Protect or Prevent? Empirical Evidence and Policy Implications of the Effect of Non-Compete Agreements on Innovation

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Motivation: Proponents of Non-Compete Agreements

Non-compete agreements are a widespread restrictive covenant in US employment contracts

Downsides

Prohibit post-separation employment with rivals, which:

- Suppresses wages
- Creates barriers to entry
- Restricts workers' mobility

Justifications

Protect firms' confidential info, which:

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Kitch (1980)

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Decreases in Innovation

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  [Garcia-Macia et al., 2019]
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The net effect depends on each effect's relative magnitude and is *a priori* ambiguous.

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   - Preview: national policies to weaken enforceability (e.g., FTC ban) could increase innovation
   - Preview: relevance to litigation related to non-compete policy
   - Preview: unlike past targeted changes, policy changes should be applied to all workers

Related Literature

NCA Effects on Wages, Entry, Etc.: Blake (1960); Hyde (2010); Bishara (2011); Marx (2011); Samila, Sorenson (2011); Marx, Fleming (2012); Lobel (2013); Starr, Balasubramanian, Sakakibara (2018); Colvin, Shierholz (2019); Lemley, McKenna (2020); Carlino (2021); Lobel, Lemley (2021); Starr, Prescott, Bishara (2021); Baslandze (2022);...

- **Here: integrate channel-specific effects (e.g., mobility, entry) within the overall innovation effect**

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NCA Effects on Innovation: Graves, DiBoise (2007); Marx, Strumsky, Fleming (2009); Conti (2014); Starr (2019); Barnett, Sichelman (2020); Xiao (2022); Lemley, Lobel (2023); Jeffers (2024); He (2025); Lavetti, Lipsitz, Pei (2025); ...

- **Here: help address long-standing theoretical and empirical debate with broad scope evidence**

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Mobility & Knowledge Diffusion: Arrow (1962); Singh (2005); Agrawal, Cockburn, McHale (2006); Agrawal, Kapur, McHale (2008); Bloom, Schankerman, Van Reenen (2013); Starr (2019); Sampson (2023); ...

- **Here: think of NCAs as an instrument for mobility to show the importance of worker-based spillovers**

Outline

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Background on Non-Compete Agreements

Non-competes are restrictive covenants in employment contracts

- Prevent employees from joining or starting a rival firm for some duration post-separation
- Heterogeneity in allowable scope across states and across time

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- Even higher for professional sector "knowledge workers"

NLSY (Self-Reported) Rate Across Industries

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NLSY (Self-Reported) Rate Across Industries

The enforceability and use of non-competes in the US increased from 2000 to 2015

- 2002-2013: 61% increase in the number of (former) employees sued over non-competes
- But more recently there have been efforts to restrict their use and enforceability (e.g., 2024 FTC Ban)

Identification

Data Overview

Extended Bishara (2011) index of state-level non-compete enforceability

Index Questions Map

- Index score captures heterogeneity in allowable scope across states and across time
- Within-state changes are mostly judicial rulings plus some legislative policy changes
- **Independent variable**: state-level changes in enforceability that affect all workers (not just, e.g., low-paid)

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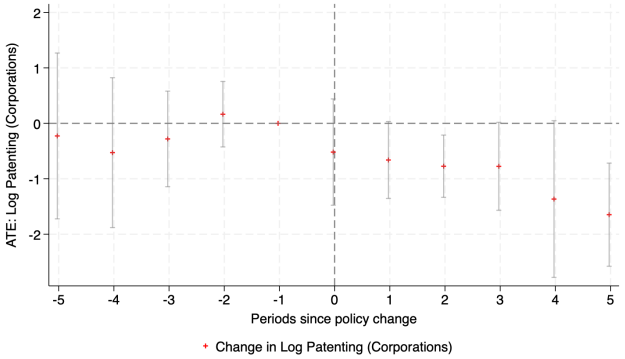
USPTO's PatentsView Project

- Disambiguated inventor and assignee names and locations
- Standard limitations – e.g., miss industries that don't patent as much (e.g., software)
- **Baseline dependent variable**: corporate patents by assignee state and application year
  - In paper: add'l outcomes (BFS, moves, ...) and robustness checks (inventor locations, ...)

Estimating Equation

Outline

Q1: What is the net effect of a change in enforceability on patenting?



Increases in enforceability lead to significant declines in patenting – avg. size strengthening (0.09): 14% decrease after 5 years

[Note: weighted by population share in year $t - 1$.]

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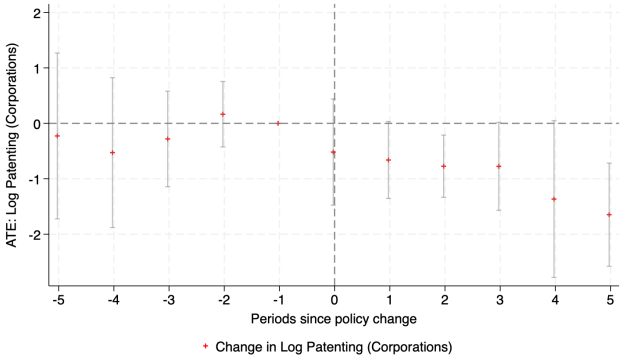


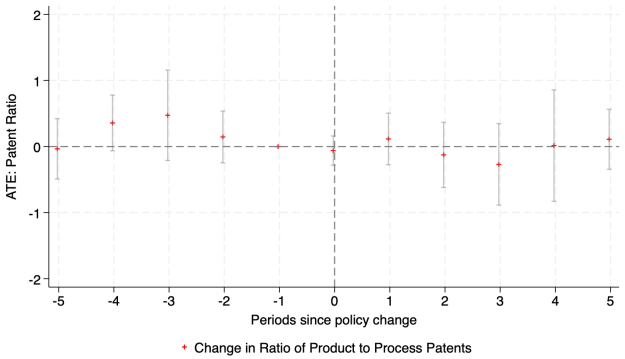
Increases in enforceability lead to significant declines in patenting – avg. size strengthening (0.09): 14% decrease after 5 years

But: we need to consider alternative (non-innovation) explanations like changes in firms' propensity to patent and cross-state spillovers

[Note: weighted by population share in year $t - 1$.]

Impact-Weighted | Novelty-Weighted | Balanced | Strengthenings | Excl. CA | Alt. Location

Q2: Do these seem like innovation effects or propensity-to-patent effects?



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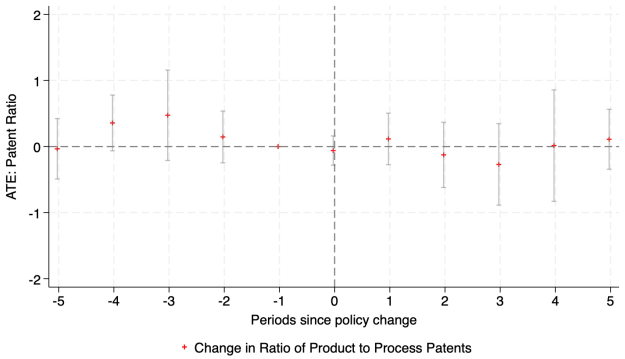

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Solution: processes are easier to protect through trade secrets than products ⇒ check mix of patents to detect substitution

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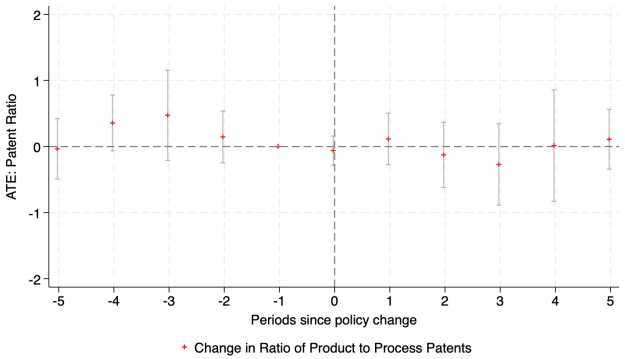

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Takeaway: no change in ratio of patent apps $\Rightarrow$ mitigates concerns re: non-compete/patent substitution

- Consistent with Greenwood et al. (2024)

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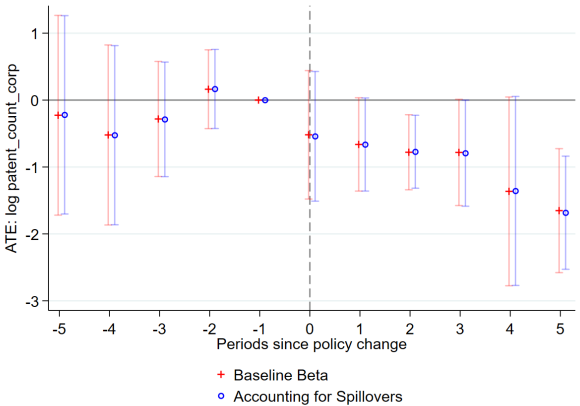

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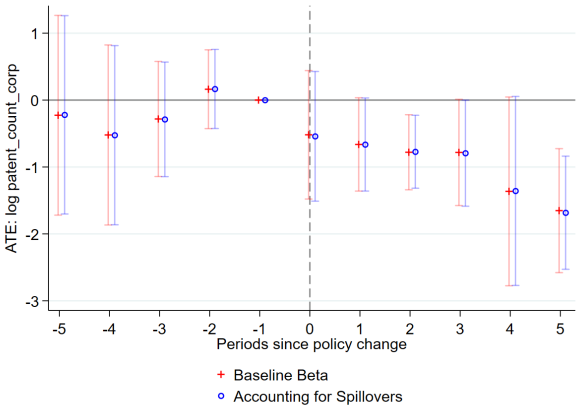

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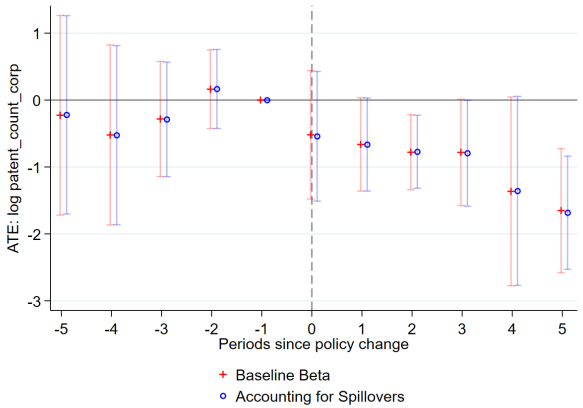

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Takeaway: no change in estimated net effect $\Rightarrow$ mitigates concerns re: cross-state spillovers biasing our results

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Likely Positive Effects of the 2024 FTC Ban on Non-Compete Agreements

The New York Times

F.T.C. Issues Ban on Worker Noncompete Clauses

The rule would prohibit companies from limiting their employees' ability to work for rivals, a change that could increase competition and boost wages.

BOTEC

Relevance of Our Findings to Judicial Challenges

Significant innovation effects = broad economic significance ⇒ **Major Question Doctrine** is likely relevant to judicial analysis of non-compete rules, esp. bans (*ATS*, *Ryan*)

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No state has ever enacted an non-compete rule as broad as the FTC's ⇒ **arbitrary and capricious** claims are likely relevant to judicial analysis of non-compete bans (*Ryan*)

Case Details

Other Targeted Strategies to Weaken Non-Compete Enforceability

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5. **...** [potentially many others]

Policy changes at the state-level are more likely to survive judicial challenges and to be well-tailored to current levels of local enforceability, and these policies should apply to all workers.

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5. **Actionable alternatives:** state-level reforms (independent consideration, red-pencil rule, ...) applied to *all* workers can unlock innovation while being more likely to survive judicial review

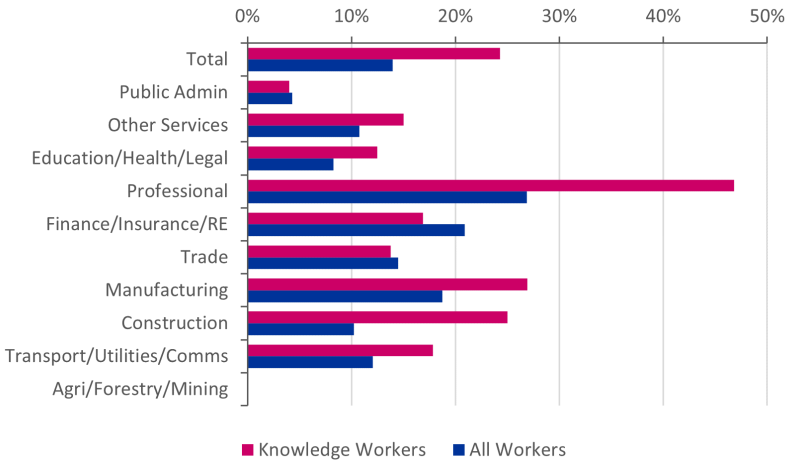
Thanks!

Please reach out with other questions and comments to:

Kate Reinmuth (reinmuth@stanford.edu)

Appendix

Non-Compete Agreement Prevalence by Industry



Source: NLSY97

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Data on Enforceability: Index Questions (1/2)

1. Is there a state statute of general application that governs the enforceability of covenants not to compete? (wt = 10)
   - Score = 0: statute that disfavors enforcement
   - Score = 5: no statute or statute that is neutral in its approach to enforcement
   - Score = 10: statute that favors strong enforcement

2. What is an employer's protectable interest and how is that defined? (wt = 10)
   - Score = 0: strictly defined limited protectable interest
   - Score = 5: balanced approach to defining a protectable interest
   - Score = 10: broadly defined protectable interest

3. What must plaintiff be able to show to prove the existence of an enforceable covenant not to compete? (wt = 5)
   - Score = 0: strong burden of proof on the employer
   - Score = 5: balanced approach to the burden placed on the employer
   - Score = 10: weak burden of proof on the plaintiff employer

4. Does the signing of a covenant not to compete at the inception of the employment relationship provide sufficient consideration to support the covenant? (wt = 10)
   - Score = 0: start of employment is never sufficient
   - Score = 5: start of employment is sometimes sufficient
   - Score = 10: start of employment is always sufficient

Data on Enforceability: Index Questions (2/2)

5. Will a change in the terms and conditions of employment provide sufficient consideration to support a covenant not to compete entered into after the employment relationship has begun? Will continued employment provide sufficient consideration after the employment relationship has begun? (wt = 5)
   - Score = 0: neither continued employment nor a beneficial change in terms would be sufficient consideration
   - Score = 5: only a beneficial change in terms was sufficient to support a covenant not to compete
   - Score = 10: continued employment is always sufficient

6. If the restrictions in the covenant not to compete are unenforceable because they are overbroad, are the courts permitted to modify the covenant to make the restrictions more narrow and to make the covenant enforceable? If so, under what circumstances will the courts allow reduction and in what form? (wt = 10)
   - Score = 0: strictly defined limited protectable interest
   - Score = 5: balanced approach to defining a protectable interest
   - Score = 10: broadly defined protectable interest

7. If the employer terminates the employment relationship, is the covenant enforceable? (wt = 10)
   - Score = 0: not enforceable if the employer terminates
   - Score = 5: enforceable only in some circumstances
   - Score = 10: always enforceable if the employer terminates

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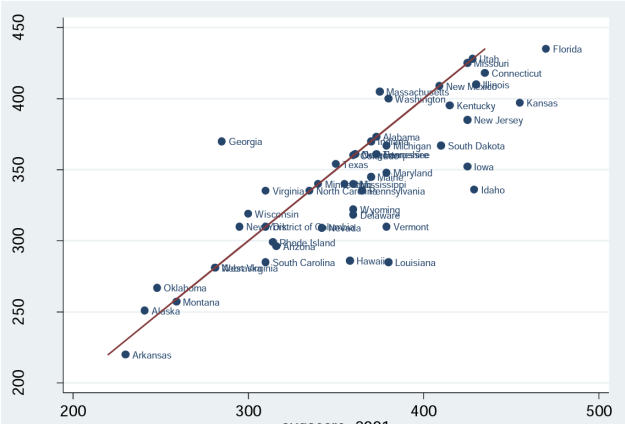
Data on Enforceability: Comparison of 1991 and 2009 Bishara Indices

Fig. 5. 1991 raw score plotted against 2009 raw score.



Source: Bishara (2011)

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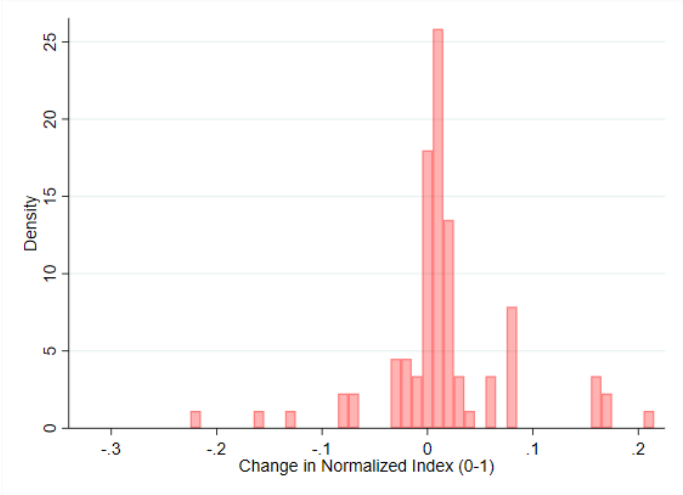
Data on Enforceability: Distribution of Non-Zero Changes Over Time



Bishara 1991/2009 Changes | National Trend

Data on Enforceability: National Average Index

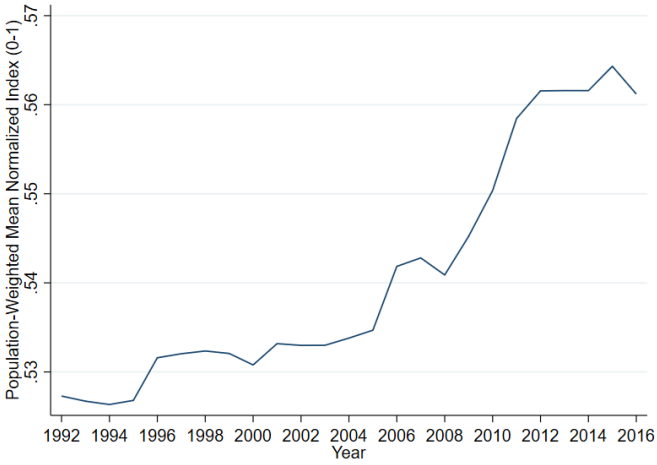


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Table 2: Can Economic and Political Factors Explain Changes in NCA Enforceability?

Dependent Variable:	NCA Enforceability	
Population (100,000s)	–0.00	(0.00)
Unemployment Rate	0.00	(0.00)
Number of Workers Compensation Beneficiaries	–0.00	(0.00)
Democratic Party Governor	–0.01	(0.00)
% of State House from Democratic Party	0.01	(0.07)
% of State Senate from Democratic Party	0.04	(0.03)
State Minimum Wage	–0.01*	(0.01)
Number of Medicaid Beneficiaries (100,000s)	–0.00	(0.00)
Social Policy Liberalism Score	–0.00	(0.02)
Economic Policy Liberalism Score	–0.02	(0.01)
Social Mass Liberalism Score	–0.00	(0.02)
Economic Mass Liberalism Score	0.03	(0.04)
Democratic Party ID Count	–0.09	(0.31)
State House Ideology Score	–0.00	(0.01)
State Senate Ideology Score	0.00	(0.01)
House Democrats Ideology Score	–0.04	(0.04)
House Republicans Ideology Score	0.04	(0.05)
Senate Democrats Ideology Score	–0.03*	(0.02)
Senate Republicans Ideology Score	–0.00	(0.02)
Union Membership	–0.00	(0.00)
N	829	
R^2	0.113	
F-Test p-Value	0.184	

Source: Johnson, Lavetti, and Lipsitz (2023)

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Data on Patent Filings: Example Moving Inventor

Year	Inventor ID	Assignee #1	Assignee #2	Assignee #3	Assignee #4
1991	fl:ja_ln:hughett-1	X			
1992	fl:ja_ln:hughett-1	X			
1993	fl:ja_ln:hughett-1	X [Exit]			
1999	fl:ja_ln:hughett-1		X [Enter]		
2000	fl:ja_ln:hughett-1		X		
2003	fl:ja_ln:hughett-1		X [Exit]	X [Enter/Exit]	
2005	fl:ja_ln:hughett-1				X [Enter]
2008	fl:ja_ln:hughett-1				
2009	fl:ja_ln:hughett-1				X
2010	fl:ja_ln:hughett-1				X
2011	fl:ja_ln:hughett-1				X
2012	fl:ja_ln:hughett-1				X
2013	fl:ja_ln:hughett-1				X
2014	fl:ja_ln:hughett-1				X
2016	fl:ja_ln:hughett-1				X

Back to case study | Back to data | Back to mobility results

Discussion of Concerns About Non-Compete/Patent Substitution

Concern: non-competes stop the flight of trade secrets easier than litigating a trade secret lawsuit $\Rightarrow$ one might wonder if non-competes are substitutes for patents.

- $\Rightarrow$ concern that we would just pick up substitution rather than true innovation

Intuitively and as explained by SLS faculty: unlikely; it would be extremely risky not to patent (no right to exclude in the case of independent discovery or reverse engineering by a competitor).

Existing empirical evidence: firms often use both trade secrets and patents to protect ideas [EUIPO, 2017]

Additional empirical strategy here:

- Split analysis by product and process patents
  - Products much easier to reverse engineer $\Rightarrow$ trade secrets more effective for processes [EUIPO, 2017]
- Observe real effect on inventor mobility

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Starr, Prescott, and Bishara (2021) - Details

Data: nationally representative survey of 11,505 labor force participants

Key results, conditional on knowing you are subject to a non-compete:

- Non-competes are more likely to be found in high-skill, high-paying jobs.
- Only 10% of employees negotiate over their non-compete.
- 33% are presented with their non-compete after having already accepted their job offer.
- Higher non-compete enforceability is associated with relatively lower wages.

Back

Marx (2011) - Details

Data: interviews with 52 randomly sampled patent holders in a single industry plus a survey of 1,029 engineers across a variety of industries

Key results, conditional on knowing you are subject to a non-compete:

- Firms strategically manage the process of getting workers to sign such contracts, waiting for workers' bargaining position to weaken.
  - Only 30.5% of EEs who signed non-competes were asked to sign *prior* to accepting the job offer.
- Ex-employees subject to non-competes are more likely to take career detours – that is, involuntarily leave their technical field to avoid a potential lawsuit.

Back

EMPLOYEE CONFIDENTIALITY AND NON-COMPETITION AGREEMENT

THIS CONFIDENTIALITY AND NON-COMPETITION AGREEMENT (the "Agreement") is made as of Nov 29, 2013 (the "Effective Date") (regardless of the dates of the parties' signatures) by and between , a(n) JJSA INC ("Employer"), and ("Employee").

1. **Background.** Employer operates as a franchisee of Jimmy John's Franchise, LLC, a Delaware limited liability company ("JJF"). JJF franchises JIMMY JOHN'S® Sandwich Shops operating at various locations throughout the country and, in connection with those activities, has invested (and continues to invest) substantial time, effort, and money in developing the products sold to customers of JIMMY JOHN'S® Sandwich Shops and refining the procedures to be used in operating JIMMY JOHN'S® Sandwich Shops, all of which JJF considers to be "Confidential Information," as further defined in this Agreement. Employer, as a franchisee of JJF, entered into that certain franchise agreement dated March 10, 2013 with JJF or its predecessor in interest Jimmy John's Franchise Inc. (the "Franchise Agreement"). Pursuant to the Franchise Agreement, Employer uses the Confidential Information in its operation of the franchise(s) located at Niles IL. Pursuant to the Franchise Agreement, all employees of Employer having access to the Confidential Information are required to execute this Agreement.

Employee desires to become an employee of Employer and acknowledges that, during the term of his or her employment with Employer, he or she will have access to Confidential Information in order to perform his or her employee duties. Employee understands the importance of Confidential Information to Employer and JJF and of preserving the confidentiality of Confidential Information. Employer is willing to hire Employee only on the condition that Employee agrees to comply with this Agreement's obligations. Employee understands that Employer is hiring Employee in reliance on Employee's willingness to comply with this Agreement and that Employer would not hire Employee if he or she were not willing to do so. Employee understands that complying with this Agreement is essential to protect Employer's and JJF's legitimate business interests.

2. **Confidentiality.** (a) The term "Confidential Information," as used in this Agreement, means certain confidential and proprietary information, including trade secrets, relating to the development and operation of JIMMY JOHN'S® Sandwich Shops. Confidential Information further includes, but is not limited to: (a) plans and specifications for [illegible]

Back

NPR BUSINESS

Many workers barely recall signing noncompetes, until they try to change jobs

January 13, 2023 5:00 AM ET
Heard on All Things Considered

One in 5 workers in the U.S., or some 30 million people, are estimated to have signed noncompete agreements. Many say they weren't aware of the details and barely even remember signing them.

Joby George was 21 years old when he got his first job out of college, working for a software company focused on the pharmaceutical industry.

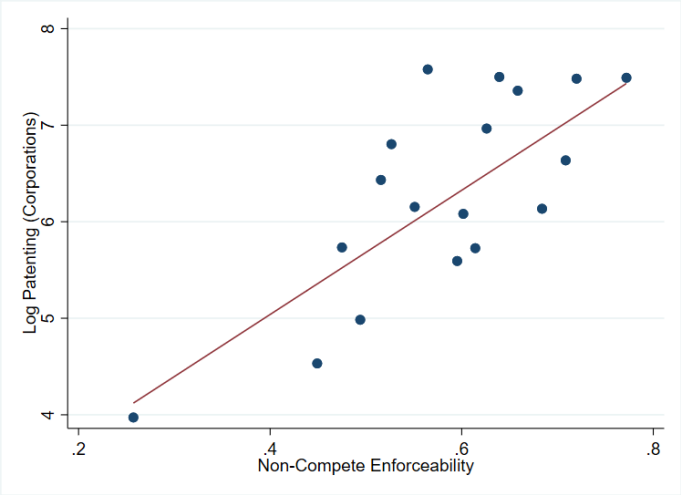
He stayed with the company for 14 years, excited to play a role in making the medicines people take every day. When he eventually decided it was time for a change, he realized he might have a problem.

"I don't remember exactly signing a noncompete, because there are a lot of forms you have to sign when you get hired," he says.

But indeed he had. And now, his employer was not happy about him leaving for a new job at another software company in the pharmaceutical space — even though, George says, he had no trade secrets to take with him.

Nevertheless, his company sued.

Bin Scatter - Log Patenting on Non-Compete Enforceability - Excl. CA



Back

From "The Law and Economics of Rights in Valuable Information" (Kitch, 1980 – Journal of Legal Studies):

II. Welfare Analysis

A conventional analysis of the law just sketched is as follows. The rules do not serve social welfare because they provide no incentive to firms to invest in information. Not only is information of value inherently difficult to protect but, outside the core trade secrecy area, the courts leave employees free to leave the firm and exploit the information in competition with the firm. This competition eliminates the return that would otherwise generate the incentive for investment in the production of that information.[72]

Back

Identification Challenges and Strategies (Overview)

Challenge: firms' use of non-competes and location choices both potentially endogenous

- Strategy: focus on plausibly exogenous variation in state-level enforceability [Garmaise, 2011; Marx and Fleming, 2012; Chen, Zhang, and Zhou, 2017; Hausman and Lavetti, 2021; Johnson, Lavetti, and Lipsitz, Working Paper]

Challenge: innovation is hard to measure; no paper trail to measure/track [Krugman, 1994]

- Strategy: follow innovation lit, use patents to proxy for innovation

Concerns About Non-Compete/Patent Substitution

Challenge: distinguishing between and quantifying channels within the net effect

- Strategy (w/o model): compare effects we can measure (e.g., entry) to net effect; theorize about residual

Back

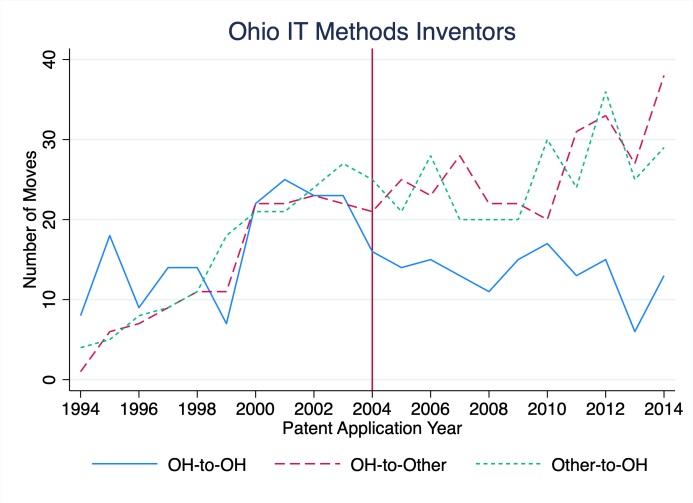
Organization Name Cleaning

Fuzzy matching and algorithmic name cleaning ⇒ GPT review ⇒ manual review.

upper(disambig_assignee_organization)
3M INNOVATIVE PROPERTIES COMPANY
3M INNOVATIVE PROPERTY COMPANIES
3M IMMOVATIVE PROPERTIES COMPANY
3M INNOVATIVE COMPANY
3M INNOVATIVE PROPERTIES COMPANY 3M CENTER
3M INNOVATIVE PROPERTIES COMPANY CORPORATION OF DELAWARE
3M INNOVATIVE PROPERTIES COMPANY MINNESOTA MINING AND MANUFACTURING CO.
3M INNOVATIVE PROPERTIES COUNSEL
3M INTELLECTUAL PROPERTIES COMPANY
3M INTELLECTUAL PROPERTY COMPANY
OFFICE OF INTELLECTUAL PROPERTY COUNSEL 3M INNOVATIVE PROPERTIES COMPANY

upper(disambig_assignee_organization)
DARTMOUNTH COLLEGE
TRUSTEES OF DARTMOUTH COLLEGE
THE TRUSTEES OF DARTMOUGH COLLEGE
THE TRUSTEES OF DARTMOUTH COLLEGE AND DARTMOUTH-HITCHCOCK CLINIC
TRUSTEES OF DARTMOUTH
TRUSTEES OF DARTMOUTH UNIVERSITY

Ohio Inventor Mobility: Example Industry Trends



In-state inventor moves are more impacted by non-competes than cross-state moves

Takeaway: in-state moves seem to fall sharply after 2004, whereas cross-state moves continue to increase

Back State-wide

Synthetic Control States – Ohio (All Sectors)

Optimal synthetic control: 18.1% DC, 5.2% MS, 5.1% WV, 4.7% SD, 4.5% IN, 4.3% NJ, 4.0% TN, 3.6% NY, 3.5% AL, 3.5% MO, 3.4% PA, 3.2% CO, 3.2% VA, 3.1% OK, 2.9% ND, 2.9% RI, 2.8% NE, 2.8% UT, 2.8% WY, 2.7% NC, 2.7% NH, 2.6% MN, 2.4% MT, 2.3% NM, 2.0% WA, and 1.6% NV.

Average synthetic control (and SEs) based on 500 permutations w/ omitted potential controls from the set under consideration.

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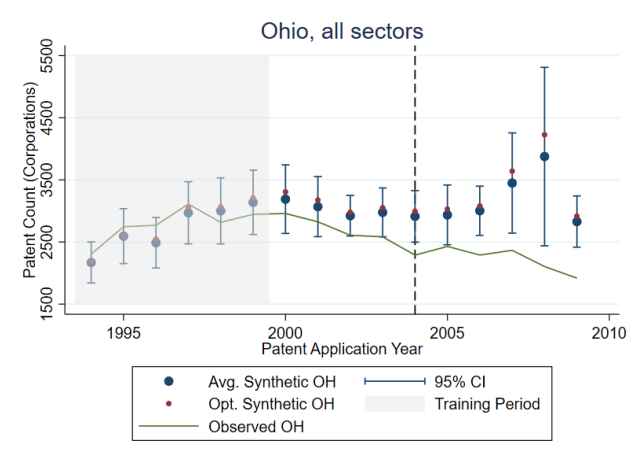
Synthetic Control States – Ohio (IT Methods)

Optimal synthetic control: 7.9% IN, 7.5% NH, 6.6% MN, 6.5% TN, 6.1% MT, 6.1% NC, 6.1% NJ, 5.9% PA, 5.6% NY, 5.5% DC, 5.4% UT, 5.4% VA, 5.4% WA, 5.3% OK, 5.2% CO, 4.9% NV, and 4.8% NE.

Average synthetic control (and SEs) based on 500 permutations w/ omitted potential controls from the set under consideration.

Back

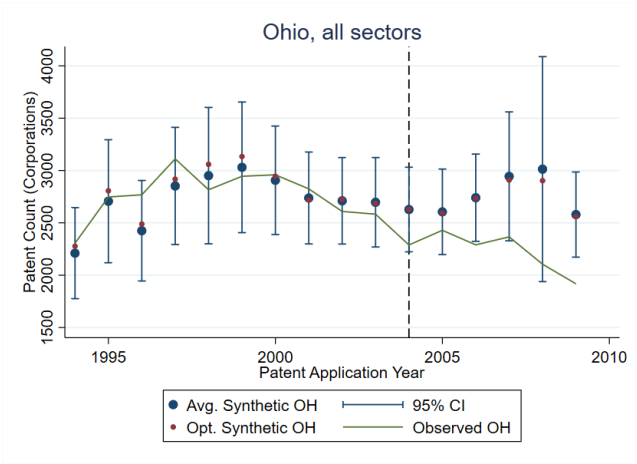
Ohio: Synthetic Control Comparison - Levels



Avg. and SEs based on 500 permutations w/ omitted potential controls from the set under consideration.

Back LOO/K-Fold Cross-Validation

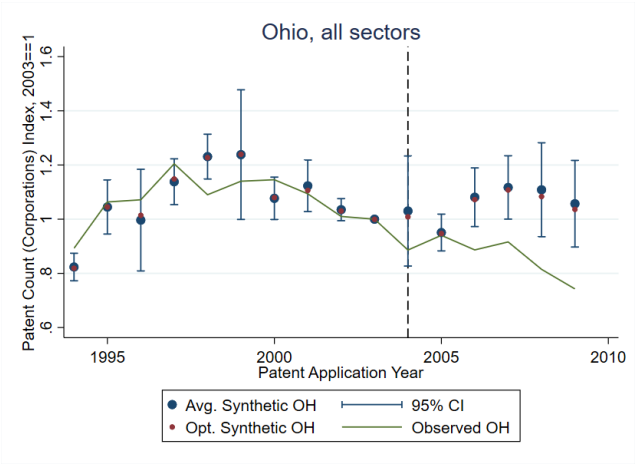
Ohio: Synthetic Control Comparison - Levels - LOO Cross Validation



Rather than splitting the time period into training and validation periods, we run multiple iterations where we leave one year out at a time and train over the other periods, then averaging those inversely weighted by the error in the prediction relative to the validating year. Avg. and SEs based on 100 permutations w/ omitted potential controls from the set under consideration.

Back

Ohio: Synthetic Control Comparison - LOO Cross Validation



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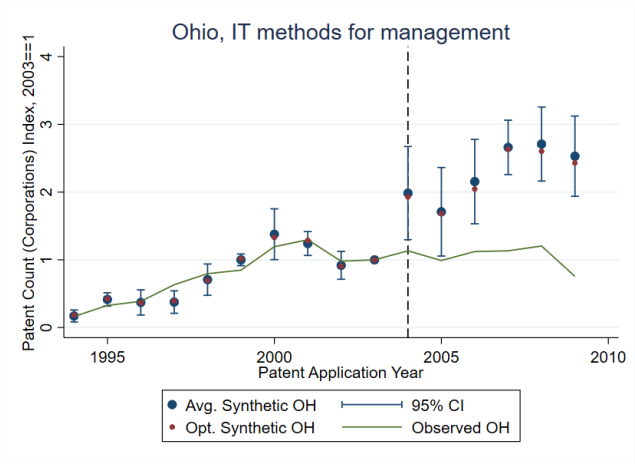
Back

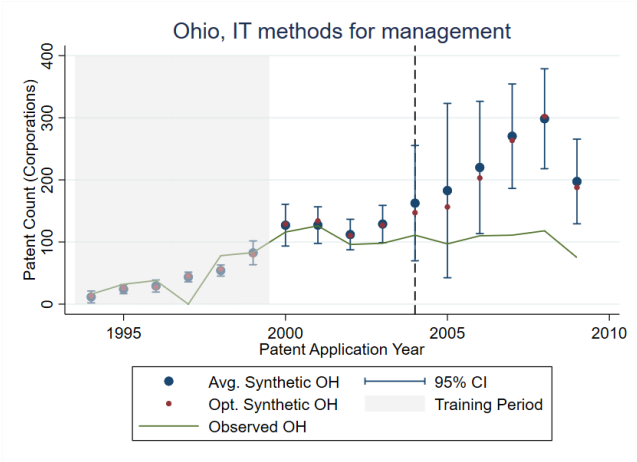
Ohio IT Methods: Synthetic Control Comparison - LOO Cross Validation



Rather than splitting the time period into training and validation periods, we run multiple iterations where we leave one year out at a time and train over the other periods, then averaging those inversely weighted by the error in the prediction relative to the validating year. Avg. and SEs based on 100 permutations w/ omitted potential controls from the set under consideration.

Back

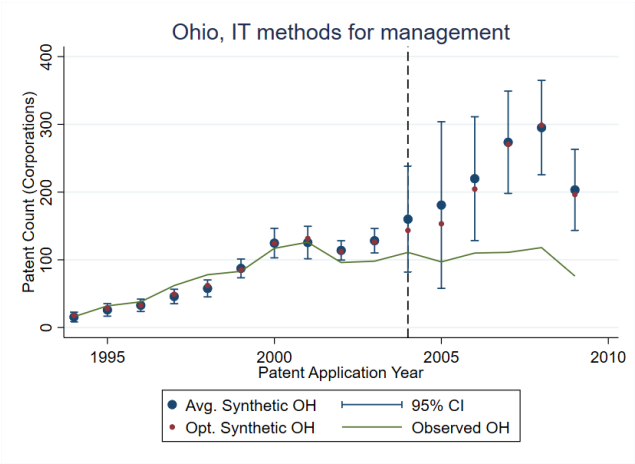
Ohio IT Methods: Synthetic Control Comparison - Levels



Avg. and SEs based on 500 permutations w/ omitted potential controls from the set under consideration.

LOO/K-Fold Cross-Validation Back

Ohio IT Methods: Synthetic Control Comparison - Levels - LOO CV



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Lake Land v. Columber – Supreme Court of Ohio (2004)

1988: Columber begins work for Lake Land.

1991: Lake Land asks Columber to sign a non-compete agreement w/ no increase in salary or other benefits.

2001: Columber leaves his job at Lake Land to start a competing business.

2001: Lake Land sues to enforce. Columber argues unenforceability for lack of consideration.

2004: Court changes OH case law: now continued employment *is* adequate consideration, even if already employed.

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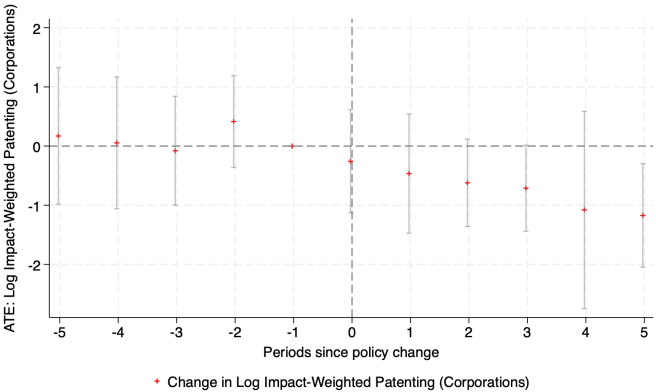
Log Impact-Weighted Patent Count



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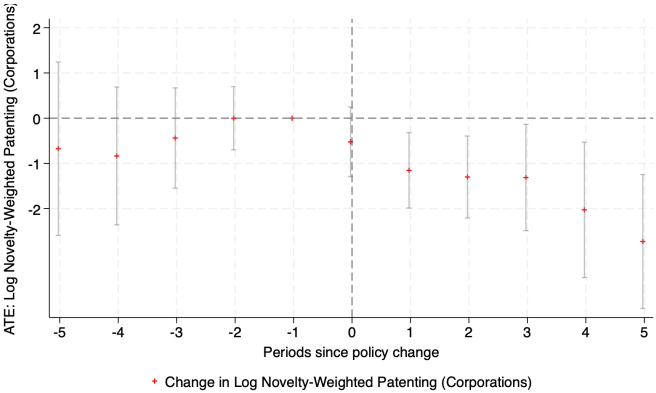
Log Novelty-Weighted Patent Count



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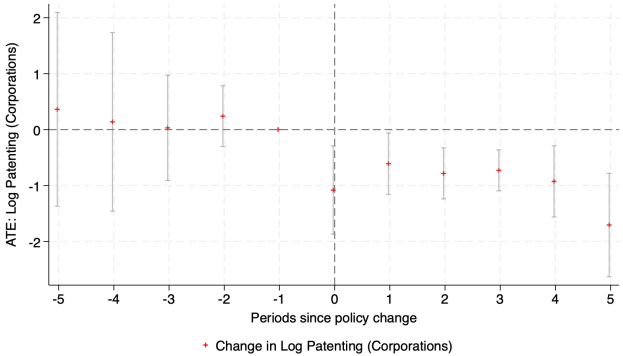
Log Patent Count - Balanced



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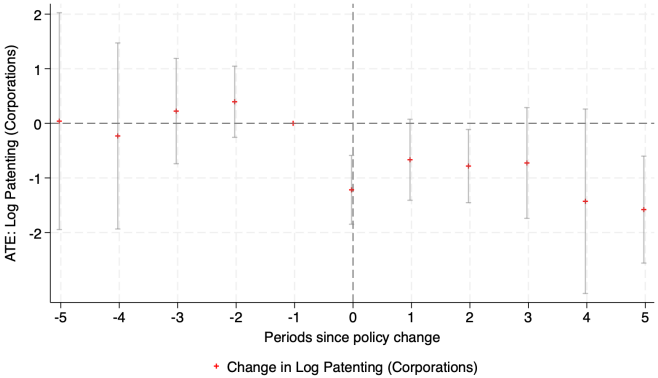
Log Patent Count - Strengthenings



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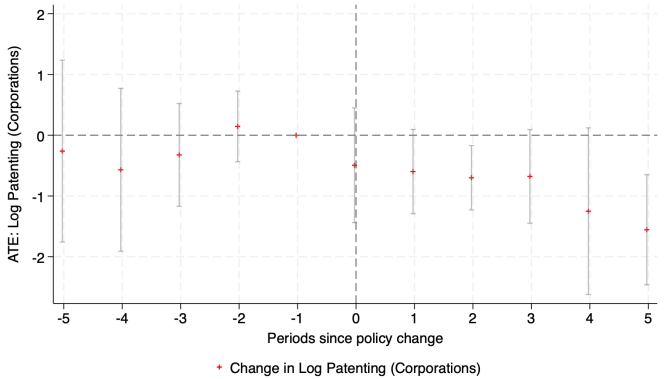
Log Patent Count - Excl. CA



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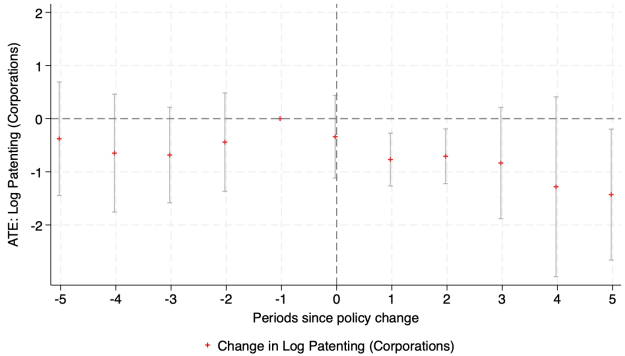
Log Patent Count - Alternative Location Definition



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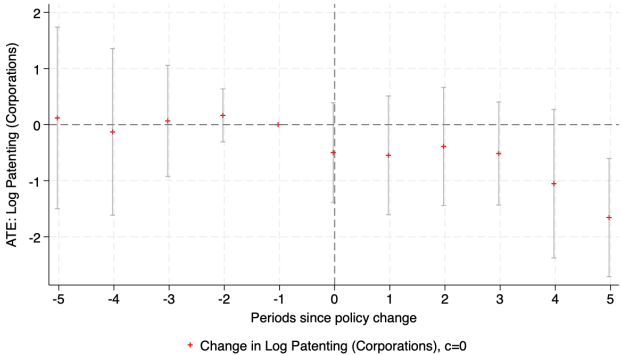
Log Patent Count - Alternative Threshold



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Extrapolating from State-Level Changes to National Changes

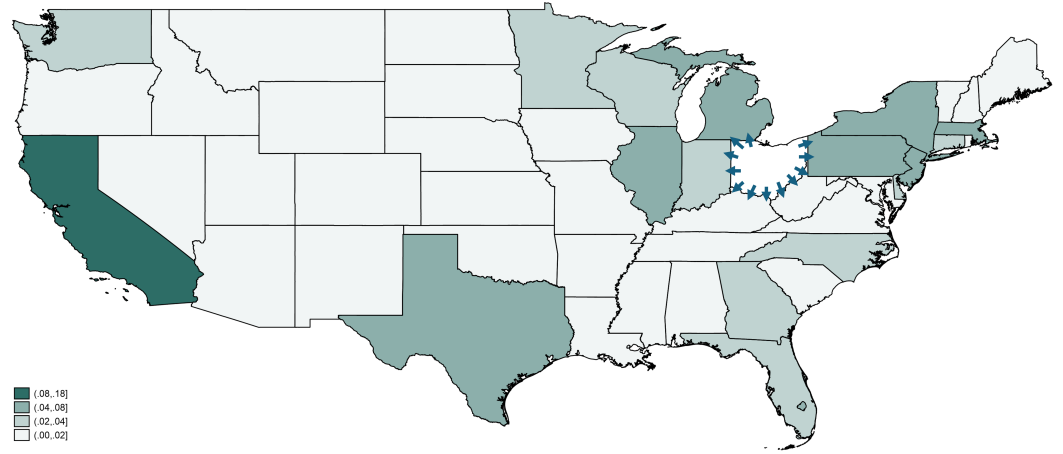
Problem: state-level changes may have spillover effects onto other states.

- Accounting for spillovers could change the estimated effect of a *national* policy change.
- Controlling for some spillovers could *intensify* our net effect (e.g., follow-on innovation).
- Controlling for other spillovers could *dampen* our net effect (e.g., out-of-state migration).

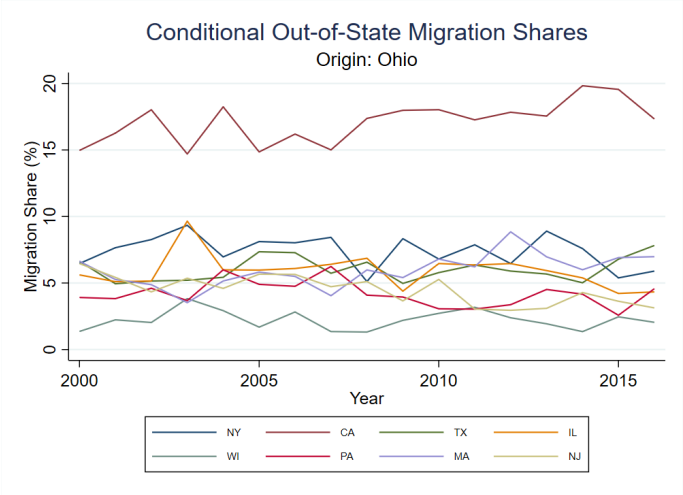
To ensure our estimated effect is a conservative lower bound in terms of magnitude: control for relative exposure of state *a* to state *b*'s out-of-state movers Details

- Stable determinants of migration (e.g., distance, industry mix, demographics, relative size).

Accounting for Spillovers: Example Mover Destinations (Ohio)



Accounting for Spillovers: Mover Destination Stability (Ohio)



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Accounting for Spillovers: Additional Controls

$\Rightarrow$ Gravity-style control for cumulative exposure to other states' changes in enforceability.

[Dubé, Legros, Thériault, DesRosiers (2017); Borusyak, Hull (2023); Borusyak, Hull, Jaravel (2022); Peri, Shih, Sparber (2015); Kerr, Lincoln (2010); Card (2001).]

$$\lambda_{i,t+h} = \left(\sum_{\forall o \neq i} \underbrace{wm_{oi,t-1}}_{i\text{'s exp. to } o} \cdot \underbrace{\mathbb{I}_{o,t} \cdot m_{o,t-1} \cdot [M_{o,t+h} - M_{o,t-1}]}_{\text{change in \# movers out of } o} \right) / \underbrace{P_{i,t-1}}_{\text{\# inventors in } i}$$

$wm_{oi,t}$: share of inventors who move out of state o in year t that end up in state i

$m_{o,t}$: level inventors moving out of state o in year t

$M_{o,t}$: log inventors moving out of state o in year t

$P_{i,t}$: level inventor population in state i in year t

Back

Accounting for Spillovers: Approach

1. $M_{o,t+h} - M_{o,t-1} = \theta_h^{\text{LP-DiD}} \cdot \mathbb{I}_{o,t} \cdot \Delta X_{o,t} + \gamma_{t+h} - \gamma_{t-1} + \varepsilon^1_{o,t+h}$
2. $Y_{i,t+h} - Y_{i,t-1} = \beta_h^{\text{LP-DiD}} \cdot \mathbb{I}_{i,t} \cdot \Delta X_{i,t} + \delta_{t+h} - \delta_{t-1} + \rho_h \cdot \hat{\lambda}_{i,t+h} + \varepsilon^2_{i,t+h}$

ρ: parameter to test for the presence of spillovers through movers

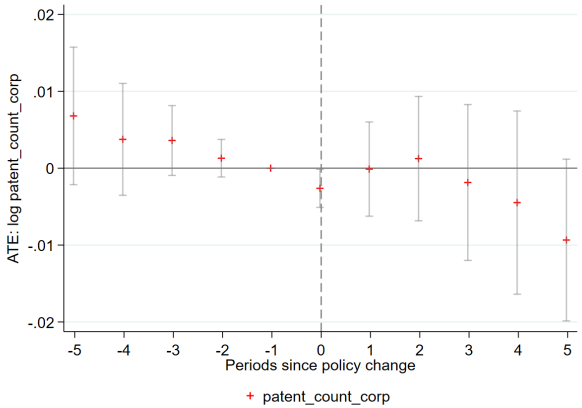
$\mathbb{I}_{i,t} \cdot \Delta X_{i,t}$: change in non-compete agreement enforceability in state i in year t (as before)

Identifying assumption #1: treatment in state i affects state j patenting only proportionally to historical migration flows.

Identifying assumption #2: treatment in state i is exogenous to things happening in state j.

Back

Accounting for Spillovers: ρ Estimate



[Note: weighted by population share in year $t-1$.]

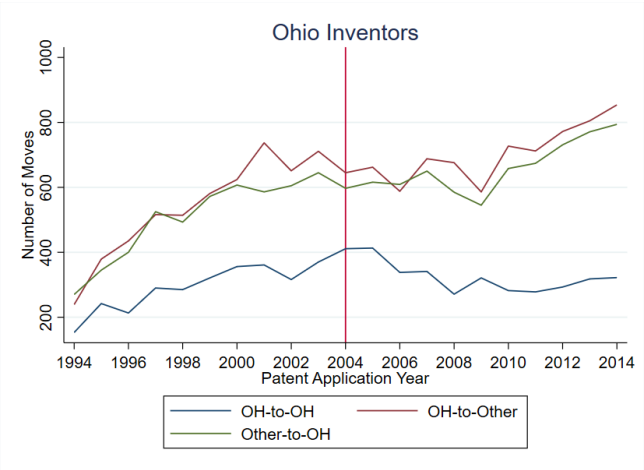
Statistically insignificant spillover effects from migration.

Effect of other states' changes $\Rightarrow$ should (and does) not depend on i's treatment period.

Consistent with existing lit that accounting for out-of-state migration does not change, e.g., optimal state-level taxation. [Mazerov, 2023]

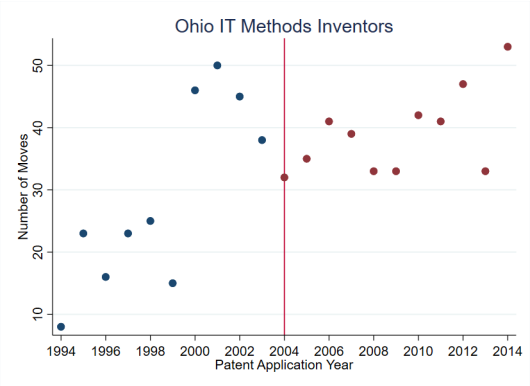
First Stage

Ohio Inventor Mobility: Statewide Trends



Back

Accounting for Spillovers: Expected Increase in Out-of-State Movers



Reconsidering Ohio IT methods:

- Roughly same number of total moves pre- and post-*Columber* in 2004.
- However, moves are more likely to be to/from out-of-state firms.

Previous Discussion Back

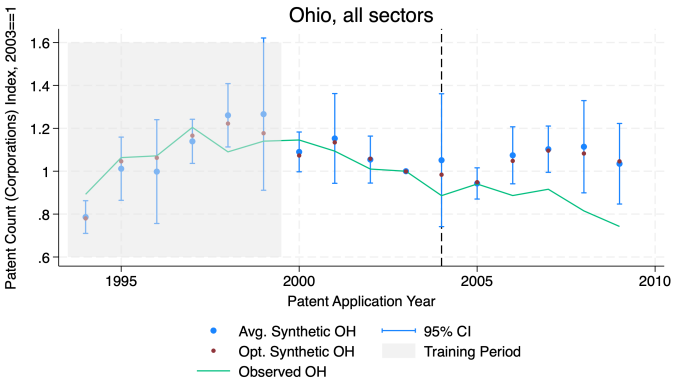
Case Study: *Lake Land v. Columber*, Ohio 2004

Lake Land Employment Group of Akron, LLC v. Columber Case Details

- Rule: continued employment *is* adequate consideration, even if the agreement is signed after employment has already started

Case study: consider effect on corporate patenting Example Mover

Ohio Patenting: Statewide Synthetic Control Comparison



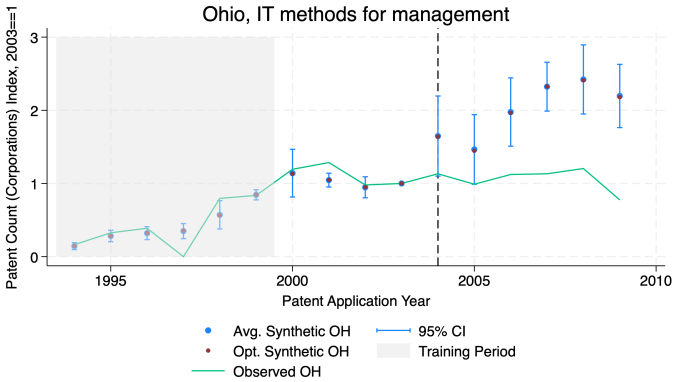
Compare Ohio to synthetic control constructed from 'never-treated' states

Takeaway: relative patenting seems to fall gradually after 2004

But this could be something else, e.g., industry-specific effects in Ohio during the Great Recession...

Levels | LOO/K-Fold Cross-Validation | States in Control

Ohio Patenting: Example Industry Synthetic Control Comparison



Patent technology fields allow us to look more closely within individual industries.

Takeaway: relative patenting seems to fall after 2004 – somewhat more sharply than when considering all industries.

Coincided with a decline in within-state inventor moves

Inventor Moves

Levels | LOO/K-Fold Cross-Validation | States in Control | Software Patentability

IT methods for management: data processing methods, specially adapted for administrative, commercial, financial, managerial, supervisory or forecasting purposes.

Early Judicial Challenges

ATS v. FTC (E.D. Pa. 2024)

- Failed to demonstrate requisite irreparable harm
- Major Questions Doctrine did not apply because (i) "the FTC had previously promulgated substantive rules to prevent unfair methods of competition" and (ii) "the rule falls squarely within the FTC's 'core mandate' of prohibiting unfair methods of competition"
- Non-Delegation Doctrine was not an issue because "Congress has articulated an intelligible guiding principle to the FTC for its substantive rulemaking authority under the FTC Act"

⇒ ATS withdrew the suit

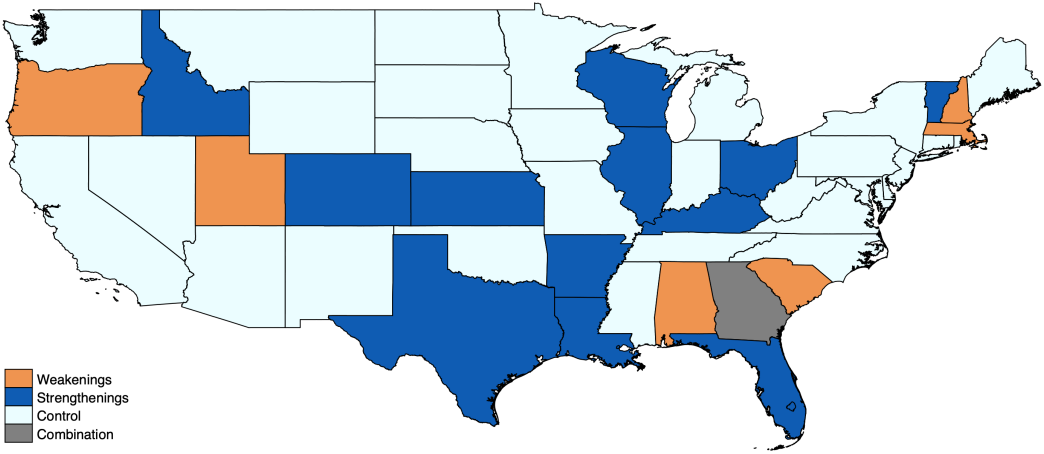
Ryan v. FTC (N.D. Tex. 2024)

- Finds requisite irreparable harm
- FTC lacked statutory authority for the ban under the Major Questions Doctrine and/or Non-Delegation Doctrine (did not specify) because "'the text, structure, and history of the FTC Act reveal that the FTC lacks substantive rulemaking authority with respect to unfair methods of competition under Section 6(g)."'
- Finding the ban arbitrary and capricious in its broad scope and impact

⇒ set aside the FTC's ban nationwide (keeping it from taking effect as planned on Sept. 4, 2024)

Back

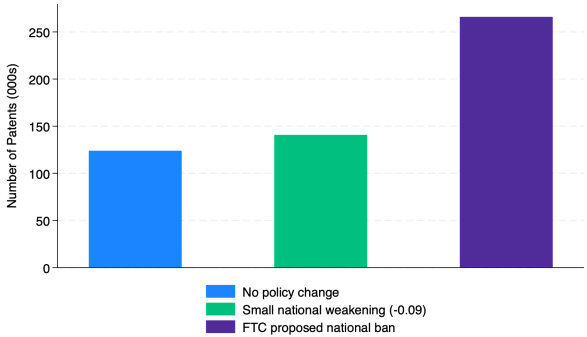
Map: States' Clean Treatments in 1991-2016



26 treatments: 17 increases and 9 decreases in enforceability

Back

Back-of-the-Envelope Calculation: National Effect of Weakenings



Predicted effect of a national weakening of average size (0.09): 14% increase in patenting

Predicted effect of a FTC ban: 115% increase in patenting

- But: could be non-linearities in the net effect; not (yet) enough data to draw definitive conclusions
- Still: positive indication + positive equity effects = some support

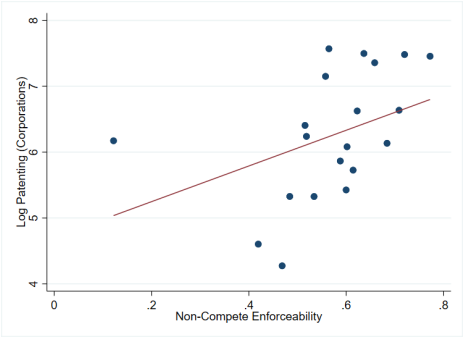
Back

Identification Strategy

Challenge: firms' use of non-competes and location choices are both potentially endogenous

- E.g., naive bin scatter of state-level patenting and non-compete enforceability in 1991-2016:

Excl. CA



- Strategy: focus on plausibly exogenous variation in state-level enforceability [Garmaise, 2011; Marx, 2009; Marx and Fleming, 2012; Chen, Zhang, and Zhou, 2017; Hausman and Lavetti, 2021; Johnson, Lavetti, and Lipsitz, 2019; and others]

Exogeneity

Other Identification Challenges | Back

Local Projections Difference-in-Difference (LP-DiD)

LP-DiD estimator from Dube, Girardi, Jordà, and Taylor (2023)

- $\sim$ Callaway/Sant'Anna (2020) & Borusyak/Jaravel/Spiess (2021) but w/ non-absorbing non-binary treatment
- Avoid negative weights bias in TWFE with staggered heterogeneous treatments

$$y_{i,t+h} - y_{i,t-1} = \underbrace{\beta_h^{\text{LP-DiD}} \cdot \mathbb{I}_{i,t} \cdot \Delta X_{i,t}}_{\text{treatment (ch. in index)}} + \underbrace{\delta_{t+h} - \delta_{t-1}}_{\text{time FE}} + \varepsilon_{i,t+h} \quad \text{for } h = -H, ..., H$$

where we restrict the sample to observations that satisfy the following conditions

- clean control: not-yet or never treated states
- clean treatment: state-years with only one treatment in the past H years / treatment greater than c

Baseline spec: $H = 5$ and $c = 15/600$ (robustness $c = 0/600$ and $c = 50/600$). SEs clustered at state-level.