.126)
<i>N</i>	55,846	56,732	49,731	49,812
Asst. Professor	-0.324 (0.305)	-0.298*** (0.099)	-0.290 (0.407)	-0.310** (0.125)
<i>N</i>	54,620	55,528	48,711	48,778
Instructor	-0.167 (0.267)	0.172 (0.120)	-0.220 (0.281)	0.125 (0.134)
<i>N</i>	51,978	52,722	45,146	45,252
Lecturer	0.094 (0.235)	-0.114 (0.140)	0.043 (0.233)	-0.115 (0.149)
<i>N</i>	16,085	16,150	14,210	13,958

Professor salary: TT unions vs. NTT unions

TT union



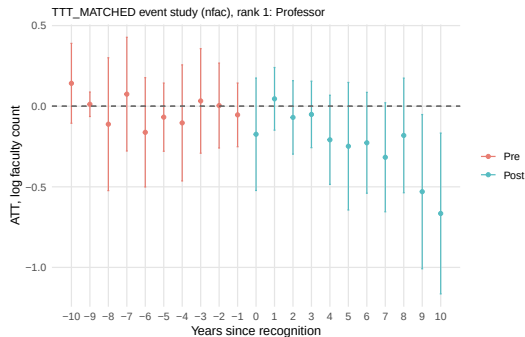
NTT union



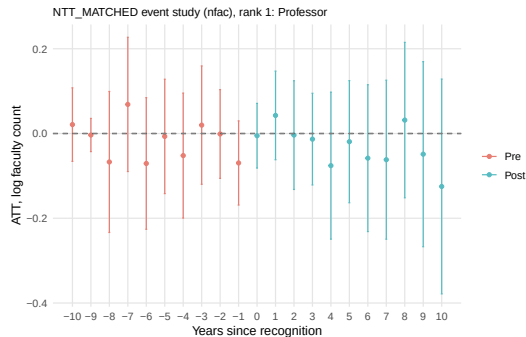
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Professor count: TT unions vs. NTT unions

TT union



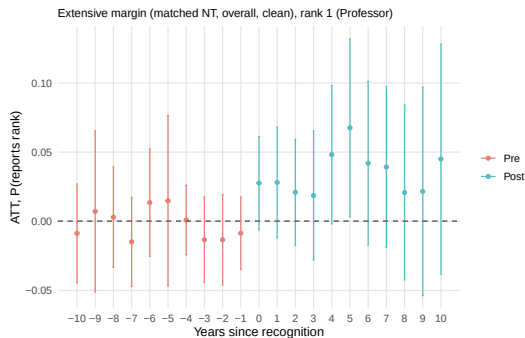
NTT union



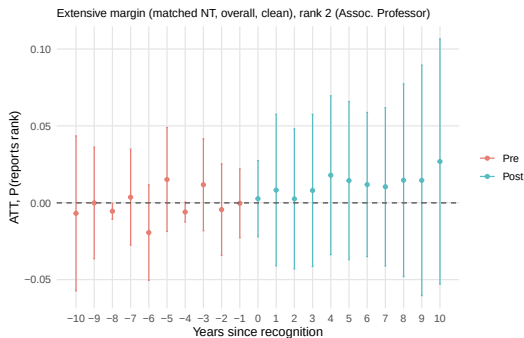
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Extensive margin by rank — Professors and Associate Professors

Professor

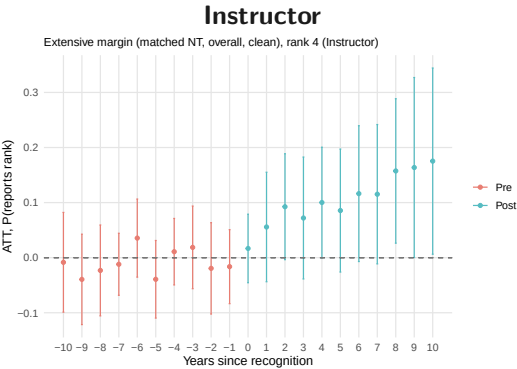
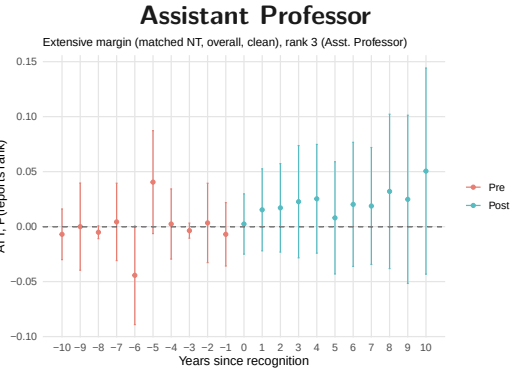


Associate Professor



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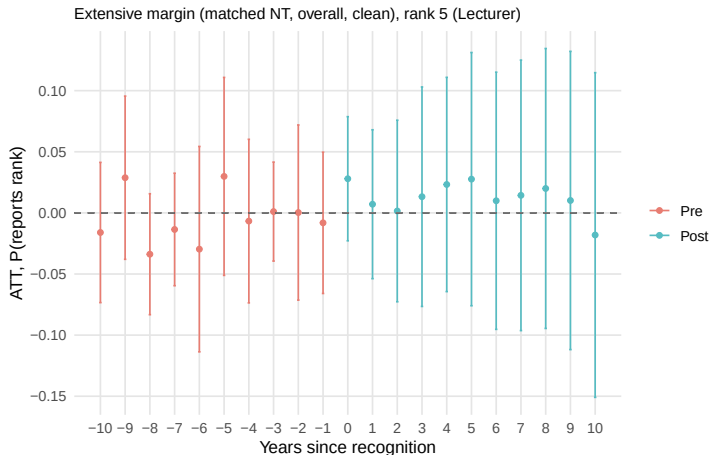
Extensive margin by rank — Assistant Professor and Instructor



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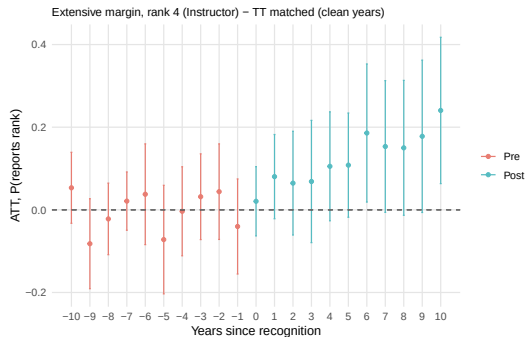
Extensive margin by rank — Lecturer

Lecturer

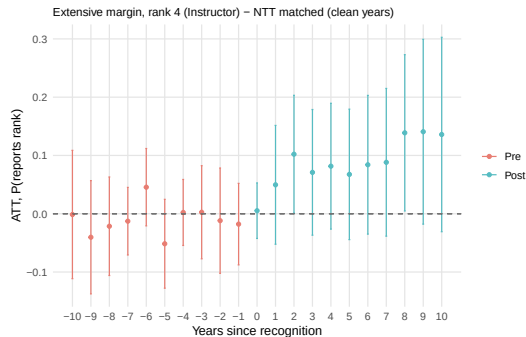


Instructor extensive margin: TT unions vs. NTT unions

TT union



NTT union



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Summary Statistics: faculty counts

Mean pre-recognition faculty count per institution

	Treated	Unmatched control	Matched control
All	235 (323)	93 (197)	224 (329)
Professor	154 (213)	48 (94)	111 (165)
Assoc. Professor	67 (71)	34 (60)	67 (89)
Asst. Professor	57 (58)	37 (61)	66 (85)
Instructor	25 (30)	23 (48)	48 (79)
Lecturer	26 (36)	19 (43)	36 (61)