Do Non-Compete Agreements Help or Hurt Workers? Evidence from the NLSY97

Bhargav Gopal, Xiangru Li, Luke Rawling

Queen's University

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Motivation

- The impact of non-compete agreements (NCs) on labor markets remains contentious.

- Proponents argue that NCs increase worker retention while helping firms and workers share returns to industry-specific investment.

- Critics argue that NCs create mobility frictions, reducing workers' bargaining power and preventing them from transitioning to firms where they would be more productive.

This Paper

- Provides a contract-choice model and panel evidence showing how NCs can help workers.

- NCs compress the external wage profile and change the mix of labor-market frictions – reducing inefficient quits but increasing inefficient retention – while helping firms and workers share returns to industry-specific investment.

- It predicts greater use of NCs when skills are transferable to industry competitors, and for NC signers, higher wages, job tenures, and firm provided investment.
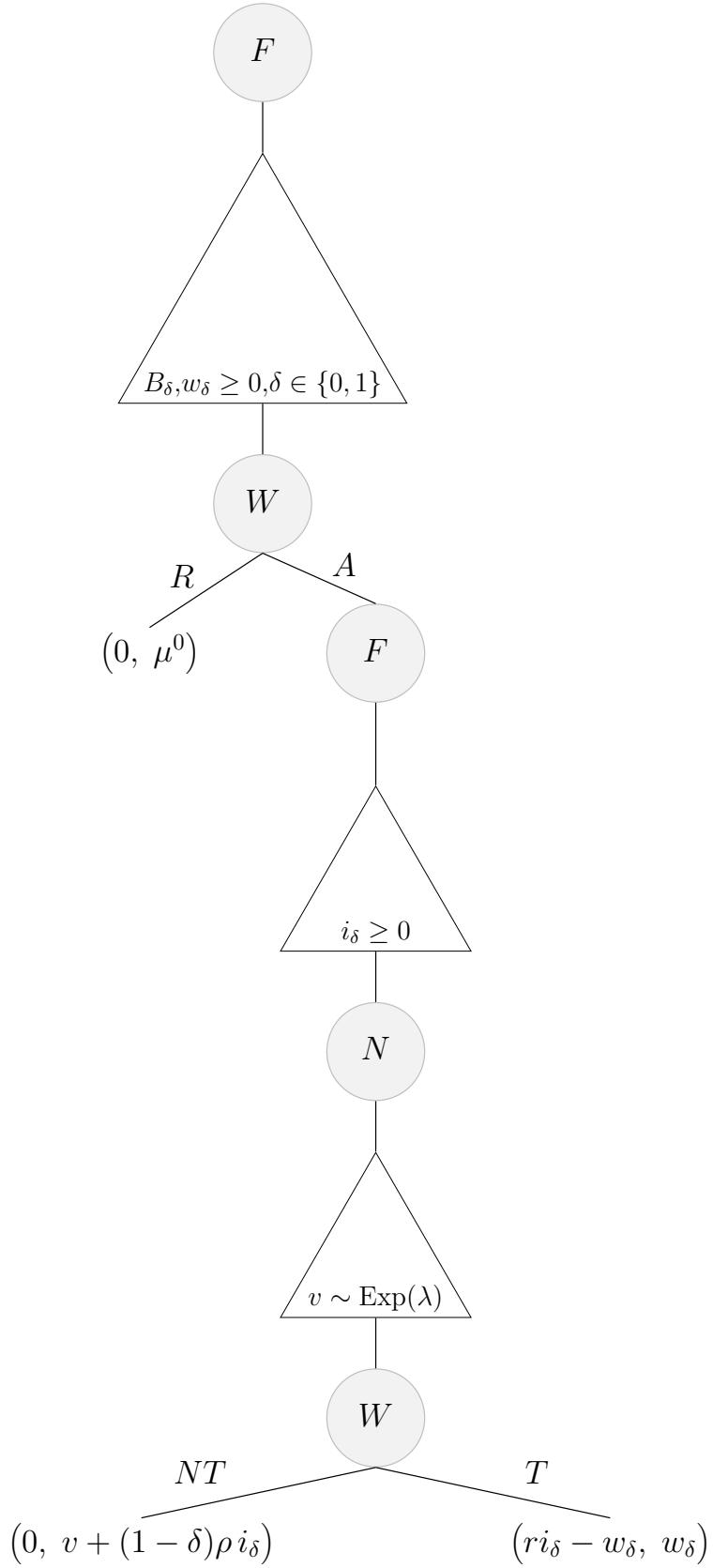
This Paper

- Empirically, use novel data on NCs from the NLSY97 to show that NC usage is more prevalent among higher skilled workers who perform more sophisticated tasks and have higher returns on experience.

- Use a stacked difference-in-difference event study to compare NC signers who start new jobs to comparable job starters who never sign NCs, with detailed controls.

- Find that signing a noncompete agreement is associated with an immediate wage jump of about 10% that settles to roughly 5% after six years, longer tenure (6% on average), and fewer job-to-job moves (3.6 percentage points lower), with no detectable increase in formal, employer-paid training.

Contributions

- Theoretical: Develop a **contract-choice** model to show that NCs encourage **industry-specific investments** but generate **ex-post allocative inefficiencies**.
  - NCs, Labor Mobility, and Hold-Up: Shi (2023), Meccheri (2009), Posner, G. G. Triantis, and A. J. Triantis (2004), Gottfries and Jarosch (2023), Shy and Stenbacka (2023), Franco and Mitchell (2008), Guimaraes, Pessoa, and Ponczek (2025), and Potter, Hobijn, and Kurmann (2024)
  - Contracts, General Investments, Allocative Efficiency: Becker (1962), Acemoglu and Pischke (1999), MacLeod and Malcomson (1993), Hashimoto (1981), Pakes and Nitzan (1983), and Grossman and Hart (1986)

- Empirical: Use **panel data** to assess the causal effects of **signing an NC for different types of workers**.
  - Effects of NC Enforcement: Johnson, Lavetti, and Lipsitz (2025), Jeffers (2023), E. Starr (2019), Lipsitz and E. Starr (2022), Young (2021), Marx, Strumsky, and Fleming (2009), and Garmaise (2011)
  - NCs in Cross-Sectional Data: Rothstein and E. Starr (2022), E. P. Starr, Prescott, and Bishara (2021), and Balasubramanian, E. Starr, and Yamaguchi (2024)
  - Effects of NCs in Narrowly Defined Labor Markets: Shi (2023), Lavetti, Simon, and White (2020), Johnson and Lipsitz (2022), and Kini, Williams, and Yin (2021)

Payoffs: (F, W)

F

$B_\delta, w_\delta \geq 0, \delta \in \{0, 1\}$

W

R　　　　A

$\left(0, \ \mu^0\right)$　　　F

$i_\delta \geq 0$

N

$v \sim \mathrm{Exp}(\lambda)$

W

NT　　　　　　T

$\left(0, \ v + (1 - \delta)\rho\, i_\delta\right)$　　　$\left(r i_\delta - w_\delta, \ w_\delta\right)$

1

Model Features

- When $\delta = 1$, the worker's outside option is fixed at v. The NC reduces quit probability and compresses the external wage profile, so raises firm investment incentives.

- When $v + \rho i_1 > r i_1$ and $w_1 > v$, separation to an industry competitor is socially efficient but the worker is contractually barred from doing so under NCs. If investment is highly specific (large $r - \rho$), an NC may lead to over-investment relative to the socially optimal level.

- For non-liquidity constrained workers, the optimal contract features an upward sloping wage-tenure profile where $w_\delta = r i_\delta$.

- The incumbent firm offers it's value to reduce inefficient quits, raise incentives to provide non-contractible investment, and raise joint surplus (not because of Bertrand price competition ex-post).

Propositions on Contract Choice

- When skills are entirely firm-specific $\rho = 0$, the hold-up problem vanishes. The No-NC and NC contracts are identical.

- Industry-Specific Skills ($\rho > 0$) with a Patient Worker ($\beta = 1$): The choice of contract is determined by a unique tipping point, $\hat{\rho} \in (0, r)$.
    - For all skill generality levels below the tipping point ($\rho \in (0, \hat{\rho}]$), the No-NC contract is strictly preferred.
    - For levels above the tipping point ($\rho > \hat{\rho}$), a marginal increase in skill generality decreases the joint surplus of the No-NC contract, increasing the relative incentive to use an NC contract.

- When the worker is liquidity constrained ($\beta \to 0$), the firm's expected profit is strictly higher under an NC and NCs can lower wages. This theory provides an explanation for NC-usage in low-wage markets where returns on investment may be low.

Extensions in Paper

- Allow the incumbent firm to counter-offers from third parties and release workers from NCs in exchange for buyout payments ("Renegotiation model").

- Restrict buyout payments to common legal remedies such as Expectation Damages and Training Repayment Programs.

- Simulations on wage dynamics for liquidity constrained and non-liquidity constrained workers.

Data

- Use data from the US National Longitudinal Survey of Youth 1997 (NLSY97)

- This dataset is a nationally representative panel that tracks the outcomes of 9000 individuals aged 12-16 in 1997.

- The NLSY97 starts measuring whether non-compete agreements are used within employment contracts starting in 2017, when survey respondents are between ages 32-36.

- In 2017, all working respondents are asked whether they have a non-compete agreement.

- In following survey rounds, only individuals who obtained a new job between survey rounds are asked about their non-compete status.

Data

- Measure job tenure in years, job separation as an indicator variable for whether an individual separated main jobs between survey years, and real hourly wages.

- The sample period runs from 2013 to 2021 and the survey is conduced biennially.

- Employer-provided training is measured in several ways; consider whether the employer directly provides training as well as whether the employer pays for training.

- Assume if NC in 2017, and same job in $t' \neq 2017$, then NC in t'.

- Restrict analysis to the primary job. Trim sample to workers earning real hourly wages between 3 and 200 (as in Deming 2017).

- Limitations: Do not observe bundling with other contractual provisions (e.g., non-disclosure agreements). Limited information on firm characteristics.

▸ High Confidence in NC Status   ▸ NC Usage by Industry   ▸ Formal Training and Wage Growth
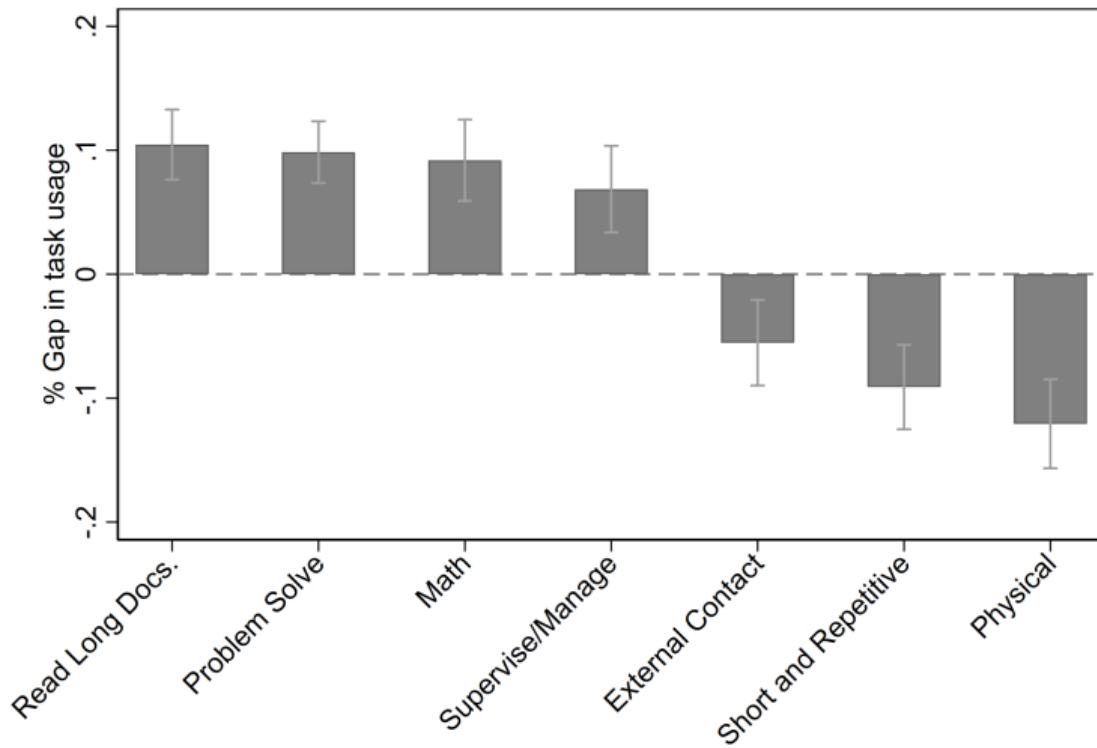
Respondent Characteristics by NC Status in 2017

	NC	No NC	Difference	P Value	N: NC	N: No NC
Job Mobility						
Tenure (Yrs)	5.24	5.11	0.12	0.50	699	4185
1(Main Job Mobility btwn 2017 and 2019)	0.28	0.32	-0.04	0.05	705	4263
1(Within-Industry Job Mobility btwn 2017 and 2019)	0.10	0.12	-0.02	0.08	686	4176
Wages and Wage Growth						
Log(Starting Wage)	2.94	2.76	0.19	0.00	705	4263
Log(Wage in 2017)	3.21	3.00	0.21	0.00	705	4263
$Log(Wage_{2017}) - Log(Wage_{2015})$	0.13	0.12	0.02	0.22	628	3778
$Log(Wage_{2019}) - Log(Wage_{2017})$	0.11	0.10	0.01	0.56	632	3753
Demographics						
Age	35.03	34.96	0.07	0.25	705	4263
1(Male)	0.58	0.50	0.08	0.00	705	4263
1(High School Degree or Higher)	0.89	0.86	0.03	0.01	699	4224
1(Bachelors Degree or Higher)	0.52	0.42	0.10	0.00	699	4224
1(Black)	0.14	0.16	-0.02	0.13	705	4263
1(Hispanic)	0.11	0.13	-0.01	0.33	705	4263
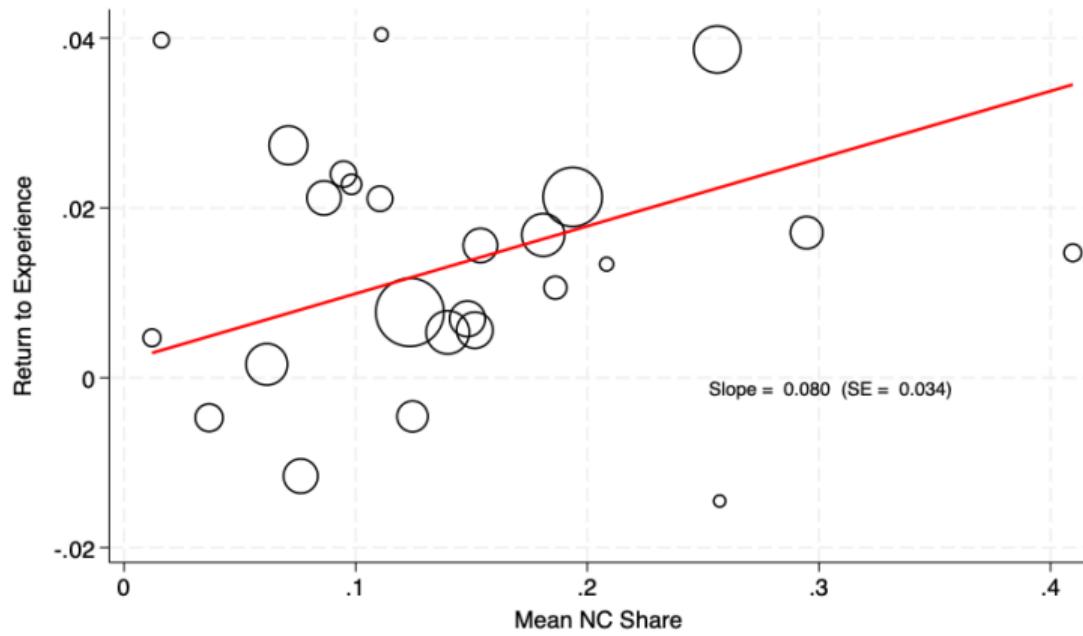
	NC	No NC	Difference	P Value	N: NC	N: No NC
Wage Bargaining and Negotiation						
1(Possible to Keep Previous Job)	0.46	0.45	0.01	0.74	304	1848
1(Negotiate Job Offer)	0.40	0.33	0.08	0.02	249	1454
Training						
1(Received Some Training)	0.09	0.11	-0.02	0.12	705	4263
1(Received Training Run by Employer)	0.01	0.03	-0.01	0.03	705	4263
1(Received On-Site Training by Non-Employer)	0.01	0.01	0.00	0.64	705	4263
1(Employer Paid for Training)	0.06	0.08	-0.02	0.08	705	4263
1(Employer Paid for Mandatory Training)	0.03	0.04	-0.01	0.26	705	4263
1(Employer Paid for Voluntary Training)	0.03	0.04	-0.01	0.16	705	4263
Other Firm Characteristics						
1(Dislike Job)	0.05	0.06	-0.01	0.57	645	3792
1(Unionized Worker)	0.11	0.16	-0.05	0.00	636	3743
Firm Size	986.28	1134.72	-148.43	0.65	595	3377

NCs and Skill-Transferability

Task Content of NC Signers Versus No-NC Signers

NC Usage and Return to Experience by Occupation

Slope = 0.080 (SE = 0.034)

▸ Return to Experience by Industry   ▸ NCs and Non-Routine Cognitive Analytical Skills   ▸ NCs and Non-Routine Cognitive Personal Skills

Baseline Regression Specification

$$\text{(Stacked Event Study)} \, Y_{itc} = \alpha_{ic} + \lambda_{tc} + \sum_{k \in \{-6+,-4,0,2,4,6\}} \beta^k d_{i,c,t-k} + \epsilon_{itc}, \text{ where}$$

$d_{ict} = 1\{e_i = t\}$ is an event indicator that takes the value of 1 in the first year of treatment.

- Treated cohort c consists of individuals who start a job with a NC in Year c

- Control cohort c consists of individuals who start a job without a NC in Year c and never sign an NC over the sample period

- Use survey years 2013 - 2021 and cohorts 2015 - 2021.

‣ With Control Variables ‣ Tasks as Outcome Variable ‣ Restrict to 2017-2021 cohorts ‣ Later NC-Signers as Control Group

Alternative Specifications

(Cross-Sectional Regression) $Y_i = \beta_0 + \beta_1 * NC_i + \boldsymbol{\beta_2 * X_i} + \epsilon_i$

(DiD Switchers Design Into and Out of NCs) $Y_{it} = \alpha_i + \lambda_t + \beta_1 NC_{it} + \epsilon_{it}$

▸ Cross-Sectional Wage Regression   ▸ Cross-Sectional Job-Mobility Regression   ▸ Switchers Non-Absorbing Treatment   ▸ Switchers Absorbing Treatment
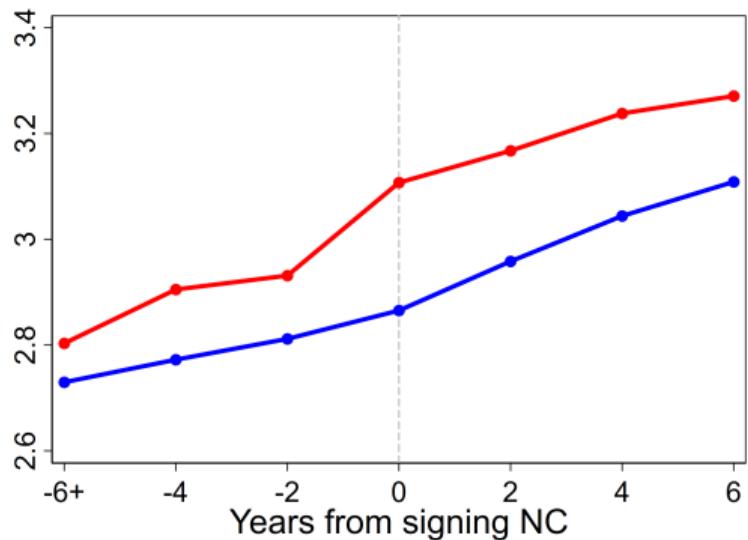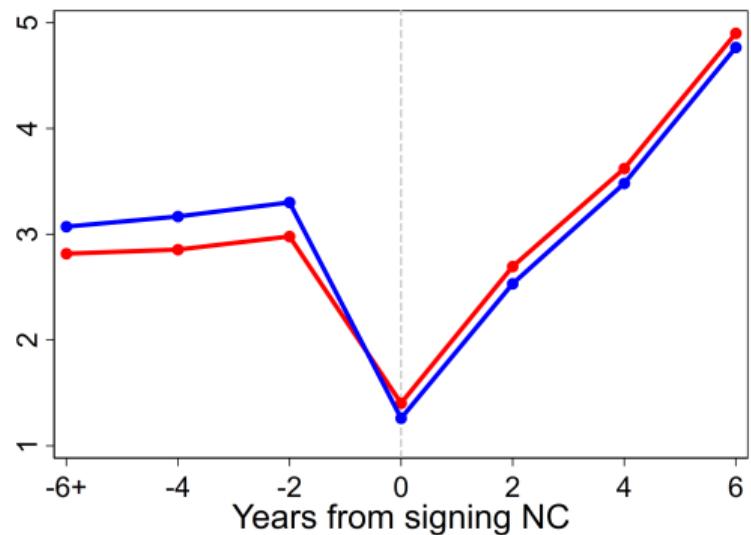
Means Relative to Event Time
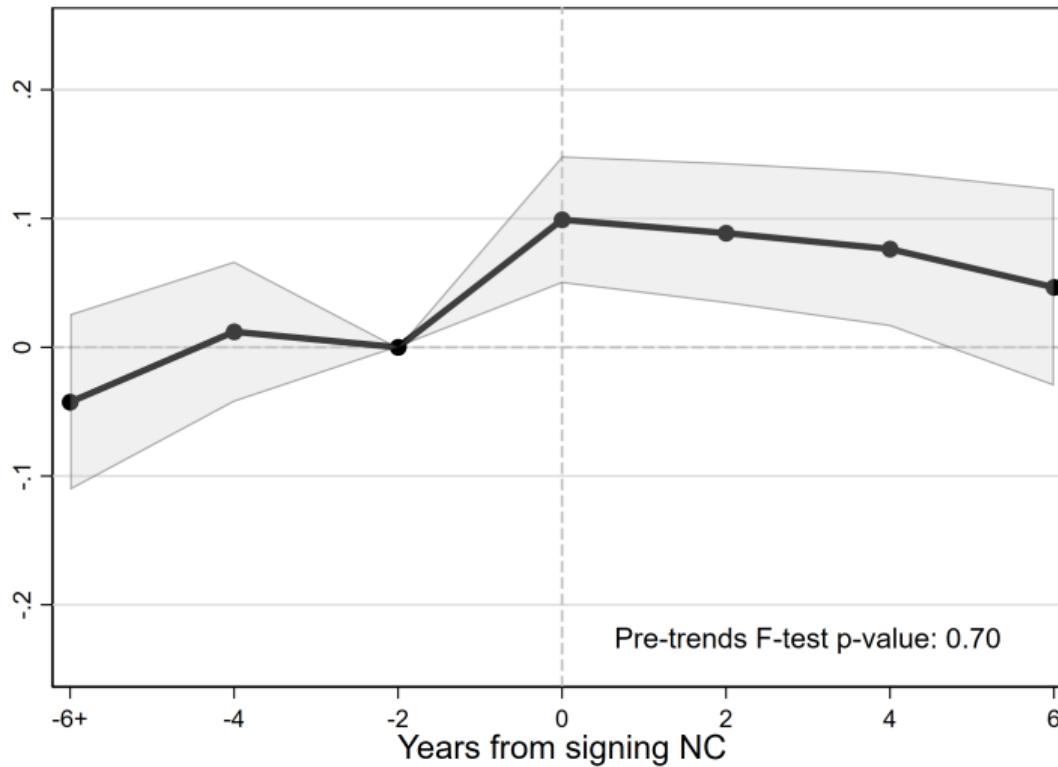
(a) Log Wages

(b) Job Tenure

The Dynamic Effects of Signing an NC on Log(Wages)

Pre-trends F-test p-value: 0.70

Years from signing NC

▸ Dynamic Effects on Job Tenure

The Aggregate Effects of Signing an NC on Wages and Job Mobility
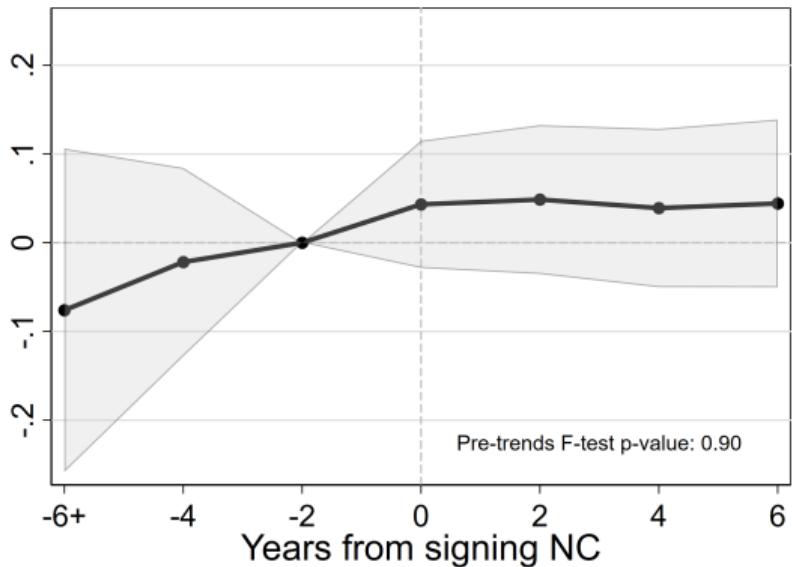
	Log Hourly Wages (1)	Tenure (2)	Change Main Emp. (3)	Within-Industry Mobility (4)
Treat $\times$ Post	0.094***	0.287**	-0.036**	0.006
	(0.022)	(0.126)	(0.016)	(0.018)
Observations	22394	22040	21614	22004
Dep. Var. Mean	2.888	2.692	0.458	0.165
Unique Treated	682	680	681	679
Unique Control	3300	3263	3296	3285
R^2	0.770	0.588	0.598	0.388

▸ Null Effects on Training and Hours
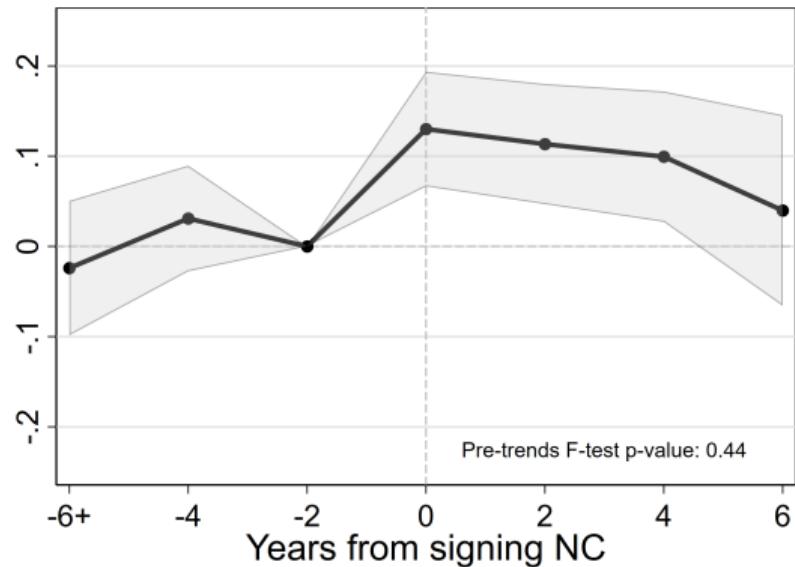
Heterogeneity in Wage-Effects

Movers vs. Stayers

(a) Movers

(b) Stayers

Pre-trends F-test p-value: 0.90

Pre-trends F-test p-value: 0.44

Years from signing NC
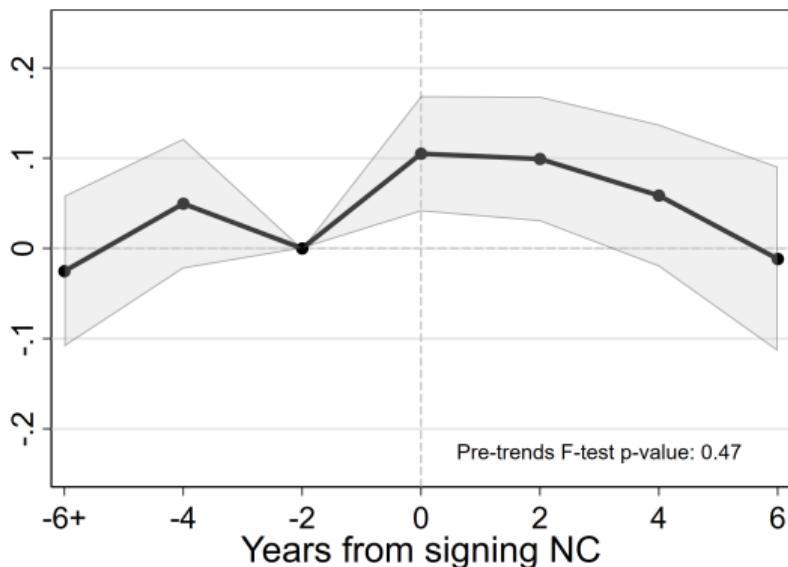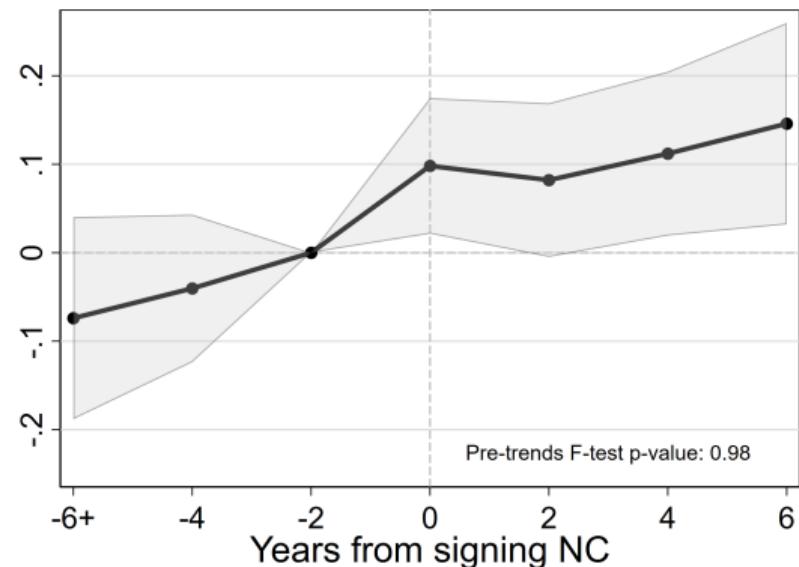
Low vs. High Wage Workers

(a) Low Wage

(b) High Wage

Pre-trends F-test p-value: 0.47

Pre-trends F-test p-value: 0.98
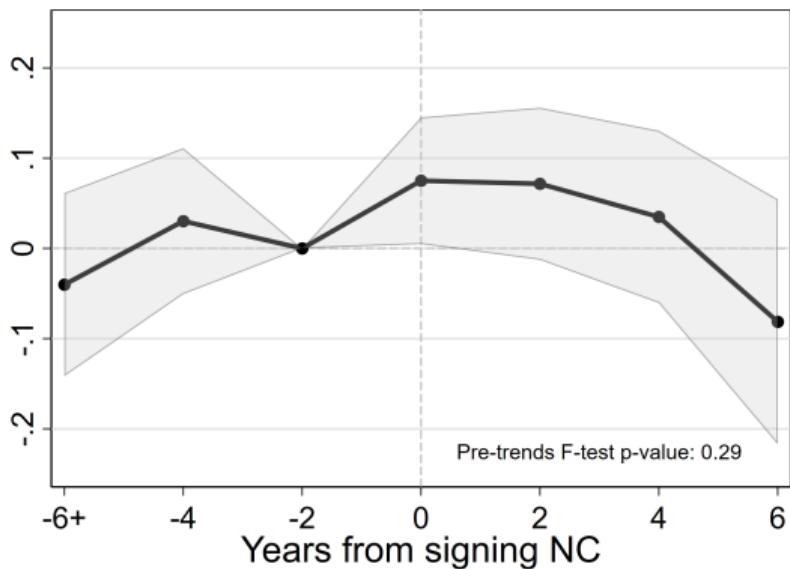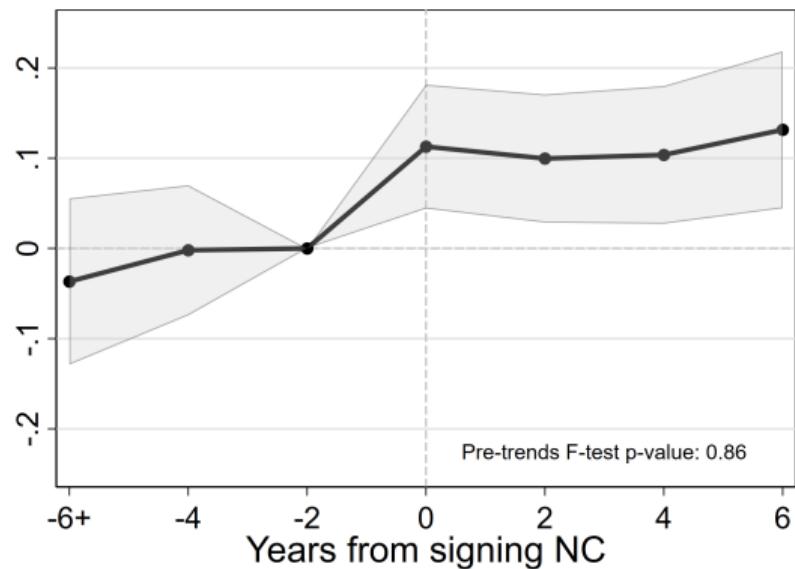
Part-Time vs. Full-Time Workers

(a) Part-Time

(b) Full-Time

Pre-trends F-test p-value: 0.29

Pre-trends F-test p-value: 0.86

Conclusions

- Develop a theoretical model to show that NCs compress the external wage profile and encourage industry-specific investments, but cause allocative inefficieces by preventing efficient transitions to industry competitors.

- Use novel data on NC contract usage to test the model's predictions. Show that NC signers
  1. Have skills that are more transferable to competing employers.
  2. Experience longer job tenures (6% on average) and fewer job-to-job moves (about 3.6 percentage points lower).
  3. Receive an immediate wage jump of 10% that settles to roughly 5% after six years.

- No effects on formal measures of training, job tasks, hours or job satisfaction.

- Formal training is not very common and contributes little to wage growth.

- Interpret persistently higher wages to human capital appreciation through informal training or on the job learning.

Appendix

Usage of Non-Compete Agreements by Industry in 2017

Industry	NC Status		Total	Share Yes
	Yes	No		
PROFESSIONAL AND RELATED SERVICES	159	463	622	0.26
INFORMATION AND COMMUNICATION	21	70	91	0.23
MINING	6	22	28	0.21
WHOLESALE TRADE	25	94	119	0.21
MANUFACTURING	82	377	459	0.18
FINANCE, INSURANCE, AND REAL ESTATE	63	282	345	0.18
ACS SPECIAL CODES	36	169	205	0.18
RETAIL TRADE	74	424	498	0.15
TRANSPORTATION AND WAREHOUSING	31	193	224	0.14
CONSTRUCTION	34	274	308	0.11
OTHER SERVICES	18	142	160	0.11
UTILITIES	3	30	33	0.09
ENTERTAINMENT, ACCOMODATIONS, AND FOOD SERVICES	37	388	425	0.09
EDUCATIONAL, HEALTH, AND SOCIAL SERVICES	101	1176	1277	0.08
PUBLIC ADMINISTRATION	21	233	254	0.08
AGRICULTURE, FORESTRY AND FISHERIES	2	30	32	0.06
ACTIVE DUTY MILITARY	0	1	1	0.00
TOTAL	713	4368	5081	0.14
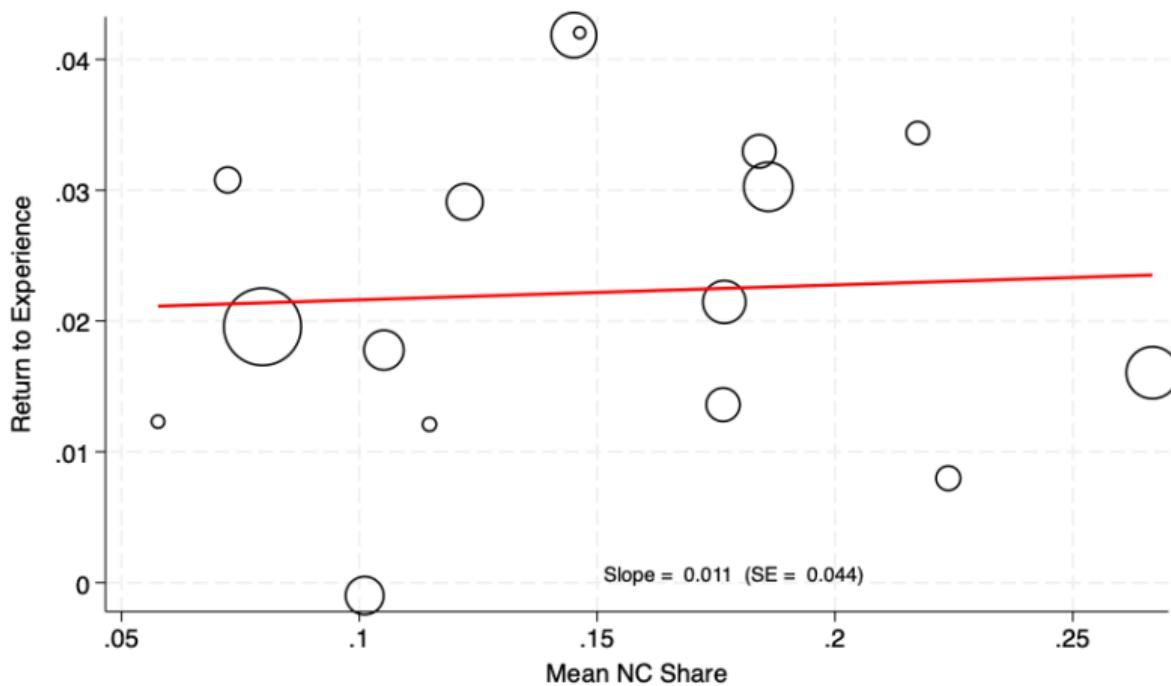
Confidence in Non-Compete Status by Industry in 2017

Industry	NC Confidence			Total	Share Very Confident
	Very Confident	Somewhat Confident	Not Confident		
AGRICULTURE, FORESTRY AND FISHERIES	33	0	1	34	0.97
CONSTRUCTION	293	14	4	311	0.94
OTHER SERVICES	152	9	2	163	0.93
TRANSPORTATION AND WAREHOUSING	211	12	7	230	0.92
EDUCATIONAL, HEALTH, AND SOCIAL SERVICES	1169	93	8	1270	0.92
ACS SPECIAL CODES	191	16	1	208	0.92
UTILITIES	29	3	0	32	0.91
INFORMATION AND COMMUNICATION	86	8	0	94	0.91
FINANCE, INSURANCE, AND REAL ESTATE	312	29	3	344	0.91
ENTERTAINMENT, ACCOMODATIONS, AND FOOD SERVICES	422	38	3	463	0.91
PUBLIC ADMINISTRATION	232	21	1	254	0.91
MANUFACTURING	412	42	4	458	0.90
MINING	24	3	0	27	0.89
WHOLESALE TRADE	104	12	1	117	0.89
RETAIL TRADE	458	49	5	512	0.89
PROFESSIONAL AND RELATED SERVICES	560	64	7	631	0.89
TOTAL	4688	413	47	5148	0.91
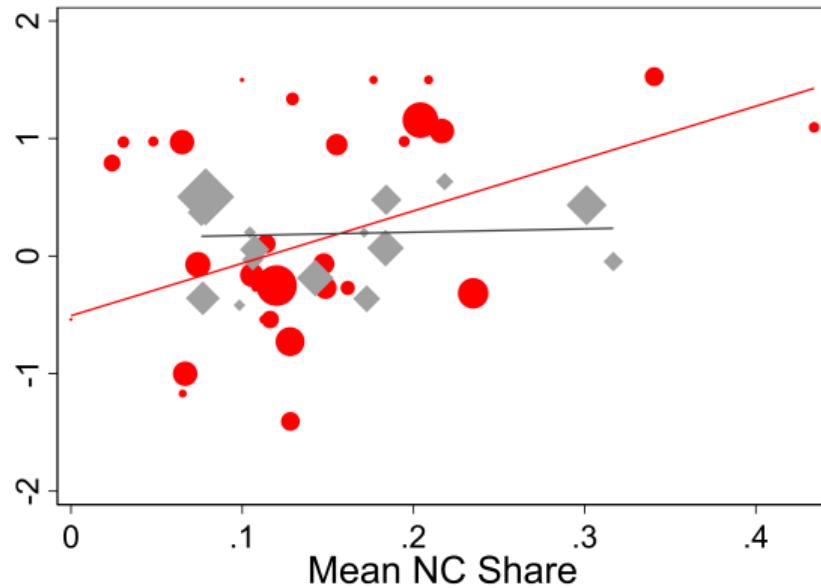
Formal Training, Wages, and Wage Growth

	Log wage			Log wage growth		
	(1)	(2)	(3)	(4)	(5)	(6)
Training	0.100***	0.060***	0.038***	0.0038	-0.0002	0.0031
	(0.018)	(0.015)	(0.014)	(0.0086)	(0.0087)	(0.0089)
Controls		yes	yes		yes	yes
Ind./Occ. FE			yes			yes
Obs.	18,464	18,464	18,464	17,079	17,079	17,079
R^2	0.003	0.310	0.438	0.000	0.012	0.018
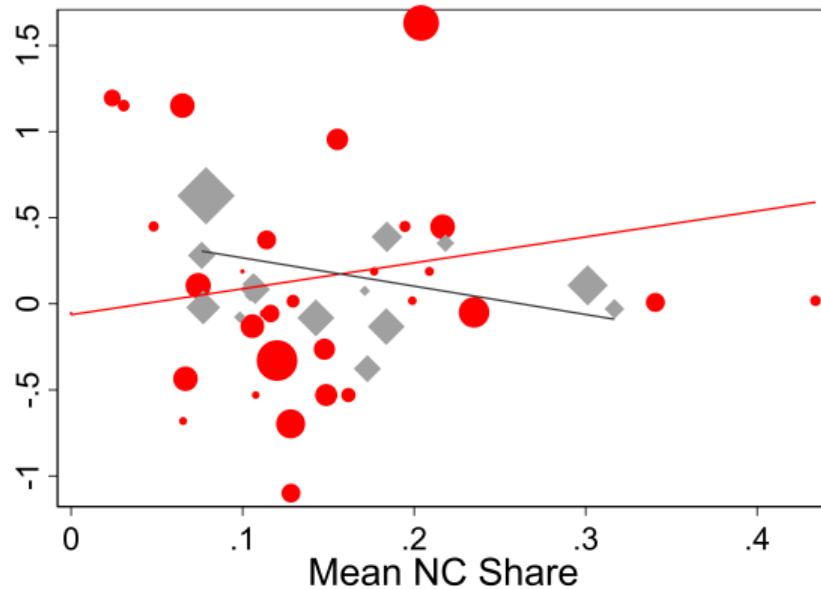
NC Usage and Return to Experience by Industry

Slope = 0.011 (SE = 0.044)
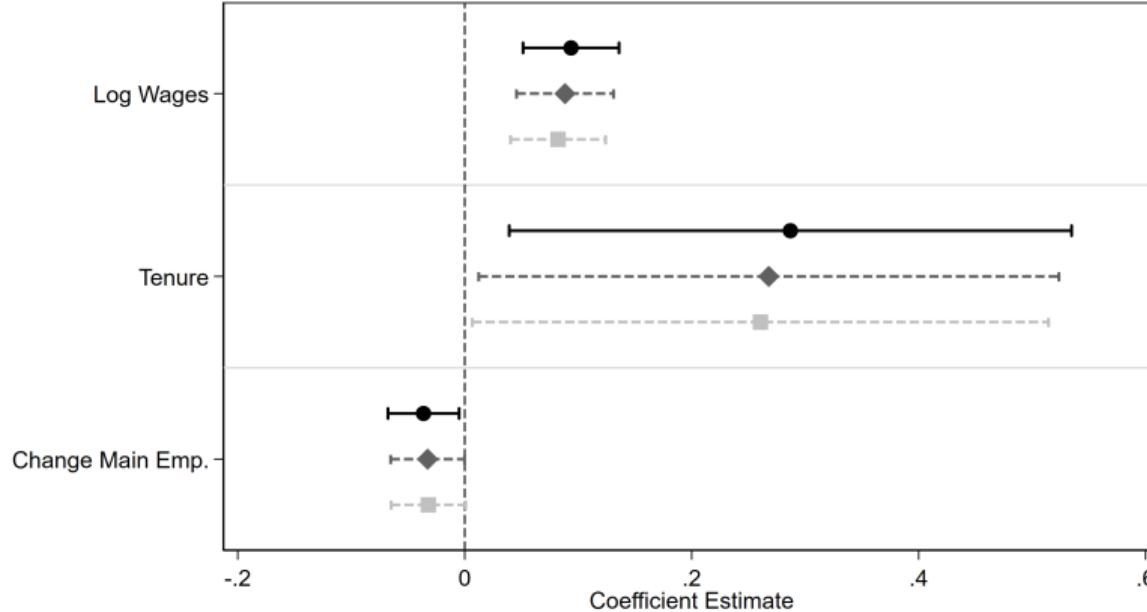
NC Usage and Non-Routine Cognitive Analytical Skills
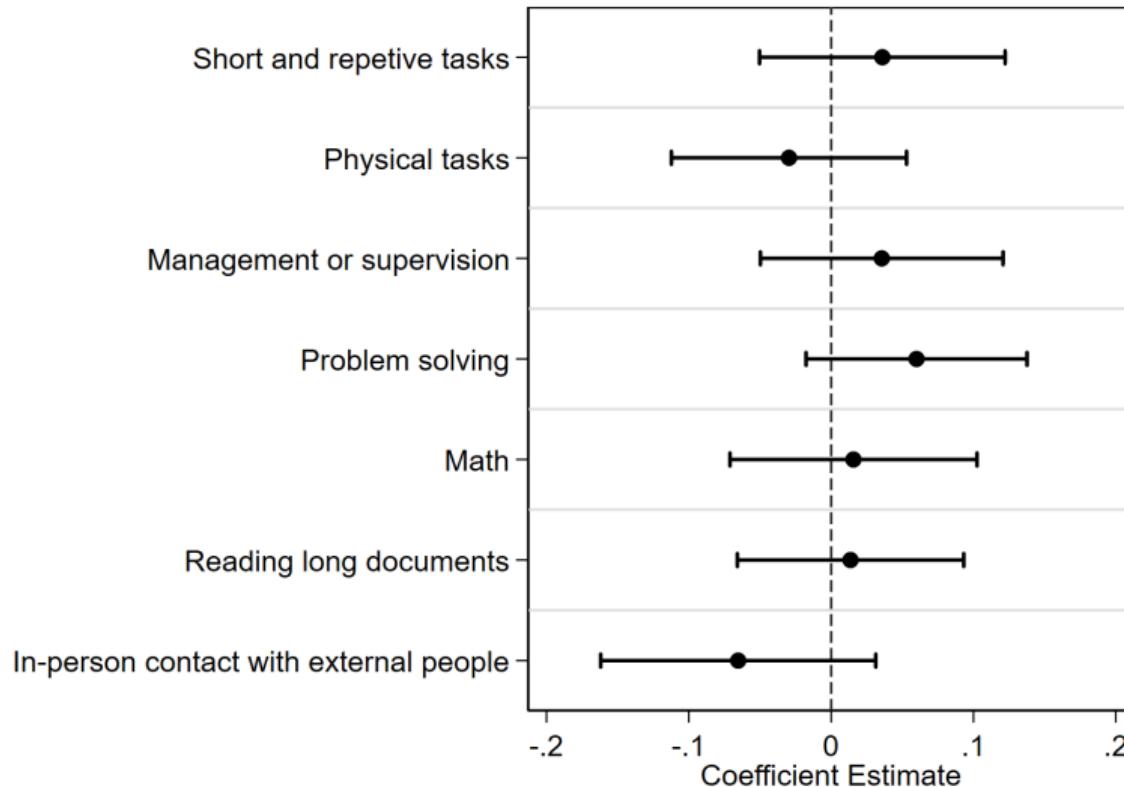
NC Usage and Non-Routine Cognitive Personal Skills
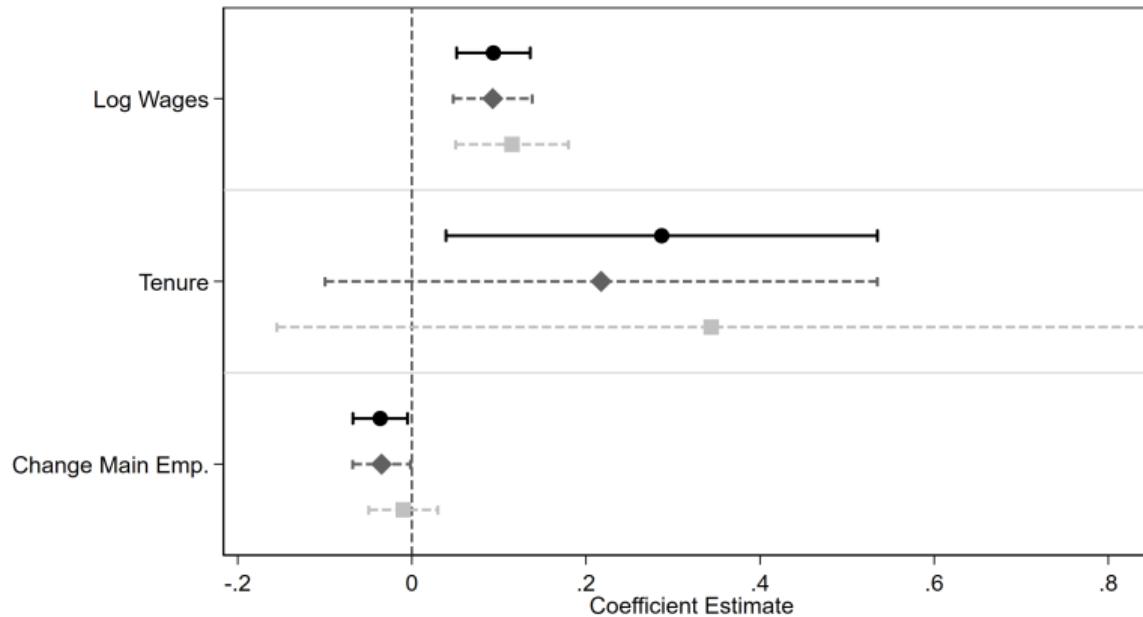
The Effect of Signing an NC: Robustness to Firm-Level Covariates
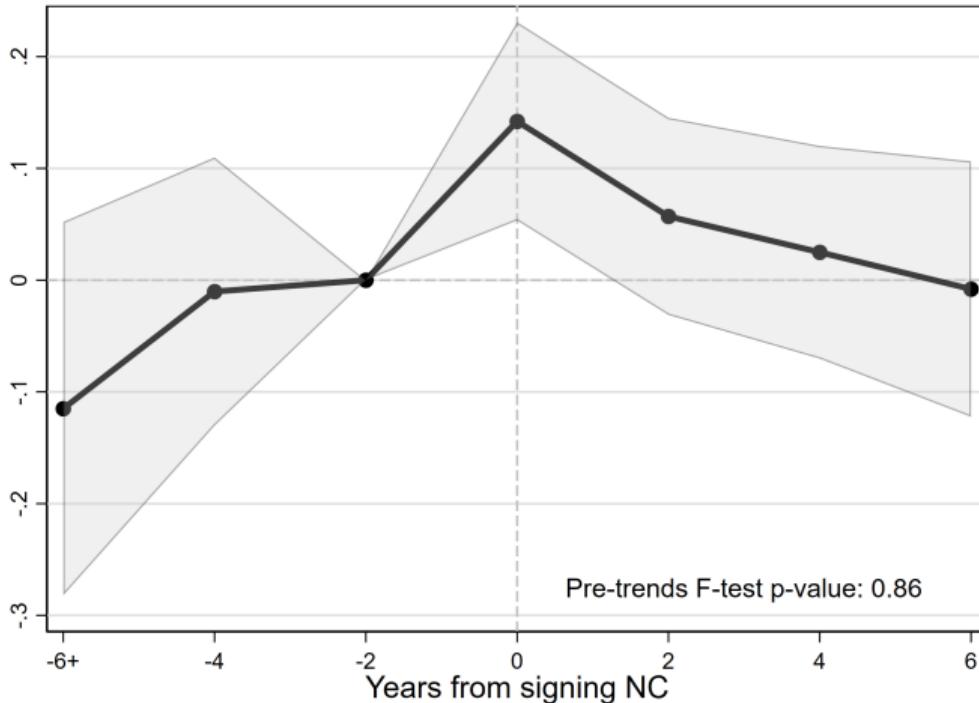
**Balance Tests for Changes in Task Content**

The Effect of Signing an NC: Robustness to Different Samples

The Effect of Signing an NC on Wages: Later-Treated as Control Group

Pre-trends F-test p-value: 0.86

Years from signing NC

Relationship between Non-Compete Agreements and Log(Wages) in 2017

Dependent Variable:				Log(Wage)			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
1(NC)	0.197***	0.192***	0.177***	0.162***	0.135***	0.110***	0.099***
	(0.024)	(0.024)	(0.022)	(0.022)	(0.020)	(0.020)	(0.020)
Tenure (Yrs)		0.026***	0.024***	0.024***	0.020***	0.019***	0.018***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Schooling (Yrs)			0.044***	0.046***	0.099***	0.094***	0.057***
			(0.009)	(0.009)	(0.005)	(0.005)	(0.006)
1(Male)				0.164***	0.204***	0.151***	0.129***
				(0.017)	(0.014)	(0.015)	(0.016)
Potential Experience					0.011**	0.011**	0.010**
					(0.005)	(0.005)	(0.005)
ASVAB Percentile							0.003***
							(0.0003)
Fixed-effects							
Industry						Yes	Yes
Occupation							Yes
Fit statistics							
Observations	4,968	4,884	4,842	4,842	4,836	4,764	3,896
Dependent variable mean	2.97	2.98	2.98	2.98	2.98	2.98	3.01
R^2	0.015	0.058	0.167	0.188	0.292	0.356	0.469

Heteroskedasticity-robust standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*
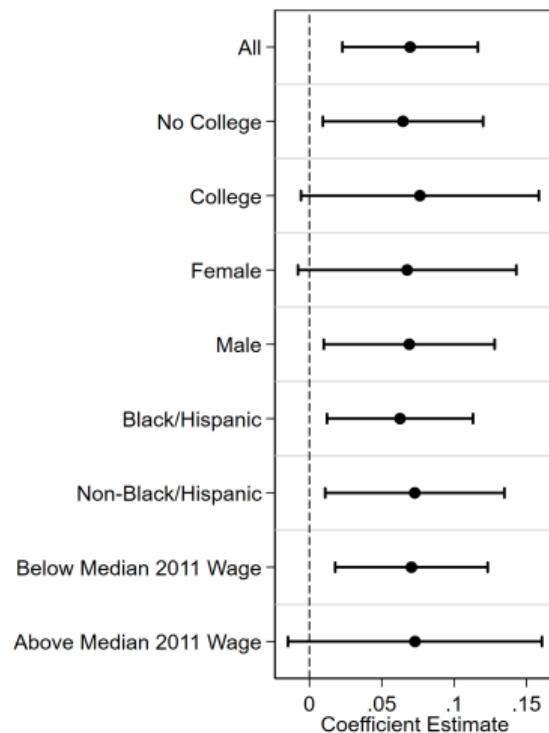
Relationship between Non-Compete Agreements and Job Separation between 2017 and 2019

| Dependent Variable:				1(Main Job Separation)			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
1(NC)	-0.043**	-0.038**	-0.033*	-0.033*	-0.027	-0.034*	-0.041*
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.021)
Tenure (Yrs)		-0.027***	-0.027***	-0.027***	-0.026***	-0.025***	-0.024***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Schooling (Yrs)			-0.007***	-0.007***	-0.018***	-0.014***	-0.011*
			(0.002)	(0.002)	(0.005)	(0.005)	(0.006)
1(Male)				-0.009	-0.016	-0.020	-0.029*
				(0.014)	(0.013)	(0.015)	(0.017)
Potential Experience					-0.003	-0.002	-0.007
					(0.005)	(0.005)	(0.005)
ASVAB Percentile							-0.0007**
							(0.0003)
Fixed-effects							
Industry						Yes	Yes
Occupation							Yes
Fit statistics							
Observations	4,968	4,884	4,842	4,842	4,836	4,764	3,896
Dependent variable mean	0.370	0.367	0.366	0.366	0.366	0.365	0.358
R^2	0.0010	0.066	0.069	0.069	0.074	0.085	0.096
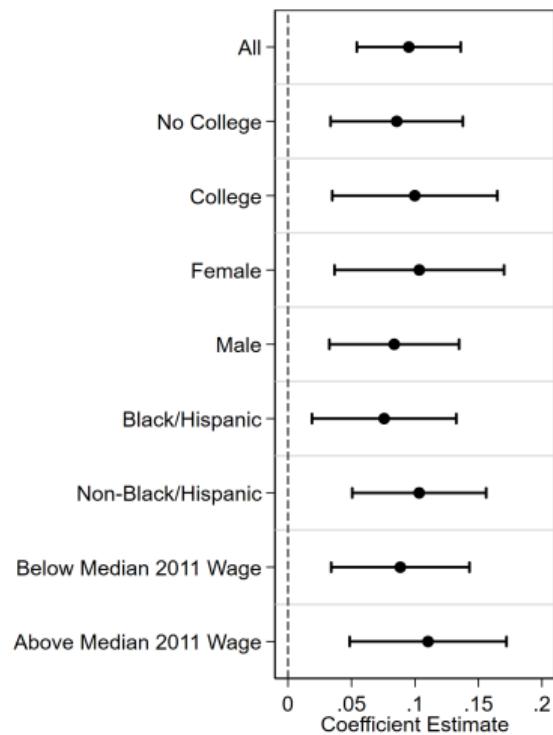
Heteroskedasticity-robust standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*
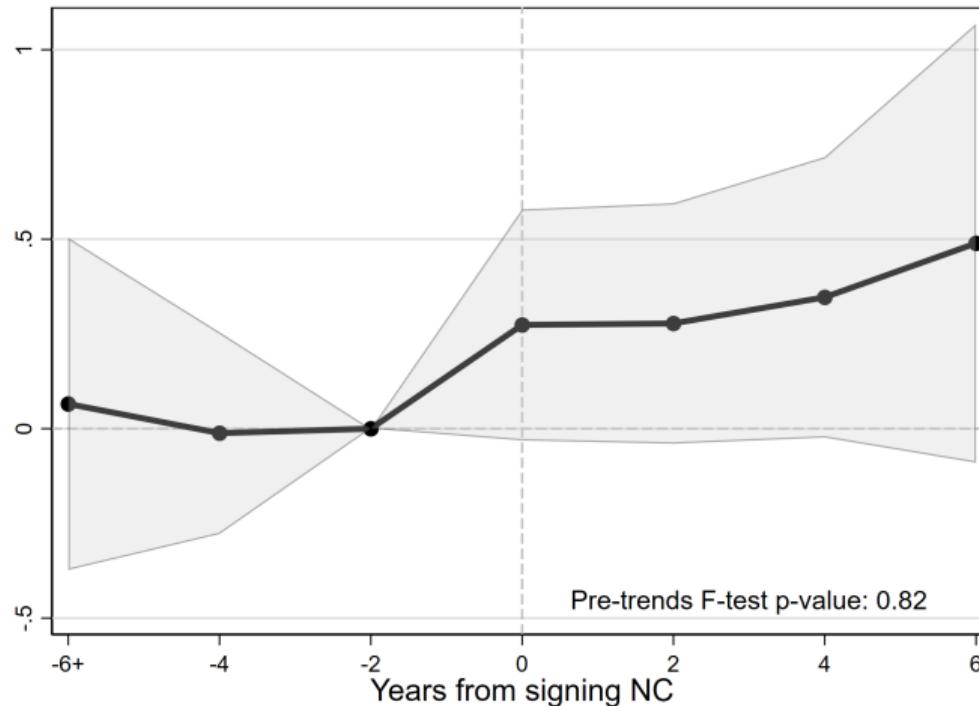
DiD Switchers Design: Non-Absorbing Treatment

DiD Switchers Design: Absorbing Treatment

The Dynamic Effects of Signing an NC on Job Tenure

Pre-trends F-test p-value: 0.82

Years from signing NC

Aggregate Effects of Signing an NC

	Other Outcomes		Formal Training					
	Log Hours Per Week (1)	Job Dissat. (2)	Any (3)	Employer Paid (4)	Log Weeks (5)	Log Hours Per Week (6)	Log Hours (7)	Completed (8)
Treat × Post	0.034 (0.024)	0.026* (0.016)	-0.023 (0.017)	-0.022 (0.015)	0.053 (0.197)	-0.309 (0.232)	-0.162 (0.301)	0.103 (0.064)
Observations	21980	17686	22394	22394	1533	1792	1511	1157
Dep. Var. Mean	3.563	0.072	0.130	0.078	1.901	1.992	3.921	0.904
R^2	0.511	0.401	0.459	0.455	0.588	0.642	0.609	0.582