

April 19, 2023

The Federal Trade Commission
600 Pennsylvania Avenue, NW
Washington, D.C. 20580

Dear Commissioners:

We are law professors, economists, and business school professors who have written extensively in the field of innovation and law. We would like to submit an important article regarding noncompetes by two of us, Jonathan Barnett & Ted Sichelman, *The Case for Noncompetes*, 86 THE UNIVERSITY OF CHICAGO LAW REVIEW 953 (2020), for review by the FTC.

This article, which presents the most comprehensive review to our knowledge of empirical evidence concerning the economic effects of noncompetes, addresses – and contradicts – many of the claims made by the FTC in support of its recent proposed rule to effectively ban noncompetes nationwide. In this regard, it offers a viewpoint quite different from the vast majority of academics invited to speak at the FTC’s January 9, 2020 workshop on the issue, *Non-Competes in the Workplace: Examining Antitrust and Consumer Protection Issues*, as well as the academic research cited by the FTC in favor of its proposed rulemaking.

Specifically, the article contributes a new perspective to the current policy debate over non-competition covenants and other contractual restrictions on employee mobility in technology sectors. As the FTC is aware, scholars have widely argued that innovation thrives in jurisdictions that prohibit noncompetes. This argument focuses on the rise of Silicon Valley as a technology hub, where noncompetes were allegedly not enforced, and the ostensible decline of Boston’s Route 128 area, where noncompetes were allegedly enforced. In related work, other scholars have conducted empirical studies purporting to show that noncompetes produce significant economic costs and dampen innovation and startup creation. Based on these scholarly views, several states have recently enacted, and more are seriously debating, statutes that limit or prohibit noncompetes. Similarly, several U.S. Senators proposed legislation that would essentially ban noncompetes nationwide. And now, the FTC seeks a nationwide ban via its proposed rulemaking.

This article makes three original and notable contributions that the FTC should seriously consider. First, it shows that neither theory nor empirics supports the economic arguments commonly made in favor of prohibiting noncompetes. As a matter of theory, conventional wisdom emphasizes that noncompetes impede the circulation of intellectual capital and depress wages, but typically overlooking that noncompetes encourage firms to cultivate employees’ human capital and invest in innovative activity. As a matter of empirics, the article contests the widely accepted view that Silicon Valley surpassed Boston because of supposed differences in noncompete enforcement, which tend to be exaggerated. A careful examination of the evidence shows that the Boston area has remained a significant innovation center and that technological and other economic factors explain Silicon Valley’s exceptional trajectory. Second, the article identifies serious factual and methodological deficiencies in several widely-cited empirical studies, which cast substantial doubt on those studies’ findings and policy implications. Notably, these studies misread and misunderstand state law and enforcement patterns related to noncompetes. Third, based on

exhaustive review of the evidence, the article proposes an original error-cost framework to analyze noncompetes, which provides an economic rationale for the common law's centuries-old reasonableness standard in determining whether to enforce a non-compete.

Unfortunately, even though the FTC is well-aware of Prof. Barnett's and Sichelman's work, they have not been invited to the FTC's workshops on noncompetes, nor were they consulted for the recent round of rulemaking, nor was their research mentioned in the 216-page Notice of Proposed Rulemaking that sets forth the FTC's proposed Non-Compete Clause Rule. In the interests of making public policy on the basis of all available evidence and scholarship, we believe that the FTC's current consideration of noncompetes would be enriched by their research, and we hope the FTC will read their work carefully and contact them to discuss it.

In short, it is critical in our view that the FTC independently assess the validity of the studies it is relying upon so heavily for its proposed rulemaking before taking any actions based on those studies' claims.

Sincerely,

Kristina M. L. Acri
John L. Knight Chair of Economics
The Colorado College

Jonathan Barnett
Professor of Law
University of Southern California

The Honorable Ronald A. Cass
Dean Emeritus
Boston University School of Law
Former Vice-Chairman and Commissioner
United States International Trade Commission

Kenneth G. Elzinga
Robert C. Taylor Professor of Economics
University of Virginia

Richard A. Epstein
Laurence A. Tisch Professor of Law
New York University School of Law
Peter and Kirsten Bedford Senior Fellow
Hoover Institution, Stanford University
James Parker Hall Distinguished Service Professor of Law Emeritus
University of Chicago Law School

Harold Furchtgott-Roth
Furchtgott-Roth Economic Enterprises
Senior Fellow
Hudson Institute

Bowman Heiden
Visiting Professor
University of California, Berkeley

Keith N. Hylton
William Fairfield Warren Distinguished Professor
Boston University School of Law

Benjamin Klein
Professor Emeritus of Economics
University of California – Los Angeles

Thomas A. Lambert
Wall Family Chair in Corporate Law and Governance
University of Missouri School of Law

Adam Mossoff
Professor of Law
Antonin Scalia Law School
George Mason University

Kristen Osenga
Austin E. Owen Research Scholar & Professor of Law
University of Richmond School of Law

Ted M. Sichelman
Judith Keep Professor of Law
University of San Diego

John M. Yun
Associate Professor of Law
Antonin Scalia Law School
George Mason University

The Case for Noncompetes

Jonathan M. Barnett[†] & Ted Sichelman^{††}

Scholars and other commentators widely assert that enforcement of contractual and other limitations on labor mobility deters innovation. Based on this view, federal and state legislators have taken, and continue to consider, actions to limit the enforcement of covenants not to compete in employment agreements. These actions would discard the centuries-old reasonableness standard that governs the enforcement of these provisions, often termed “noncompetes,” in all but four states (notably, California). We argue that this zero-enforcement position lacks a sound basis in theory or empirics. As a matter of theory, it overlooks the complex effects of contractual limitations on labor mobility in innovation markets. While it is frequently asserted that noncompetes may impede knowledge spillovers that foster innovation, it is frequently overlooked that noncompetes may encourage firms to invest in cultivating intellectual and human capital. As a matter of empirics, we show that two commonly referenced bodies of evidence fail to support zero enforcement. First, we revisit the conventional account of the rise of Silicon Valley and the purported fall

[†] Torrey H. Webb Professor, University of Southern California, Gould School of Law.

^{††} Professor of Law, University of San Diego School of Law.

We thank Shyam Balganes, Norman Bishara, Michael Burstein, Richard Castanon, Bryan Choi, Victor Fleischer, Lee Fleming, Ronald Gilson, John Goldberg, Robert Gomulkiewicz, Charles Tait Graves, Michael Guttentag, Ryan Holte, Justin Hughes, David Levine, Orly Lobel, Greg Mandel, Karl Mannheim, Matt Marx, Adam Mossoff, Natasha Nayak, Ruth Okediji, David Orozco, Eric Posner, Greg Reilly, Michael Risch, Ben Sachs, David Schwartz, Joseph Singer, Henry Smith, Kathy Spier, Matt Stephenson, James Stern, Olav Sorenson, Evan Starr, David Taylor, Saurabh Vishnubhakat, Polk Wagner, and Stephen Yelderman, as well as attendees at the 2015 Works in Progress in Intellectual Property Conference, the 2017 Conference of the American Law and Economics Association, and workshops at Harvard Law School, University of Pennsylvania Law School, Loyola Law School, Los Angeles, the Center for Law and the Social Sciences at the University of Southern California School of Law, and the University of San Diego School of Law for their helpful discussions and comments on prior versions of this paper. We also thank Carolyn Ginno, Matthew Arnold, Anna Ayar, Vanand Baroni, Haley Dumas, Ryan Foley, David Javidzad, Rachel Stariha, and Millicent Whitmore for their valuable research assistance.

of the Boston area as innovation centers, showing that this divergence cannot suitably be explained by differences in state law regarding noncompetes. Second, we show that widely cited empirical studies fail to support a causal relationship between noncompetes, reduced labor mobility, and reduced innovation. Given these theoretical and empirical complexities, we propose an error-cost approach that provides an economic rationale for the common law's reasonableness approach toward contractual constraints on the circulation of human capital.

INTRODUCTION.....	955
I. OLD AND NEW VIEWS: FROM AGNOSTICISM TO ABOLITIONISM.....	967
A. Foundations: Becker and Marshall.....	967
1. Becker: Human capital as an economic asset.....	968
2. Marshall: Industrial districts and agglomeration economies. ...	968
B. The Old View: Restricting Labor Mobility Is Good and Bad for Innovation	969
1. The credible commitment problem.	969
2. The noncompete solution.....	971
3. A weak objection to noncompetes.....	972
4. A better objection to noncompetes.	973
5. Evaluation.....	974
C. The New View: Restricting Labor Mobility is Bad for Innovation	975
1. Background: Saxenian and Gilson.....	975
2. An initial critique.....	976
3. The empirical challenge.....	977
II. THE EVIDENCE AGAINST NONCOMPETES: A CLOSE LOOK.....	978
A. Reasons to Doubt the Standard Account of the Rise of Silicon Valley.....	978
1. Did California courts really never enforce noncompetes?.....	980
2. Substitutes for noncompetes.	986
3. Was Massachusetts's noncompete and trade secret law significantly different from California's?.....	992
4. Did weak enforcement of noncompetes really cause the Valley to rise?.....	997
5. Did Massachusetts really decline?.....	1006
B. Empirical Studies: Noncompetes, Mobility, and Innovation	1009
1. Nonexperimental studies.	1010
2. Experimental studies.....	1027
3. Evaluation.....	1029
III. MAKING NONCOMPETE POLICY UNDER UNCERTAINTY	1030
A. Policy Continuum.....	1031
B. The "Free Contracting" Baseline.....	1032
C. Is There Really a Collective Action Problem?.....	1033
D. Why Employers Decline to Use Noncompetes	1036
1. Variation in use of noncompetes across employee types.....	1039

2. Variation in the use of noncompetes across industry types.....	1040
E. Error Costs and Noncompete Policy.....	1042
CONCLUSION	1045
APPENDIX.....	1047

INTRODUCTION

On February 23, 2017, two titans of Silicon Valley went to war in federal court: Google filed a lawsuit against Uber, accusing it of using intellectual property allegedly stolen by one of the lead engineers on Waymo, Google's self-driving automotive subsidiary.¹ Specifically, Google alleged that Anthony Levandowski had misappropriated Google's intellectual property before departing (along with other Google engineers) to found Otto, a self-driving car startup subsequently acquired by Uber for \$680 million.² The legal basis for Google's lawsuit against Uber and Levandowski consisted of a medley of federal trade secret, patent infringement, and state trade secret and unfair competition claims.³ Given the high economic stakes, commentators speculated that if Google prevailed, the ultimate damages could exceed a billion dollars.⁴ While the litigation was pending, the trial judge ordered Levandowski to stop working on projects involving the technology that had been allegedly misappropriated.⁵ Although Google and Uber settled the dispute shortly after trial proceedings commenced for a mere \$245 million, an arbitration panel subsequently found against Levandowski (who was fired by Uber⁶) and, on an interim basis, awarded Google \$127 million in damages, for which Uber may be financially responsible under indemnification obligations to its former employee.⁷

¹ Complaint, *Waymo LLC v Uber Technologies, Inc.*, No 3:17-cv-00939, *2–5 (ND Cal filed Feb 23, 2017) (available on Westlaw at 2017 WL 726994) (Waymo Complaint) (stating various causes of action against Uber relating to alleged actions by a former Waymo employee in connection with his departure from Waymo to Uber's self-driving car project).

² See id at *3–4 (describing evidence showing that Levandowski, former Waymo engineer, misappropriated information from Waymo upon departure from company).

³ Id at *2, 16, 19, 21, 27 (stating trade secret, patent infringement, and unfair competition causes of action).

⁴ See Aarian Marshall, *Google's Robocar Lawsuit Could Kill Uber's Future and Send Execs to Prison* (Wired, Feb 28, 2017), archived at <https://perma.cc/SH8J-ZQ2H>.

⁵ Joe Mullin, *Judge's Order Bars Uber Engineer from Lidar Work, Demands Return of Stolen Files* (Ars Technica, May 15, 2017), archived at <https://perma.cc/B7KC-ZD46>; Order Granting in Part and Denying in Part Plaintiff's Motion for Provisional Relief, *Waymo LLC v Uber Technologies, Inc.*, No 3:17-cv-00939, *23 (ND Cal filed May 11, 2017).

⁶ Aarian Marshall, *Uber Fired Its Robocar Guru, but Its Legal Fight with Google Goes On* (Wired, May 30, 2017), archived at <https://perma.cc/YZ3K-78TV>.

⁷ Uber Technologies, Inc., *Form S-1 Registration Statement* F-72, F-82 (SEC filed Apr 11, 2019), archived at <https://perma.cc/Z2JE-NZBQ>.

The Google-Uber litigation, and the rich suite of legal and economic instruments deployed to restrain the departure of a prized employee, is a notable counterexample to the now-standard account of unrestrained employee movement in Silicon Valley, the world's preeminent innovation cluster. That account emphasizes the ease with which technical and managerial talent, and the intellectual capital embodied in that talent, circulates among competitors, resulting in knowledge spillovers that redound to the collective benefit of the innovation ecosystem. This free-flowing movement of human capital is widely attributed to cultural norms, organizational practices, and, especially among legal scholars, California's refusal to enforce a contractual clause known as a "covenant not to compete" (or "noncompete").⁸

A noncompete typically limits a former employee's ability to work for competitors in a certain industry and a certain geographic area for a certain period of time. In contemporary scholarly and policy discussions of innovation policy, the noncompete has recently become a surprising focal point. Specifically, the literature has widely adopted the view initially espoused by Professor Ronald Gilson—albeit in a much more qualified form—that California's general refusal to enforce noncompetes in significant part explains the exceptional growth of Silicon Valley since the early 1980s while Massachusetts's willingness to enforce noncompetes spurred the purported decline of the Route 128 area around Boston.⁹ Following this view, California has enjoyed a healthy

⁸ On cultural norms and organizational practices, see AnnaLee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* 1–9, 32–34, 44–45, 50–56 (Harvard 1996) (arguing that Silicon Valley's comparative advantage compared to Route 128 derived from its "network-based" system that promotes collective learning through informal collaboration within and between firms, as compared to Route 128's hierarchical system based on centralized and vertically integrated corporate entities). On noncompetes, see Ronald J. Gilson, *The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete*, 74 NYU L Rev 575, 602–09 (1999) (arguing that differences in the enforceability of noncompetes contributed significantly to the ascendance of Silicon Valley over Route 128 by promoting the circulation of human and intellectual capital among competing firms).

⁹ For the original statement of this view, see Gilson, 74 NYU L Rev at 602–09 (cited in note 8). In the legal literature, representative contributions that have adopted and expanded upon Gilson's insight include: Orly Lobel, *Talent Wants to Be Free: Why We Should Learn to Love Leaks, Raids and Free Riding* 67–70 (Yale 2013) (arguing that California's refusal to enforce noncompetes at least partly accounts for its ascendance over Route 128 and attributing this hypothesis to Ronald Gilson); Orly Lobel, *The New Cognitive Property: Human Capital Law and the Reach of Intellectual Property*, 93 Tex L Rev 789, 825–26 (2015) (likening noncompetes to "a thick cluster of property rights that rigidifies the market and reduces the ability to move forward"); Viva R. Moffat, *Making Non-Competes Unenforceable*, 54 Ariz L Rev 939, 979–80 (2013) (arguing for a uniform rule of nonenforceability on the ground that noncompetes skew the balance in intellectual property policy

circulation of human capital, while Massachusetts has been deprived of the “agglomeration economies” that promote robust innovation clusters.¹⁰ The result in California is a virtuous circle of accelerated innovation that led to the rise of Silicon Valley; the result in Massachusetts is a sad story of a Silicon Valley that could have been but wasn’t.

The recent surge of interest in noncompetes is a welcome extension of innovation policy analysis. Noncompetes, and the broader universe of contractual and economic restraints on labor mobility, are a critical but overlooked tool in promoting robust innovation ecosystems. Scholarly discussions of innovation policy typically focus on the extent to which intellectual property rights such as patents or copyrights regulate the flow of informational assets. But this misses a key component of any innovation environment—namely, the flow of intellectual capital embedded in the human beings that innovate and commercialize new products and services. In the business world, firms are keenly aware of the value of human capital and use contractual and economic instruments to avoid losing their most valuable personnel to competitors. Based on a survey of 11,500 participants, a recent study found that an estimated 18 percent of all US workers (roughly, 30 million people), and approximately one-third of workers in professional, scientific, and technical occupations, are subject to noncompetes.¹¹ The extent to which the law should enforce these contractual instruments is a matter of fundamental importance.

between protecting R&D incentives and the public domain); Viva R. Moffat, *The Wrong Tool for the Job: The IP Problem with Non-Competition Agreements*, 52 Wm & Mary L Rev 873, 911–20 (2010) (arguing that noncompetes are a poor tool for protecting IP rights). In the economics literature, see Sampsa Samila and Olav Sorenson, *Noncompete Covenants: Incentives to Innovate or Impediments to Growth*, 57 Mgmt Sci 425, 436 (2011) (arguing that empirical evidence supports relaxing enforcement of noncompetes to accelerate labor mobility and stimulate entrepreneurship). In an important variant on this line of argument, Professor Alan Hyde agrees that labor mobility lies behind the success of Silicon Valley but attributes this difference principally to California firms’ reluctance to bring trade secret claims against former employees and California courts’ resistance to grant such claims, rather than differences in the treatment of noncompetes. See Alan Hyde, *Working in Silicon Valley: Economic and Legal Analysis of a High-Velocity Labor Market* 32–40 (M.E. Sharpe 2003).

¹⁰ Gilson, 74 NYU L Rev at 576, 606–07 (cited in note 8).

¹¹ See J.J. Prescott, Norman D. Bishara, and Evan Starr, *Understanding Noncompetition Agreements: The 2014 Noncompete Survey Project*, 2016 Mich St L Rev 369, 461; Evan Starr, J.J. Prescott, and Norman Bishara, *Noncompetes in the U.S. Labor Force* *16–19 (University of Michigan Law and Economics Research Paper, Aug 2019), archived at <https://perma.cc/ZXU6-NAGU>.

In recent years, a growing number of scholars and policymakers have adopted a simple answer to this question: *never*.¹² Following this view—popularized by the slogan, “talent wants to be free”—the free circulation of human capital always, or usually, promotes innovation. As such, any constraints “imposed” by employers reflect either overreaching or economic irrationality.¹³ As a matter of policy, this view recommends that all states adopt California’s purported zero-tolerance regime—a change that would undo the common-law “reasonableness” standard currently used by forty-six states to adjudge the enforceability of noncompetes.¹⁴ (The current exceptions are California, North Dakota, and Oklahoma, which bar noncompete enforcement against individuals in most circumstances;¹⁵ recently, Hawaii barred noncompetes for “technology business[es].”¹⁶) To be clear, even under the long-standing common law doctrine (dating from an English precedent in 1711¹⁷), noncompete clauses are enforceable only if they set forth “reasonable” temporal, geographic, and scope-of-industry limitations.¹⁸ For the “talent wants to be free” school of

¹² See note 13 (noting scholars and policymakers adopting this view); Part I.C (same).

¹³ For representative sources that express this view, see Lobel, *Talent Wants to Be Free* at 27–41, 201 (cited in note 9) (arguing that legal constraints, such as noncompetes, that impede labor mobility discourage innovation by hindering employee creativity and blocking interfirm flows of intellectual capital); Yochai Benkler, *Law, Innovation and Collaboration in Networked Economy and Society*, 13 Ann Rev L & Soc Sci 231, 235 (2017) (arguing that noncompetes are incompatible with a “network view,” rather than an “atomistic view,” of innovation, and citing empirical evidence that innovation thrives in network relationships with high rates of knowledge flow); Lobel, *Talent Wants to Be Free* at 64 (cited in note 9) (arguing that firms that advocate for noncompete enforcement “would likely benefit from the very movement they are attempting to limit”); Moffat, 52 Wm & Mary L Rev at 893–97 (cited in note 9) (“[N]oncompetes are at odds with both the fair bargaining process and efficiency underpinnings of the freedom of contract rationale.”); id at 898–99 (arguing that the “IP justification” for noncompetes is insufficient and advocating a policy of zero enforcement); Alan Hyde, *Should Noncompetes Be Enforced?*, 33 Regulation 6, 9 (Winter 2010–11) (stating that losing an employee means gaining access to a new information network, rather than losing an information asset). Ronald Gilson expresses a similar view, although he clarifies that the positive welfare effects he attributes to California’s refusal to enforce noncompetes may be limited to that particular state at a particular point in time in its economic trajectory. See Gilson, 74 NYU L Rev at 619–20, 627–29 (cited in note 8).

¹⁴ For a review of state laws on noncompetes, see generally J. Gregory Grisham, *Beyond the Red-Blue Divide: An Overview of Current Trends in State Non-Compete Law*, 18 Federalist Society Rev 42 (June 19, 2017), archived at <https://perma.cc/33Q7-N9JF>.

¹⁵ Cal Bus & Prof Code § 16600; ND Cent Code § 9-08-06; 15 Okla Stat § 217.

¹⁶ Hawaii Rev Stat Ann § 480-4(d).

¹⁷ *Mitchel v Reynolds*, 24 Eng Rep 347, 347 (KB 1711) (stating that a “bond or promise to restrain oneself from trading in a particular place, if made upon a reasonable consideration, is good”).

¹⁸ See id at 348 (drawing distinction between restraints “not to exercise a trade throughout the kingdom,” which are deemed to be void, and restraints that are “limited to

thought, it seems that no limitation on the movement of talent can ever be deemed reasonable.

These academic views now play a prominent part in ongoing policy debates and press coverage concerning proposed laws that would limit, or bar, the enforcement of noncompetes.¹⁹ On March 7, 2019, a bipartisan group of six Democratic and Republican US senators sent a joint letter to the Government Accountability Office requesting that it investigate the impact of noncompetes “on workers and on the economy as a whole.”²⁰ Citing academic research that “California’s ban on non-compete agreements has been a prime factor in the state’s growing economy,” three Democratic US senators introduced legislation in April 2018 to impose a ban on noncompetes nationwide, which was re-introduced by

a particular place,” which may be deemed reasonable). For more detailed discussion of the reasonableness standard, see Part II.A.3.b.

¹⁹ Reflecting unusual interest in the intricacies of employment contracts, *The New York Times*, *The Wall Street Journal*, *Forbes*, *Fortune*, *The Boston Globe*, and other media outlets have run stories and op-eds on the use of noncompete clauses and legislative proposals to ban these clauses. See, for example, Orly Lobel, *Companies Compete but Won’t Let Their Workers Do the Same* (NY Times, May 4, 2017), archived at <https://perma.cc/LG33-EUTV> (discussing states’ differences in enforcing noncompetes, federal proposals to limit noncompetes, and the harmful effects of noncompetes on employees); Steven Greenhouse, *Noncompete Clauses Increasingly Pop Up in Array of Jobs* (NY Times, June 8, 2014), archived at <https://perma.cc/P575-QQCX> (discussing proposed legislation in Massachusetts limiting enforcement of noncompetes); Neil Irwin, *When the Guy Making Your Sandwich Has a Noncompete Clause* (NY Times, Oct 14, 2014), archived at <https://perma.cc/FQ4X-FNKB> (discussing the economic, legal, and moral issues raised by noncompetes); Ruth Simon and Angus Loten, *Litigation over Noncompete Clauses Is Rising* (Wall St J, Aug 14, 2013), online at <https://www.wsj.com/articles/litigation-over-non-compete-clauses-is-rising-does-entrepreneurship-suffer-1376520622> (visited Feb 17, 2020) (Perma archive unavailable) (discussing increasing litigation over, and prevalence of, noncompete agreements); Joann S. Lublin, *Companies Loosen the Handcuffs on Non-Competes* (Wall St J, Aug 12, 2013), online at <https://www.wsj.com/articles/companies-loosen-the-handcuffs-on-noncompetes-1376320350> (visited Feb 11, 2020) (Perma archive unavailable) (discussing cases in which employers declined to strictly enforce noncompetes when executives departed for other large corporations); Eric Goldman, *Why Congress Should Restrict Employee Non-Compete Clauses* (Forbes, June 30, 2015), archived at <https://perma.cc/52G4-KTLD> (supporting federal legislation to limit enforcement of noncompetes); Claire Zillman, *Are Noncompete Agreements Hurting Tech Innovation?* (Fortune, July 1, 2015), archived at <https://perma.cc/2YRK-95G4> (discussing differing views on enforceability of noncompetes, their impact on innovation, and proposed state legislation to limit enforceability); John McEleney, *Noncompetes Hurt Workers and Their Employers* (Boston Globe, June 28, 2015), online at <https://www.bostonglobe.com/opinion/2015/06/27/onshape-ceo-john-mceleney-noncompetes-hurt-workers-and-their-employers/6NbXbI5jhZpl5wyvc28FSI/story.html> (visited Feb 3, 2020) (Perma archive unavailable) (CEO of Massachusetts-based company arguing that noncompetes should “go away altogether”).

²⁰ Senator Christopher Murphy, et al, Letter to the Honorable Gene Dodaro, Comptroller General, US Government Accountability Office *1 (Mar 7, 2019), archived at <https://perma.cc/W38U-2YRR>.

two Democratic and Republican US senators in October 2019.²¹ Like these US senators, advocates for strict limitations on, or outright bans of, noncompetes explicitly refer to selected empirical studies in arguing that these reforms would facilitate labor mobility and promote innovation.²² A leading academic opponent of noncompetes has written: “[T]he research suggests that noncompetes should be banned for all employees, regardless of skill, industry or wage; they simply do more harm than good.”²³ In 2018, the influential *Economist* magazine endorsed an only slightly more qualified position, arguing that noncompetes should be enforced only in narrow circumstances and similarly referring to academic research to support this position.²⁴

A sizeable number of state legislatures have derived similar conclusions. Since 2014, the legislatures of thirty-seven states have formally considered laws that would affect the enforceability of noncompetes in employment agreements.²⁵ Of those proposed

²¹ On the April 2018 proposed legislation, see Office of Senator Ron Wyden, Press Release, *Wyden, Murphy, Warren Introduce Bill to Ban Unnecessary and Harmful Non-Compete Agreements* (Apr 26, 2018), archived at <https://perma.cc/6N2T-V6N2> (“The new legislation would prohibit the use of non-compete agreements. . . . Many believe that California’s ban on non-compete agreements has been a prime factor in the state’s growing economy.”); Workforce Mobility Act of 2018, S 2782, 115th Cong, 2d Sess (Apr 26, 2018). On the October 2019 proposed legislation, see Office of Senator Todd Young, Press Release, *Young and Murphy Introduce Bill to Limit Non-Compete Agreements, Protect Workers* (Oct 17, 2019), archived at <https://perma.cc/PFU9-6GWW> (“Research indicates that workers trapped by non-competes are less mobile, which results in firms having difficulty hiring workers with the right set of skills.”); Workforce Mobility Act of 2019, S 2614, 116th Cong, 1st Sess (Oct 27, 2019).

²² See, for example, Lobel, *Companies Compete but Won’t Let Their Workers* (cited in note 19). Lori Ehrlich, a Massachusetts representative who introduced a bill to preclude most noncompete enforcement, believes noncompetes have an “overall impact of stifling innovation” and cites academic studies on her website. Lori A. Ehrlich, *Fact Sheet: H. 2366* (2018), archived at <https://perma.cc/6XJR-9ZY8> (discussing a “recent peer-reviewed academic paper” which shows that nearly one in five employees are bound by a noncompete). See also Zillman, *Are Noncompete Agreements Hurting Tech Innovation?* (cited in note 19).

²³ Lobel, *Companies Compete but Won’t Let Their Workers* (cited in note 19).

²⁴ *Restrain the Restraints: The Case Against Non-compete Clauses* (The Economist, May 19, 2018), online at <https://www.economist.com/leaders/2018/05/19/the-case-against-non-compete-clauses> (visited Feb 11, 2020) (Perma archive unavailable) (supporting a requirement for employers to demonstrate genuine harm in noncompete litigation, as well as arguing that noncompetes should be enforced only if they apply for a short time and they are negotiated before an employee accepts a job offer).

²⁵ These states are Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Hawaii, Idaho, Illinois, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New York, Ohio, Pennsylvania, New Jersey, North Dakota, Oregon, Rhode Island, South Dakota, Texas, Utah, Vermont, Washington, and West Virginia. This includes all legislatures in which a member has formally proposed a law affecting noncompetes, whether generally or in specific industries, since 2014, based on a search of legislative proposals in the Westlaw and LexisNexis databases. See also Appendix.

bills, all but six proposed to limit enforceability (up to and including outright bans). In twenty-one states, these debates have translated into action. This includes Massachusetts, which in 2018 enacted a statute prohibiting noncompetes for certain categories of employees²⁶ and, in most other cases, imposes notice obligations on employers.²⁷ The Appendix shows all statutory changes to state noncompete laws during 2014–2019. Nineteen changes reduced enforceability and six enhanced it (although one was repealed two years later and the other was offset by other provisions that limited enforceability). In enacting its ban on noncompetes in the technology industry, Hawaii specifically referenced academic studies that purportedly supported this policy action as being conducive to innovation.²⁸ Additionally, in California, some courts have recently adopted expansive understandings of the state’s statutory limitation on enforcing noncompetes against individuals, applying it to other contractual obligations that have long been thought to lie outside the purview of the statute.²⁹ In

²⁶ The statute primarily captures workers who are “nonexempt under the Fair Labor Standards Act,” Mass Gen Laws Ann, ch 149, § 24L, which generally targets salaried workers employed on a fixed hourly basis and most likely would not target managerial and other professional employees. See US Department of Labor Wage and Hour Division, *Fact Sheet #17A: Exemption for Executive, Administrative, Professional, Computer & Outside Sales Employees Under the Fair Labor Standards Act (FLSA)* (July 2008), archived at <https://perma.cc/7VDP-MURT>. However, there may be ambiguities in certain cases. For further discussion, see Stephen T. Melnick, Chris Kaczmarek, and Melissa L. McDonagh, *Frequently Asked Questions About the New Massachusetts Noncompetition Agreement Act* (Littler, Sept 5, 2018), archived at <https://perma.cc/ER4R-PMZZ>.

²⁷ Mass Gen Laws Ann, ch 149, § 24L. The statute also requires that a noncompete “must be no broader than necessary to protect . . . legitimate business interests of the employer” and must have a reasonable geographic, temporal, and industry scope, see *id*; however, this language simply restates Massachusetts courts’ holdings on this point. For further discussion, see notes 150–51 and accompanying text. Note further that the effect of the Massachusetts statute is qualified in two respects: (i) the law does not apply to a noncompete provision in an employer-employee separation agreement (if there is a seven-day period during which the employee can rescind acceptance), and (ii) Massachusetts simultaneously codified the “inevitable disclosure” doctrine, which entitles employers to seek injunctions against departing employees in the case of “threatened misappropriation,” Massachusetts Trade Secrets Act, Mass HR 4868, § 19, 190th Sess (July 31, 2018). For further discussion, see note 130 and accompanying text.

²⁸ The legislature stated: “[A]cademic studies have concluded that embracing employee mobility is a superior strategy for nurturing an innovation-based economy.” Robert B. Milligan, *Hawaii Bans Non-Compete and Non-Solicit Agreements with Technology Workers* (Seyfarth Shaw, July 6, 2015), archived at <https://perma.cc/TTQ3-Y9G9>.

²⁹ These decisions purport to apply the California Supreme Court’s 2008 decision in *Edwards v Arthur Andersen LLP*, 189 P3d 285 (Cal 2008). See, for example, *Barker v Insight Global LLC*, 2019 WL 176260, *3 (ND Cal) (allowing claim that a nonsolicitation clause was illegal under California’s noncompete ban to go forward); *AMN Healthcare, Inc v Aya Healthcare Services, Inc*, 28 Cal App 5th 923, 935–37 (2018) (holding that a firm could not enforce a nonsolicitation clause against a former recruiter employed by the firm, on the grounds that doing so would violate California’s ban on noncompetes); *Golden v*

2018, a California lower court even applied the statutory limitation to prevent businesses from entering into exclusivity agreements between themselves, which had been traditionally the purview of California's antitrust provisions, not its statutory prohibition against noncompetes.³⁰ While the appellate court reversed this ruling, it is nonetheless indicative of an increasingly dogmatic approach against the enforcement of noncompetes or other contractual provisions deemed to have a comparable effect.³¹

The vigorous political debate and ongoing legislative activity relating to noncompetes encompasses a variety of policy concerns, including efficiency-related economic concerns as well as noneconomic concerns involving personal autonomy and distributive justice.³² In markets for highly skilled technical and managerial labor (as distinguished from lower-income and lower-skilled occupations, which has been the focus of some of the proposed legislative bans³³), the debate on both sides has principally relied on economic arguments. The toolkit of law-and-economics analysis is well suited to provide a balanced analysis of efficiency-related arguments for and against proposed policy shifts with respect to

California Emergency Physicians Medical Group, 896 F3d 1018, 1024–26 (9th Cir 2018) (refusing to uphold a litigation settlement agreement in which a physician-plaintiff agreed not to work at any facility that is owned, managed, or contracted by the medical group that had formerly employed the physician, but without imposing any other restrictions on the physician's pursuit of other employment opportunities). Note that the *Barker* and *AMN Healthcare* decisions depart from long-standing California precedent upholding the enforceability of postemployment nonsolicitation covenants subject to a reasonableness standard, see *Loral Corp v Moyes*, 174 Cal App 3d 268, 278–79 (1985).

³⁰ See *Beckman Coulter, Inc v Quidel Corp*, 2018 WL 9943513, *1–2 (Cal Super).

³¹ See *Quidel Corp v Superior Court of San Diego County*, 39 Cal App 5th 530, 533, 535–36, 544–45 (2019) (reversing lower court's ruling based on *Edwards* invalidating the exclusivity agreement, and holding that *Edwards* does not extend beyond the employment context).

³² For a critique of noncompetes on distributional grounds, with an emphasis on the lack of meaningful negotiation on the part of the employee, see Rachel S. Arnow-Richman, *Bargaining for Loyalty in the Information Age: A Reconsideration of the Role of Substantive Fairness in Enforcing Employee Noncompetes*, 80 Or L Rev 1163, 1214–15 (2001). See also Christopher T. Wonnell, *The Contractual Disempowerment of Employees*, 46 Stan L Rev 87, 106 (1993). Because our Article focuses on the effects of noncompetes on technological innovation, we generally ignore the distributional (and autonomy-related) effects of noncompetes, though our intention is not to diminish their importance in the overall policy-making calculus.

³³ See, for example, Office of Senator Marco Rubio, Press Release, *Rubio Introduces Bill to Protect Low-Wage Workers from Non-Compete Agreements* (Jan 15, 2019), archived at <https://perma.cc/JM6P-QPS3> (describing a bill proposed by US Senator Marco Rubio to ban noncompetes nationwide for employees who are eligible for protection under federal overtime eligibility laws).

noncompetes that apply to technical and managerial personnel in technology markets.

In this Article, we undertake that task. Specifically, we look closely and broadly at the economic arguments, both theoretical and empirical, that have been advanced in support of the “talent wants to be free” view. While the details are complex and nuanced, our conclusion is simple and modest. Neither economic theory nor empirical evidence provides compelling support to abandon the common law’s centuries-old reasonableness standard. Contractual restraints on labor mobility in technology markets raise complex trade-offs between employers’ training and R&D incentives (generally favored by noncompetes) and employee mobility (generally disfavored by noncompetes).³⁴ While the latter is important for innovation, so is the former, and case-specific application of the reasonableness standard arguably offers the best, albeit imperfect, mechanism for balancing those competing considerations.

The now-popular view that innovation always or usually does best when human capital circulates freely relies heavily on a single historical example: the divergence in economic fortunes of Silicon Valley in California and Route 128 in Massachusetts and the different cultural norms and noncompete enforcement policies attributed to each innovation cluster. The results are surprising. Contrary to the standard account, we show that there is little compelling ground to attribute Silicon Valley’s ascendance over Route 128 in the late 1980s and early 1990s to differences in the enforceability of noncompetes.³⁵

There are multiple reasons. First, during Silicon Valley’s ascendance, California’s policy against noncompetes was clouded by several important exceptions. Second, California firms could significantly mimic noncompetes through trade secret and patent infringement litigation, long-term contracts, deferred compensation, and other mechanisms. Third, it is not clear that Massachusetts law substantially restrained employee turnover as an *effective* matter. Contemporary accounts of Route 128 in the heyday of the minicomputer industry in the 1970s and 1980s describe the same type of job hopping and spin-off formation associated with Silicon Valley. Fourth, Silicon Valley’s rise over Route 128 most likely stemmed far more from technological and

³⁴ A potential negative secondary effect of noncompetes is to depress employee creativity and effort. We address this concern below in Part I.B.3.

³⁵ See Part II.A.

economic fundamentals associated with the “PC revolution,” rather than fine distinctions in noncompete enforcement. Lastly, Route 128’s decline was relatively short lived, and it has remained a significant innovation center, especially in the life sciences and certain information technology markets.

Our original and comprehensive reexamination of the Silicon Valley / Route 128 narrative raises doubts concerning the widely accepted causal sequence running from prohibiting noncompetes to increased employee mobility to increased innovation. These doubts are intensified by a close analysis of recent empirical studies that are regularly cited as evidence that noncompetes impede innovation. Contrary to the characterization of these studies in much of the policy commentary by academics and governmental agencies,³⁶ these studies suffer from significant methodological limitations, deliver statistically weak results, and do not provide compelling support for the view that banning noncompetes promotes innovation.

A fully informed policy position concerning noncompetes must reflect the uncertain state of our empirical understanding of the effects of these agreements in innovation markets. That is, it must reflect the fact that available evidence can neither support nor rebut any systematically adverse relationship between noncompetes and innovation outcomes in general. Only this measured conclusion, rather than the strongly “abolitionist” position that scholars and policymakers have increasingly advanced, is consistent with theoretical analysis that identifies the counter-vailing efficiency effects of noncompetes and other constraints on employee mobility. The free movement of talent implies efficiency

³⁶ See, for example, Lobel, *Talent Wants to Be Free* at 67–72 (cited in note 9) (describing empirical studies that purportedly have confirmed Gilson’s hypothesis attributing the rise of Silicon Valley in part to California’s refusal to enforce noncompetes); The White House, *Non-Compete Agreements: Analysis of the Usage, Potential Issues, and State Responses* *2, 5–7 (May 2016), archived at <https://perma.cc/CR5Y-V8JX> (discussing empirical studies measuring the prevalence and economic effects of noncompetes on employee mobility and start-up formation); US Department of the Treasury, Office of Economic Policy, *Non-compete Contracts: Economic Effects and Policy Implications* *11–13, 18–23, 26 (Mar 2016), archived at <https://perma.cc/V383-QXM7> (reviewing research on use and effects of noncompetes and concluding that economic justifications for noncompetes have weak support); Lobel, *Companies Compete but Won’t Let Their Workers* (cited in note 19) (same); Lobel, 93 Tex L Rev at 827, 839–42 (cited in note 9) (describing empirical studies suggesting that noncompetes reduce employee mobility, depress employee effort, and reduce innovation); Benkler, 13 Ann Rev L & Soc Sci at 235 (cited in note 13) (describing empirical research purporting to show that enforcing noncompetes depresses employee mobility, reduces knowledge spillovers, and undermines innovation); Hyde, 33 Regulation at 9 (cited in note 13) (“Study after study shows how much more productive firms will be if they can hire, free of lawsuits, someone who worked at a rival.”).

gains from knowledge sharing and accelerated “*n*-mover” innovation. However, a blanket prohibition of noncompetes implies efficiency losses from uncompensated transfers of intellectual capital to competitors—which, far from being mere efficiency-neutral transfers, may discourage *first*-mover innovation and employee training, which may depress the development of human intellectual capital in the first instance.

Complex problems deserve complex solutions. Contrary to what is hastily becoming conventional wisdom, which is in turn being converted into concrete policy actions, there is no one-size-fits-all solution to this trade-off as a matter of economic analysis. Based on available evidence, there is no reason to believe that the efficiency gains from freely circulating human capital systematically outweigh the efficiency losses from uncompensated uses of intellectual capital. Rather, the net efficiency effect of noncompetes in any particular market depends on the interaction between multiple factors that vary across industries, firms, and types of employees. Even if California’s zero-enforcement policy has been *locally* optimal (or at least, sufficiently workable) from an efficiency perspective, it may be suited to a particular type of innovation economy at a particular time—an important but neglected qualification that Gilson made when he originally attributed Silicon Valley’s success to California’s refusal to enforce noncompetes.³⁷ At the same time, we emphasize that neither theory nor empirics support an unqualified freedom-of-contract approach that enforces noncompetes in all circumstances absent evidence of fraud or coercion. Rather, we explicitly recognize the uncertainty involved in assessing the net efficiency effects of noncompetes. Using the error-cost approach developed in antitrust analysis and jurisprudence,³⁸ we embed that uncertainty in our policy analysis, concluding that the common law’s reasonableness standard remains the best available instrument to reflect, albeit imperfectly, the trade-off between efficiency gains and losses inherent to limitations on employee mobility in innovation markets.

³⁷ See Gilson, 74 NYU L Rev at 627–29 (cited in note 8).

³⁸ For the leading sources, see Frank H. Easterbrook, *Workable Antitrust Policy*, 84 Mich L Rev 1696, 1711 (1986) (“We want to hold to a minimum the sum of the costs of harmful activity wrongly condoned and useful activity wrongly condemned (or discouraged).”); Frank H. Easterbrook, *The Limits of Antitrust*, 63 Tex L Rev 1, 16 (1984) (“[W]e should prefer the error of tolerating questionable conduct, which imposes losses over a part of the range of output, to the error of condemning beneficial conduct, which imposes losses over the whole range of output.”).

In sum, our Article makes three important contributions to the literature. First, it exhaustively reviews the widespread contention that noncompetes thwart innovation.³⁹ Our detailed analysis shows that neither theory nor empirics supports the economic arguments commonly wielded in favor of prohibiting noncompetes.⁴⁰ As a matter of theory, conventional wisdom emphasizes that noncompetes impede the circulation of intellectual capital while overlooking that noncompetes may encourage firms to cultivate employees' human capital.⁴¹ As a matter of empirics, we contest the widely accepted view that Silicon Valley surpassed Boston because of supposed differences in noncompete enforcement, which tend to be exaggerated.⁴² A careful examination of the evidence shows that the Boston area has remained a significant innovation center and that technological and economic factors better explain Silicon Valley's exceptional trajectory.⁴³ Second, we uncover serious factual and other deficiencies in several widely cited empirical studies, which cast substantial doubt on those studies' findings and policy implications.⁴⁴ Third, based on our exhaustive review of the available evidence, we propose an original error-cost framework to analyze noncompetes, which provides a robust economic rationale for the common law's reasonableness standard.⁴⁵

The Article proceeds as follows. Part I describes the noncompete debate and, in particular, contrasts newly ascendant views favoring the free circulation of human capital with older views that recognize that reasonable contractual limitations on employee mobility may promote social welfare. Part II reexamines the standard narrative of the rise of Silicon Valley and the decline of Route 128, looking closely at multiple factors that may account for Silicon Valley's exceptional success as an innovation center. Additionally, we review more recent empirical studies on the relationship between noncompetes, employee movement, and innovation. Part III revisits the range of policy options with respect to noncompetes, using an error-cost approach that has not been previously applied to the enforcement of noncompetes. We briefly conclude.

³⁹ See Parts I and II.

⁴⁰ See Part II.

⁴¹ See Part III.

⁴² See Part II.A.

⁴³ See Part II.A.

⁴⁴ See Part II.B.

⁴⁵ See Part III.

I. OLD AND NEW VIEWS: FROM AGNOSTICISM TO ABOLITIONISM

In this Part, we review two key stages in the intellectual history of the current debate over noncompetes and other restraints on employee mobility, and situate that debate within a larger body of economic thought relating to the economics of human capital. First, we review an earlier generation of law-and-economics scholarship, which identified the social costs and gains attributable to noncompetes and generally adopted an agnostic position concerning these restraints as a general matter. These scholars were therefore sympathetic to the common law's reasonableness standard, which upholds or invalidates noncompetes on a case-specific basis. Second, we review a more recent school of thought that takes the strong view that the social costs associated with noncompetes typically or almost always outweigh the social gains, and therefore supports ending noncompete enforcement following California's example.

A. Foundations: Becker and Marshall

Economically informed analysis of noncompetes and other restraints on labor mobility in innovation markets stands at the intersection of two foundational bodies of economic thought: Gary Becker's breakthrough work on the economics of human capital and Alfred Marshall's classic writings on the agglomeration economies that derive from the interchange of intellectual capital. Contemporary discussions of the legal treatment of noncompetes has relied (sometimes implicitly) almost entirely on the work of Marshall, which is a key reference point in the literature on innovation policy, while devoting little attention to the insights of Becker, widely recognized as *the* foundational work in the modern field of labor economics.⁴⁶ We review both contributions briefly below and will then integrate these classic insights from innovation policy and labor policy scholarship throughout our analysis of noncompetes and other constraints on the mobility of human capital.

⁴⁶ On the importance of Becker's work, see generally Yoram Weiss, *Gary Becker on Human Capital*, 81 *J Demographic Econ* 27 (2015).

1. Becker: Human capital as an economic asset.

Nobel Prize-winning economist Gary Becker effectively founded the economic analysis of human capital with the publication of his landmark work, *Human Capital*, in 1962.⁴⁷ Becker showed that economic analysis could be applied to the acquisition and cultivation of human capital, whether through education, training, or other mechanisms. From an economic point of view, human capital acquisition involves the use of scarce resources to maximize net expected value, as with any other costly activity. In implementing this analysis, Becker drew a key distinction between *general* and *firm-specific* human capital assets.⁴⁸ General human capital refers to technical, managerial, and other skills and knowledge that have value across a broad pool of firms or industries.⁴⁹ Firm-specific human capital refers to the narrower set of technical, managerial, and other skills and knowledge that have value (or have greater value) only at a particular firm.⁵⁰ The scholarly literature that has followed Becker's work has identified an intermediate form of human capital that is specific to an industry—namely, skills and knowledge that have value within an industry but not more generally.⁵¹ As discussed below, these different types of human capital give rise to different implications when analyzing the efficiency effects of noncompetes and other limitations on employee mobility.

2. Marshall: Industrial districts and agglomeration economies.

In the innovation context, economic analysis of noncompetes and other limitations on employee mobility often makes reference to the concept of “industrial districts,” originated by Alfred Marshall in his landmark treatise, *Principles of Economics*, first

⁴⁷ See generally Gary S. Becker, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education* (Chicago 3d ed 1993). Subsequent notes refer to this edition, unless otherwise indicated. This is an updated edition of Gary S. Becker, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education* (National Bureau of Economic Research 1964). Some of the ideas were initially set forth in Gary S. Becker, *Investment in Human Capital: A Theoretical Analysis*, 70 J Pol Econ 9 (1962).

⁴⁸ See Becker, *Human Capital* at 33–51 (cited in note 47).

⁴⁹ See id at 33–34.

⁵⁰ See id at 40.

⁵¹ See, for example, Derek Neal, *Industry-Specific Human Capital: Evidence from Displaced Workers*, 13 J Labor Econ 653, 653 (1995) (identifying categories of skills that are “specific to firms in a given industry or sector of the economy” and therefore do not fall into the existing categories of firm-specific or general human capital).

published in 1890.⁵² In a short passage in that work, Marshall proposed that certain industries benefit collectively from a free-flowing exchange of ideas, even if an individual firm may periodically suffer the loss of some portion of its investment in developing an innovation.⁵³ In Marshall's famous words: "The mysteries of the trade become no mysteries; but are as it were in the air."⁵⁴ The movement of R&D personnel among firms is one of the key mechanisms by which the "mysteries of the trade" are disseminated and, according to Marshall, promote the general long-term welfare of all members of that innovation community. This line of reasoning is the basis for an extensive literature on the "agglomeration economies" that arise in innovation clusters in which geographically proximate firms and other entities draw from a free-flowing pool of human and intellectual capital assets to mutual advantage.⁵⁵

B. The Old View: Restricting Labor Mobility Is Good and Bad for Innovation

The recent wave of academic interest in noncompetes is predated by scholars who had examined the efficiency of noncompete clauses and, explicitly or by implication, other restraints on employee mobility. Generally speaking, that view identifies both efficiency gains and losses that in general could arise from the use of noncompetes in innovation markets. Without an empirical methodology by which to quantify those potentially offsetting effects, that literature largely concluded that the net efficiency of noncompetes is indeterminate as a general matter.

1. The credible commitment problem.

Earlier scholars observed that human capital markets suffer from what economists call a credible commitment problem. Specifically, potential employees cannot provide adequate assurance to employers who are reluctant to invest in cultivating the human capital of employees who can simply move to another employer,

⁵² Alfred Marshall, *Principles of Economics* 169 (Palgrave MacMillan 8th ed 1920).

⁵³ *Id.* at 225.

⁵⁴ *Id.*

⁵⁵ See Rainer vom Hofe and Ke Chen, *Whither or Not Industrial Cluster: Conclusions or Confusions?*, 4 *Indust Geographer* 2, 4–8 (2006) (reviewing the literature on "agglomeration economies").

thereby conferring an advantage on a competitor.⁵⁶ When an employee leaves, the employer potentially suffers three costs: (i) it loses its training investment, which may involve a combination of firm-specific and general human capital; (ii) the employee may transmit proprietary information to a competitor; and (iii) the firm must incur costs to recruit and train a substitute employee, which again involves the transmission of firm-specific and general human capital.⁵⁷

Without the ability to block employees from moving to a competitor, and without a sufficient up-front payment from employee to employer to cover the employer's expected costs in the event of the employee's departure, an employer faces two choices. Setting aside the possibility of various substitutes for deterring employee movement (most notably, deferred compensation arrangements and long-term employment contracts), the employer can (i) decline to hire the employee or (ii) hire the employee but underinvest in training (especially training that involves the cultivation of general human capital that has positive postemployment value) and the development and transmission of proprietary, often innovative, information.⁵⁸ These concerns account for apprenticeship systems that predate modern intellectual property regimes: limiting the apprentice's ability to switch employers enabled the master to internalize the gains from the intellectual capital transferred to the apprentice.⁵⁹ Or, put differently, limiting the apprentice's ability to switch employers enabled the apprentice to credibly commit against expropriating the employer's investment in the apprentice's human capital.

⁵⁶ See Paul H. Rubin and Peter Shedd, *Human Capital and Covenants Not to Compete*, 10 J Legal Stud 93, 99–102 (1981) (arguing that employers will reduce investment in employee training absent noncompetes); Edmund W. Kitch, *The Law and Economics of Rights in Valuable Information*, 9 J Legal Stud 683, 685 (1980) (asserting that, absent noncompetes, poaching employers will free ride on training investments by existing employers, who will in turn decline to make those investments); Harlan M. Blake, *Employee Agreements Not to Compete*, 73 Harv L Rev 625, 647 (1960) (contending that the objective of postemployment restraints is “to prevent competitive use, for a time, of information or relationships which pertain peculiarly to the employer and which the employee acquired in the course of the employment”).

⁵⁷ See note 56 and accompanying text.

⁵⁸ See Kitch, 9 J Legal Stud at 685 (cited in note 56).

⁵⁹ See Rubin and Shedd, 10 J Legal Stud at 93–99 (cited in note 56) (arguing that covenants not to compete do not, as earlier scholars assumed, necessarily reflect an exercise of monopoly power by employers).

2. The noncompete solution.

Just like the apprentice contract, the noncompete clause can result in joint efficiency gains by enabling employment transactions (and associated knowledge transfers) that otherwise would not take place. This is beneficial not only for the employer but the employee and the industry as a whole. This point is overlooked in recent discussions of noncompetes that tend to emphasize how these clauses block employment opportunities and suppress innovation.⁶⁰ However, it is important not to overlook the possibility that the *absence* of noncompetes can block certain *other* employment opportunities. Assuming the prospective employee is financially constrained and cannot post a sufficient “bond” against expropriating the employer’s training investment or R&D assets, an otherwise efficient employment transaction—and the associated cultivation of human capital—may not move forward. In that case, both employer and prospective employee are made worse off.

Even if the absence of noncompetes does not entirely block the employment relationship, it may distort the employer’s behavior during the term of employment and, as a result, sometimes disadvantage both the firm and the employee. At least three distortions are possible. First, the inability to enforce noncompetes may induce an employer to modify the internal allocation of team personnel so as to mitigate informational leakage from employee departures. For instance, Apple is famous for its secrecy practices and separate teams that work on different projects so as to minimize information transfer between them.⁶¹ Second, the firm may skew the allocation of training resources toward the cultivation of firm-specific human capital so as to maximize the employee’s value in the internal labor market but minimize the employee’s value in the external labor market.⁶² Third, the firm may underinvest in R&D by reallocating resources to activities in which it is not generating informational assets that an employee can transmit to another employer. In a world in which noncompetes are enforceable at some reasonable cost and high probability, these distortions are mitigated and the firm can allocate resources more efficiently among the available set of innovation and non innovation activities.

⁶⁰ See note 9 and accompanying text.

⁶¹ See Adam Lashinsky, *This Is How Apple Keeps the Secrets* (Fortune, Jan 18, 2012), online at <https://fortune.com/2012/01/18/the-secrets-apple-keeps> (visited Feb 3, 2020) (Perma archive unavailable).

⁶² See Nicola Meccheri, *A Note on Non-competes, Bargaining and Training by Firms*, 102 Econ Letters 198, 200 (2009).

3. A weak objection to noncompetes.

Some commentators argue that noncompetes may discourage employees from cultivating their human capital (or, specifically, general or industry-specific human capital)—which in turn may depress employees' effort or creative output—due to the limited ability to access postemployment opportunities.⁶³ This objection is not especially persuasive. Discouraging employees from acquiring human capital would appear to be inconsistent with rational profit maximization. Put affirmatively, any employer has an incentive to reward employees who enhance their firm-specific human capital (or some value-maximizing combination of firm-specific, industry-specific, and general human capital) and can therefore make a greater contribution to firm value. While there are inherent measurement and verification difficulties in assessing employees' relative contributions in a team environment,⁶⁴ firms clearly use a variety of compensation systems to at least approximately reward employee performance, including promotion, monetary bonuses, and more tailored compensation mechanisms.⁶⁵ This is unsurprising: in a competitive market, any firm that includes noncompete clauses in its employment package has a rational self-interest in adopting incentive structures that correct for any underperformance effects that could arise as a result.⁶⁶ Market forces reward firms who do so successfully and discipline those who do not.

⁶³ See On Amir and Orly Lobel, *Driving Performance: A Growth Theory of Noncompete Law*, 16 Stan Tech L Rev 833, 846 (2013) ("An employee who knows their market opportunities are significantly reduced due to an enforceable noncompete restriction will be less driven to perform well and to invest in his own human capital."); Mark Garmaise, *Ties That Truly Bind: Noncompetition Agreements, Executive Compensation, and Firm Investment*, 27 J L Econ & Org 376, 413–14 (2011) (setting forth model in which noncompete enforcement can induce employers to invest in managers' human capital but reduce managers' incentives to do so, in which case the manager's human capital may be lower relative to a zero-enforcement regime).

⁶⁴ For the classic treatment, see Armen A. Alchian and Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 Am Econ Rev 777, 779 (1972) (discussing the difficulties of determining each individual's contribution when observing a team's output).

⁶⁵ See Robert P. Merges, *The Law and Economics of Employee Inventions*, 13 Harv J L & Tech 1, 38–41 (1999) (discussing the "intra-firm appropriability environment" fostered by employee reward mechanisms).

⁶⁶ Below, we criticize experimental studies that purport to confirm the depressing effects of noncompetes on the cultivation of human capital by noting that they fail to adequately account for the large menu of employee incentive mechanisms used in the actual market. See note 305 and accompanying text.

4. A better objection to noncompetes.

It is certainly the case that enforcing noncompetes limits to some extent the mobility of R&D personnel, which may impede the agglomeration economies that arise from the regular dissemination of knowledge within an industry. To be clear, however, it is not precise to say (as is often said) that a noncompete “binds” an employee to a firm; rather, a noncompete requires that the employee or (more typically) a third party pay a fee demanded by the employer to obtain a waiver of the noncompete.⁶⁷ Payments exchanged for waiver of a noncompete are mere wealth transfers without efficiency consequences from a short-term static perspective. Precisely understood, a noncompete is simply a mechanism by which resource-constrained employees can credibly commit to indirectly compensate their employer for training and knowledge leakage costs in the event employees depart for a competitor.⁶⁸ The employee’s commitment is made credible by providing the employer with a contractual right that can be “sold” to the employee’s next employer.

This is not to say that there is no circumstance in which noncompetes can frustrate the efficiency gains associated with the circulation of human capital from one firm to another. First, even when an employer permits an employee otherwise under a noncompete to move to a new firm, the transaction costs of negotiating and executing a waiver of the noncompete generate static costs that would not be incurred if noncompetes were wholly unenforceable. Of course, like all contracting costs, such costs are tolerable when the social gains from contracting (here, for a noncompete) outweigh these costs.

⁶⁷ For example, in 2005, Nortel paid Motorola \$11.5 million to release its chief operating officer from a noncompete agreement. See Robert McMillan, *Nortel Appoints Ex-Motorola Exec as Operations Chief* (Network World, Jan 19, 2006), archived at <https://perma.cc/B4MJ-YTFC>.

⁶⁸ Noncompetes may also relieve an employer from having to increase existing employees’ compensation to match alternative employment opportunities, given the departure costs imposed by the noncompete. For a theoretical model reaching this result, see Natarajan Balasubramanian, et al, *Locked In? The Enforceability of Covenants Not to Compete and the Careers of High-Tech Workers* *9–11 (Ross School of Business Working Paper No 1339, Jan 2017), archived at <https://perma.cc/3SBZ-UJD8>. It should be noted, however, that available evidence is generally inconsistent with this model. The most comprehensive empirical study finds that employees who sign noncompetes earn 6.6 percent more on average than employees who do not sign noncompetes (controlling for various other factors), although this wage differential is limited to employees who are presented with a noncompete prior to accepting a job offer. See Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *28 (cited in note 11).

Second, when the costs of negotiating and executing the waiver of a noncompete are sufficiently great so as to impede employee turnover, this may generate long-term dynamic efficiency losses to the extent that slowing down employee turnover impedes the transmission of intellectual capital that benefits the industry as a whole. These dynamic efficiency costs present a potential collective action problem because these costs may not be fully internalized by an individual firm in a given industry when that firm makes a decision whether to adopt and enforce a noncompete for a particular employee.

5. Evaluation.

The welfare effects of noncompete agreements can now be summarized. On the one hand, noncompetes support employers' incentives to invest in employees' human capital and R&D projects that would otherwise be subject to expropriation by departing employees. On the other hand, noncompetes raise the transaction costs involved in the circulation of human capital, which may impede the innovation process in the industry as a whole. Given these offsetting effects, earlier scholars generally concluded that economic analysis does not support a definitive position against or in favor of enforcing noncompetes in all circumstances.⁶⁹ If noncompetes enable firms to secure gains from training and R&D investments, then barring noncompetes may reduce the common pool of technological knowledge that is available for circulation through employee movement. A ban on noncompetes would yield a net social gain over time only if the disincentive effects arising from uncompensated human capital transfers were exceeded by the agglomeration economies and other benefits associated with the unimpeded circulation of human capital. Without empirical evidence in any particular case, this analytical framework is agnostic in general with respect to the net long-term efficiency of those restraints. However, it does recognize a meaningful range of circumstances in which enforcing noncompetes could make firms and employees better off by resolving the credible commitment problem that might preclude or distort employment relationships.

⁶⁹ See note 56 and accompanying text.

C. The New View: Restricting Labor Mobility is Bad for Innovation

The traditional approach is intellectually modest in taking the view that enforcing noncompetes *may* have a net positive effect on innovation. By contrast, the new view on noncompetes tends to take the bolder view that enforcing noncompetes usually, if not always, discourages innovation by slowing down the flow of intellectual capital and impeding the agglomeration economies and similar benefits that fuel the innovation process. This new view consists of a two-part logical sequence. In step one, it claims that barring noncompetes accelerates employee movement. Stated precisely, this assertion reflects the assumption that noncompetes increase the transaction costs of human capital movements. In step two, the new view makes the stronger assertion that increased circulation of R&D personnel promotes innovation by facilitating knowledge spillovers that benefit the industry as a whole. The normative implication is simple and clear: the law should decline to enforce noncompetes in all circumstances.

1. Background: Saxenian and Gilson.

The new view relies on the work of AnnaLee Saxenian, a sociologist, and Ronald Gilson, a law professor, both of whom apply the Marshallian concept of agglomeration economies to interpret a key episode in the history of US technology markets. Both Saxenian and Gilson contrasted Silicon Valley with Boston's Route 128 area to argue that institutional mechanisms—cultural norms and organizational forms in Saxenian's analysis⁷⁰ and a legal ban on noncompetes in Gilson's analysis⁷¹—that promote employee mobility can promote innovation by facilitating the flow of intellectual capital among competitors. Both authors identify these institutional differences as key factors in accounting for Silicon Valley's rise over Route 128 as the country's leading innovation center starting in the late 1980s.

More specifically, Gilson argued that California's ban on noncompetes represented a solution to a collective-action problem. While no firm individually would agree *not* to adopt a noncompete and thereby expose its human and intellectual capital to competitors, it may be in *all* firms' collective long-term interest to refrain from adopting noncompetes and thereby enjoy the resulting flow

⁷⁰ See Saxenian, *Regional Advantage* at 1–9, 29–30, 59–60 (cited in note 8).

⁷¹ See Gilson, 74 NYU L Rev at 578–79, 602–09 (cited in note 8).

of knowledge spillovers.⁷² By implication, Massachusetts firms were caught in a collectively irrational equilibrium in which all firms imposed noncompetes and could not enjoy the collective gains that would result from a more fluid circulation of human capital. Gilson cautioned that this explanation may be specific to Silicon Valley and would not necessarily generalize to other contexts.⁷³ Nonetheless, a significant body of commentary by legal scholars and economists has endorsed this proposition in stronger formulations and has made largely unqualified policy assertions that enforcing noncompetes and other restraints on employee mobility depresses innovation.⁷⁴ For these scholars, California's approach should be the rule, not the exception.

2. An initial critique.

The new view on noncompetes reflects a coherent and straightforward application of the standard collective-action problem in economic analysis. However, it is incomplete in significant respects. Specifically, the new view makes little effort to address the efficiency losses inherent to a legal regime in which a voluntary restraint on the mobility of talent is removed from the table of contracting options. Earlier analysis of noncompetes had recognized that an efficiency loss would arise in any circumstance in which an employee could not credibly commit against expropriating the employer's human capital investment and R&D assets. The employer would respond by distorting the terms of employment to limit its training investments or the employees' exposure to R&D assets or by declining to enter into an employment relationship at all.

⁷² See id at 596.

⁷³ See id at 629.

⁷⁴ See Lobel, *Talent Wants to Be Free* at 67–72 (cited in note 9) (arguing that empirical evidence supports California's "zero tolerance" policy for noncompetes); Lobel, *Companies Compete but Won't Let Their Workers* (cited in note 19) (same); Benkler, 13 Ann Rev L & Soc Sci at 235 (cited in note 13) (arguing that empirical evidence suggests that contractual and other legal constraints on employee mobility undermine innovation); Hyde, 33 Regulation at 10–11 (cited in note 13) (arguing that balance of evidence supports adopting California's policy of zero enforcement toward noncompetes); Moffat, 54 Ariz L Rev at 965 (cited in note 9) (advocating for a zero-enforcement policy toward noncompetes); Moffat, 52 Wm & Mary L Rev at 918–21 (cited in note 9) (same).

A recent economic model formulated by Professor James Rauch shows that this loss can extend well beyond just one employment transaction.⁷⁵ Consider a sequence of transactions consisting of (i) an initial employment transaction involving a parent firm and an individual employee, followed by (ii) a series of spin-off transactions involving employees who depart from the parent firm to form or join a spin-off firm, and then depart from the spin-off to form a new entity, and so forth. Noncompetes may raise the transaction costs relating to, and even frustrate, some portion, or even all, of the potential spin-off transactions. That is the focus of the “talent wants to be free” literature. However, it is important not to ignore the possibility that the inability to enforce a non-compete may preclude the initial hire by restoring the credible commitment problem, in which case the subsequent stream of spin-off transactions could be stunted or blocked entirely.⁷⁶ Moreover, if noncompetes are not enforceable, even a certain portion of the set of spin-offs may face the same credible commitment dilemma and may be wholly precluded or move forward under distorted terms.⁷⁷ If that is the case, then compared to a regime in which noncompetes are enforced, talent may be freer but it could well be worse off.

3. The empirical challenge.

As a theoretical matter, the new view on noncompetes, and the accompanying policy arguments in favor of a total or near-total ban, provide no reason to arbitrarily value the social costs attributable to noncompetes—primarily, potentially reduced circulation of intellectual capital (the focus of Marshall’s analysis)—more heavily than the social gains—primarily, potentially increased investment in employee training and R&D (the focus of Becker’s analysis). Given this uncertainty, we can only make progress toward assessing the relative intellectual strength of the new view based on empirical inquiry. Commentary by scholars and policymakers in favor of a ban on noncompetes often asserts that empirical data shows that noncompetes depress innovation.⁷⁸

⁷⁵ See James Rauch, *Dynastic Entrepreneurship, Entry, and Non-Compete Enforcement* *1–2, 19 (National Bureau of Economic Research Working Paper No 21067, Apr 2015), archived at <https://perma.cc/TP8G-3372>.

⁷⁶ See id at *1–2, 9–11 (showing formally that the efficiency of noncompetes depends in part on a trade-off between these two countervailing effects on the parent firm and spin-off firms).

⁷⁷ See id at *10.

⁷⁸ See note 36.

In the next Part, we look closely at that body of evidence, finding that nearly all of these studies are badly flawed and, even so, common characterizations of their findings often dramatically overstate the policy conclusions that the data can reasonably support.

II. THE EVIDENCE AGAINST NONCOMPETES: A CLOSE LOOK

In this Part, we undertake the most comprehensive examination to date of the two principal bodies of empirical evidence that are commonly referenced in support of the “talent wants to be free” school of thought. First, we review in detail the explanation provided by Saxenian and in particular, Gilson, to account for Silicon Valley’s dramatic rise over Route 128 as the world’s leading innovation center. We find significant reason to doubt that this fundamental shift in economic trajectories can be traced back to relatively fine differences in the enforceability of noncompetes between California and Massachusetts. Second, we review some of the most highly cited empirical studies that purport to show a three-step causal link between bans on noncompetes, increased employee turnover, and increased innovation. This exercise identifies important methodological and other limitations that cast serious doubt on the policy positions for which those studies have been cited.

A. Reasons to Doubt the Standard Account of the Rise of Silicon Valley

As of the mid-1970s, Silicon Valley and Route 128 were both viewed as key centers for innovation in the electronics industry, but with different strengths.⁷⁹ Silicon Valley excelled in semiconductor chips while Route 128 excelled in minicomputers, a category situated between the supercomputer (or mainframe) segment dominated by IBM and the nascent “microcomputer” (in today’s terms, PC) segment pioneered by Apple.⁸⁰ Starting in the

⁷⁹ See Willem Hulsink, Dick Manuel, and Harry Bouwman, *Clustering in ICT*, in Willem Hulsink and Hans Dons, eds., *Pathways to High-Tech Valleys and Research Triangles: Innovative Entrepreneurship, Knowledge Transfer and Cluster Formation in Europe and the United States* 53, 53–55 (Springer 2008) (stating that Route 128 predated the Silicon Valley technology cluster, which started growing in the 1950s and 1960s and overtook Route 128 in the 1970s); Nancy S. Dorfman, *Route 128: The Development of a Regional High Technology Economy*, 12 *Rsrch Pol* 299, 300, 313 (1983) (observing that, as of the late 1970s, the Boston area and Silicon Valley had the same number of high-tech employees while the greater San Francisco Bay Area had “about 30 percent more”).

⁸⁰ See Hulsink, Manuel, and Bouwman, *Clustering in ICT* at 59 (cited in note 79) (describing how the “minicomputer manufacturers of Route 128 quickly lost ground to the manufacturers of the fast-emerging PCs and workstations in Silicon Valley”).

early 1980s, Silicon Valley overtook Route 128 and secured its place as the world's preeminent information technology center. Saxenian attributes the ascendance of Silicon Valley, and the decline of Route 128, to differences in industrial organization and cultural norms.⁸¹ The West Coast environment was characterized by a constant flow of technical personnel among a network of loosely connected firms, which spawned spin-offs that accelerated the innovation process. This structure was supported by industry norms that promoted information sharing and employee mobility.

By contrast, the East Coast environment was characterized by a small number of vertically integrated firms and exhibited little employee turnover. This structure was purportedly supported by industry norms that promoted loyalty to a single employer and discouraged information sharing. Building on Saxenian's narrative, Gilson argued that the free flow of human capital could be attributed in part to California's refusal to enforce noncompetes, while Massachusetts's insistence on enforcing noncompetes may have stagnated the flow of human capital, resulting in a slowdown in innovation.⁸² Put together, Saxenian and Gilson's work identifies certain informal and formal institutional characteristics that purportedly set Route 128 on a path to decline, while sending Silicon Valley on an upward trajectory.

Both Saxenian's and Gilson's accounts of the rise of Silicon Valley and decline of Route 128 have been widely adopted in the academic literature.⁸³ In the discussion below, we identify several considerations that cast doubt on this now-standard account. These include: (i) there were several exceptions (and other legal causes of action) that substantially qualified California's "ban" on noncompetes during this period; (ii) firms could substantially mimic the effect of a noncompete through compensation and other mechanisms; (iii) it is not clear that differences in Massachusetts law on noncompetes and trade secrets resulted in substantial differences in employee mobility as a practical matter; (iv) there are fundamental technological and economic factors that more plausibly account for Silicon Valley's ascendance; and (v) Route 128 has continued to exhibit robust innovative performance.

⁸¹ See Saxenian, *Regional Advantage* at 1–9 (cited in note 8).

⁸² See Gilson, 74 NYU L Rev at 602–09 (cited in note 8).

⁸³ As of February 19, 2020, Google Scholar estimates that Saxenian's leading contribution in the area, the book-length *Regional Advantage*, has been cited more than 13,200 times and Gilson's 1999 NYU article on Silicon Valley and Route 128 has been cited more than 900 times. See also note 9 (listing several scholarly publications that refer to and rely on Saxenian's or Gilson's work).

1. Did California courts really never enforce noncompetes?

Scholars have not adequately questioned whether California courts in actuality declined to enforce noncompetes during the period in which Silicon Valley overtook Route 128. That seems to be the case based on the California statute, which declares void “every contract by which anyone is restrained from engaging in a lawful profession, trade, or business of any kind.”⁸⁴ Given that blanket prohibition, however, it is curious that California firms often insert noncompete clauses in executive employment agreements. Two studies that focus on adoption rates of noncompetes in executive employment agreements at large publicly traded firms find these clauses in 58–62 percent of agreements with firms headquartered in California, as compared to rates of 70–84 percent at the same types of firms headquartered in other states (which generally enforce noncompetes subject to the reasonableness standard).⁸⁵ Even more surprisingly, a broader study involving all types of employees finds that the incidence of noncompetes in California (19 percent) is approximately the same as observed in states that enforce noncompetes.⁸⁶

This discrepancy between law and practice might be attributed to the possibility that technical personnel are unaware

⁸⁴ Cal Bus & Prof Code § 16600.

⁸⁵ Specifically, from a sample of 874 CEO employment contracts at S&P 1500 firms executed during 1996–2010, Norman Bishara, Kenneth Martin, and Randall Thomas found that California firms include noncompetes at a rate of 62 percent (compared to 84 percent for firms in other states). See Norman D. Bishara, Kenneth J. Martin, and Randall S. Thomas, *An Empirical Analysis of Noncompetition Clauses and Other Restrictive Postemployment Covenants*, 68 Vand L Rev 1, 34 (2015). Garmaise finds that, in a sample of large, publicly traded firms, approximately 70 percent of firms used noncompetes, including 58 percent of California-based firms. Garmaise, 27 J L Econ & Org at 396 (cited in note 63). Garmaise does not specifically identify the rate of noncompete adoption among firms located in the forty-eight enforcing states, although it would be expected that that rate would be somewhat higher than the 70 percent rate reported for the full sample of all firms in all states. See id.

⁸⁶ See Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *19 (cited in note 11). We note two additional points concerning the methodology and findings of the Starr, Prescott, and Bishara study. On methodology, we note that the paper carefully distinguishes in its survey methodology between noncompetes and other related provisions such as nondisclosure or nonsolicitation covenants. This is important because it provides confidence that the findings relate specifically to noncompetes rather than other related provisions in employment agreements. See id at *3–4. On substance, we note that the authors do not find any meaningful change in the incidence of noncompetes in comparing “multi-unit” firms, which have operations in California and other states, and “single-unit” firms, which operate only in California. See id at *19. This is a noteworthy result because it might have been expected that large national firms in particular might include noncompete clauses as a “default” provision in their employment agreements since they mostly operate in states that uphold noncompetes under the common-law reasonableness standard.

of California law and firms include a noncompete clause as an *in terrorem* device to be used against departing employees. That explanation assumes that these personnel do not consult legal advisors, particularly a potential new employer's legal counsel, or review publicly available information about a basic point of law. Alternatively, one might argue that, because knowledgeable employees understand that noncompetes are generally *not* enforceable in California, it is not worth the transaction costs of negotiating with an employer to remove these clauses. At a minimum, it is worth inquiring whether the standard understanding of California law is entirely precise during the period in which Silicon Valley overtook Route 128.

In fact, it is not. Writing in 1989, a treatise on trade secrets law observed: "Despite the clear language of" California's statute, "the California courts do not regard all covenants not to compete . . . invalid *per se*."⁸⁷ Specifically, there were at least five important circumstances in which California employers could have had some expectation of being able to enforce a noncompete during the period in which Silicon Valley overtook Route 128. While it remains the case that California courts did not *generally* enforce noncompetes against individuals during this period, it is incorrect to assume that a sufficiently motivated employer would *never* rationally invest resources in enforcing (and therefore could never credibly threaten to seek) enforcement of a noncompete against a departing employee.

a) Narrow restraints. In 1987, the Ninth Circuit held that noncompetes were enforceable under California law if the noncompete narrowly restrained postemployment opportunities, as distinguished from a general restraint that barred entry into an entire profession.⁸⁸ From the 1970s through the 2000s, litigants that pursued variants of the narrow restraint exception achieved

⁸⁷ See Melvin F. Jager, *Trade Secrets Law* § 13.01[2] (1989).

⁸⁸ *Campbell v Board of Trustees of Leland Stanford Junior University*, 817 F2d 499, 502 (9th Cir 1987) (citing California law for the proposition that the statutory ban on noncompetes precludes only contractual restraints on entering an "entire business, trade or profession," as distinguished from "only a small or limited part of the business, trade or profession"), quoting *Boughton v Socony Mobil Oil Co*, 231 Cal App 2d 188, 192 (1964). The court purported to apply state law precedent, as set forth in *Boughton*, 231 Cal App 2d at 192, which in turn relied on *King v Gerold*, 240 P2d 710 (Cal App 1952). An earlier Ninth Circuit decision had upheld a clause in a collective bargaining agreement involving the partial forfeiture of certain pension and profit-sharing benefits in the event a retired employee took employment with another firm in the same industry. The court's decision relied on the view that California law does not prohibit an alleged restraint on employee mobility that is "limited in nature and furthers sound public policies." See *Smith v CMTA-IAM Pension Trust*, 654 F2d 650, 660 (9th Cir 1981).

mixed results, sometimes achieving success in (mostly) federal courts but usually not faring well in California state courts.⁸⁹ In 1997 and 1999, the Ninth Circuit again applied the exception to uphold a noncompete covenant.⁹⁰ Only in 2008, well after Silicon Valley had established its place as the world's technology center, did the California Supreme Court resolve this uncertainty by rejecting the narrow restraint exception.⁹¹

b) Sale of a business. Based on a statutory exception,⁹² both federal and state courts typically enforced (and continue to enforce) noncompetes executed in connection with the sale of a business. The exception applies to noncompetes entered into by majority target shareholders and possibly other target employees with smaller equity interests.⁹³ This exception provides some of the legal logic behind the now-popular "acqui-hire" transactional structure, in which a large firm acquires a start-up firm primarily for purposes of retaining the services of its founders and senior managerial and technical personnel. Without a commitment from key personnel that they will remain with or at least not compete with the acquirer for some reasonable period of time, the transaction is not viable. This partially explains why exempting business

⁸⁹ For cases recognizing the exception, see *Centeno v Roseville Community Hospital*, 107 Cal App 3d 62, 68–71 (1979); *Latona v Aetna US Healthcare Inc*, 82 F Supp 2d 1089, 1094 (CD Cal 1999); *Cin-Med Associates, Inc v Hemocue, Inc*, 2001 WL 1117562, *3–4 (CD Cal). In *Scott v Snelling & Snelling, Inc*, 732 F Supp 1034, 1042–43 (ND Cal 1990), the court recognized that "California courts may, in some circumstances apply a 'rule of reason' to only partial restrictions on competition" but declined to apply it in the case of a noncompete that imposed postemployment geographic and temporal restrictions. For cases rejecting the exception, see *Golden State Linen Service, Inc v Vidalin*, 69 Cal App 3d 1, 13 (1977); *Liberty Mutual Insurance Co v Arthur J. Gallagher & Co*, 1994 WL 715613, *3 (ND Cal); *Arrowhead Financial Group, Inc v Welty*, 2002 WL 31661269, *6–7 (Cal App); *Jan Marini Skin Research, Inc v Allure Cosmetic USA, Inc*, 2007 WL 1508686, *16 (Cal App); *Thompson v Impaxx, Inc*, 113 Cal App 4th 1425, 1430–31 (2003).

⁹⁰ *General Commercial Packaging, Inc v TPS Package Engineering, Inc*, 126 F3d 1131, 1132–33 (9th Cir 1997) (enforcing a one-year noncompete between a contractor and subcontractor with respect to the contractor's clients); *International Business Machines Corp v Bajorek*, 191 F3d 1033, 1040–41 (9th Cir 1999) (holding that noncompete obligation in stock option agreement did not violate the California statutory ban on noncompetes).

⁹¹ *Edwards v Arthur Andersen LLP*, 189 P3d 285, 293 (Cal 2008).

⁹² Cal Bus & Prof Code § 16601.

⁹³ It is not clear how large that equity interest must be. Rulings have been mixed. See *Hilb, Rogal & Hamilton Insurance Services of Orange County, Inc v Robb*, 33 Cal App 4th 1812, 1816, 1822–25 (1995) (in connection with the merger of an insurance company, upholding a noncompete with an employee of the merged company, who had held a 35 percent ownership interest in the merged company, on ground that a sufficient transfer of goodwill had taken place); *Vacco Industries, Inc v Van Den Berg*, 5 Cal App 4th 34, 48–49 (1992) (finding that a 3 percent interest, which was the ninth largest shareholder interest, in conjunction with an officer position, constituted a substantial shareholder).

acquisitions from noncompete enforcement limitations, which is the rule even in California, is likely to be, and is widely viewed as, efficient.

c) Protection of trade secrets. Since a California Supreme Court decision in 1958,⁹⁴ California law has recognized that the statutory bar against noncompetes does not extend to certain postemployment restrictions—most typically, nondisclosure and nonsolicitation covenants—that are enforced for the purpose of protecting an employer’s trade secrets or confidential information.⁹⁵ Since the 1980s, California courts have periodically applied the trade secret exception to enforce nonsolicitation and nondisclosure obligations (and, in one recent case, even a noncompete clause “construed to bar only the use of confidential source code, software, or techniques”⁹⁶) that were found to be narrowly tailored to protect a trade secret.⁹⁷

⁹⁴ *Gordon v Landau*, 321 P2d 456, 459 (Cal 1958) (upholding a nonsolicitation clause because “it did not prevent defendant from” engaging in the same or similar business as his former employer).

⁹⁵ See Jager, *Trade Secrets Law* § 13:4 at 13-13 (cited in note 87) (observing that California courts sometimes enforce noncompetes to protect trade secrets or other confidential information). For cases stating this principle, see *Muggill v Reuben H. Donnelley Corp.*, 398 P2d 147, 149 (Cal 1965) (stating that § 16600 invalidates noncompete provisions “unless they are necessary to protect the employer’s trade secrets”); *Gordon Termite Control v Terrones*, 84 Cal App 3d 176, 178 (1978) (stating that § 16600 “has been construed by the Supreme Court as invalidating contracts not to compete, except where their enforcement is necessary to protect the trade secrets of an employer”); *Loral Corp v Moyes*, 174 Cal App 3d 268, 276 (1985) (stating that § 16600 “does not invalidate an employee’s agreement not to disclose his former employer’s . . . trade secrets”); *Moss Adams Co v Shilling*, 179 Cal App 3d 124, 130 (1986); *American Paper & Packaging Products, Inc v Kirgan*, 183 Cal App 3d 1318, 1322 (1986) (Section 16600 invalidates noncompetes “unless their enforcement is necessary to protect an employer’s confidential information or trade secrets”); *Scott*, 732 F Supp at 1043 (recognizing a judicially created exception to § 16600 to the extent necessary to protect trade secrets).

⁹⁶ *Richmond Technologies, Inc v Aumtech Business Solutions*, 2011 WL 2607158, *18–19 (ND Cal) (finding the nonsolicitation clause and noninterference clauses “are likely to be found unenforceable” because they “are more broadly drafted than necessary to protect . . . trade secrets,” but a noncompete clause and related clause barring the use of confidential information are “likely enforceable as necessary to protect . . . trade secrets”).

⁹⁷ See *Hollingsworth Solderless Terminal Co v Turley*, 622 F2d 1324, 1338 (9th Cir 1980) (vacating and remanding the lower court’s invalidation of a postemployment covenants involving nondisclosure of customer lists and nonsolicitation of a former employer’s customers); *John F. Matull & Associates, Inc v Cloutier*, 194 Cal App 3d 1049, 1054–55 (1987) (upholding a nonsolicitation obligation); *Morlife, Inc v Perry*, 56 Cal App 4th 1514 (1997) (affirming a nonsolicitation covenant against former employees); *Asset Marketing Systems, Inc v Gagnon*, 542 F3d 748, 758 (9th Cir 2008) (observing that “non-competition agreements are unenforceable [under California law] unless necessary to protect an employer’s trade secret”); *Lindzy v Q-Railing USA Co*, 2013 WL 4437164, *6 (Cal App) (finding a nondisclosure clause and a nonsolicitation clause valid).

In 2008, the Supreme Court of California specifically declined to affirm or reject the trade secret exception.⁹⁸ A recent federal court opinion summarizes the current state of California law on this point: “Although California courts have consistently ‘condemned’ agreements that place restraints on the pursuit of a business or profession . . . ‘an equally lengthy line of cases has consistently held former employees may not misappropriate the former employer’s trade secrets to unfairly compete with the former employer.’”⁹⁹ Simply put: Section 16600 does not preclude an employer from preventing a departing employee via injunctive relief from joining a new employer by enforcing nondisclosure, non-solicitation, or other similar postemployment obligations when doing so promotes the employer’s interest in protecting its trade secrets.

d) *ERISA*. A California employer can avoid the statutory ban on noncompetes by embedding the noncompete in a deferred compensation or severance pay arrangement governed by the Employee Retirement Income Security Act of 1974¹⁰⁰ (*ERISA*). These clauses operate as a forfeiture mechanism that conditions entitlement to certain benefits under the plan upon compliance with the noncompete obligation. As observed in practitioner commentary, this exception typically arises in litigation concerning deferred benefit plans for highly compensated executives.¹⁰¹ In 1981 and 1987, the Ninth Circuit held that *ERISA* preempts state law, specifically including noncompete restrictions.¹⁰² California state courts have adopted the same position.¹⁰³ This enforcement strategy is limited only by the *ERISA* requirement that a noncompete

⁹⁸ *Edwards*, 189 P3d at 289 n 4.

⁹⁹ *Richmond Technologies*, 2011 WL 2607158 at *18 (internal brackets omitted), citing *Edwards*, 189 P3d at 290–91 and *Retirement Group v Galante*, 176 Cal App 4th 1226, 1237 (2009).

¹⁰⁰ Pub L No 93-406, 88 Stat 829, codified as amended in various sections of Title 26 and Title 29.

¹⁰¹ See Amy L. Blaisdell and Wendy S. Menghini, *Pulling Tricks Out of a Top Hat: Preemption of Non-Compete Laws Applicable to “Top Hat” Plans* *1 (DRI: The Voice of the Defense Bar, Dec 29, 2010), archived at <https://perma.cc/4SYD-PEAV>.

¹⁰² See *Clark v Lauren Young Tire Center Profit Sharing Trust*, 816 F2d 480, 481 (9th Cir 1987) (involving a noncompete under Oregon law); *Lojek v Thomas*, 716 F2d 675, 678, 679–80 (9th Cir 1983) (involving a noncompete under Idaho law). Gilson cites a 1965 California Supreme Court decision that invalidated this type of forfeiture provision in a retirement plan. See Gilson, 74 NYU L Rev at 607 n 100 (cited in note 8), citing *Muggill*, 398 P2d at 149. However, *Muggill* would not appear to survive the Ninth Circuit’s interpretation of *ERISA*, which was enacted in 1974.

¹⁰³ See, for example, *Weinfurther v Source Services Corp Employees Profit Sharing Plan and Trust*, 759 F Supp 599, 602 (ND Cal 1991).

forfeiture clause cannot be applied to deprive the employee of benefits accrued after ten years of service.¹⁰⁴

e) Choice-of-forum clauses. California courts will not enforce a noncompete entered into under the law of another state that generally enforces noncompetes. However, prior to 2017, if an employer and former employee were subject to the jurisdiction of an out-of-state court that enforces noncompetes, and the decision was final in that state before any decision in a parallel California action, then a noncompete agreement was typically enforceable within California. In general, the two key factors at issue in such situations were whether (1) the agreement selected another state's courts as the forum for disputes; and (2) whether the employee is now a California resident employed by a California employer. Although California courts will generally not enforce an out-of-state choice-of-law clause, especially if the defendant-employee is a California resident employed by a California firm,¹⁰⁵ prior to 2017, they often respected an out-of-state choice-of-forum clause, even if the other state potentially applied its own law.¹⁰⁶ In practice, this meant that California employees employed by a firm with corporate headquarters out of state—or out-of-state employees moving to California—could be subject to enforceable noncompete restrictions under a properly drafted agreement prior to 2017.¹⁰⁷

¹⁰⁴ 29 USC § 1053(a)(2)(A).

¹⁰⁵ See *Application Group, Inc v Hunter Group, Inc*, 61 Cal App 4th 881, 894–905 (1998).

¹⁰⁶ Compare *Davis v Advanced Care Technologies, Inc*, 2007 WL 2288298, *4–9 (ED Cal) (finding California law applicable to the case despite a Connecticut choice-of-law provision because California had a materially greater interest; the employee was a California resident, the former employer was based in Connecticut, and the new employer was a California-based employer), with *Universal Operations Risk Management, LLC v Global Rescue LLC*, 2012 WL 2792444, *6–7 (ND Cal) (enforcing a forum selection clause despite the strong possibility that the forum state would uphold the covenant not to compete).

¹⁰⁷ See, for example, *Meyer v Howmedica Osteonics Corp*, 2015 WL 728631, *11–12 (SD Cal) (ordering a transfer of forum to New Jersey consistent with the forum selection clause, when there was also a choice of law provision for New Jersey law), citing *Swenson v T-Mobile USA, Inc*, 415 F Supp 2d 1101 (SD Cal 2006) (dismissing a California declaratory relief action in the presence of forum selection clause when the previous action was pending out-of-state); *Universal Operations Risk Management, LLC*, 2012 WL 2792444 at *6–7; *Advanced Bionics Corp v Medtronic, Inc*, 59 P3d 231, 232–34 (Cal 2002) (vacating a lower court's issuance of a temporary restraining order that had blocked the former employer from pursuing a noncompete action it had filed out of state); *Biosense Webster, Inc v Superior Court*, 135 Cal App 4th 827, 830 (2006) (extending the holding of *Advanced Bionics* to circumstances in which no previous action had been filed out of state); *Google, Inc v Microsoft Corp*, 415 F Supp 2d 1018, 1021–22, 1026 (ND Cal 2005) (staying noncompete proceedings pending those in Washington in order to prevent forum shopping). But see *Manchester v Arista Records, Inc*, 1981 US Dist LEXIS 18642, *13–17 (CD Cal) (upholding a choice-of-forum clause in a case involving Cal Labor Code § 2855, which limits

2. Substitutes for noncompetes.

In addition to the five exceptions described above, California firms could elect (and still can elect) from a large menu of substitute legal and economic instruments to deter employee mobility. To illustrate these alternatives concretely, we can return to the case involving the former Google engineer who took a new position with Uber. As noted previously, the employee had been involved in developing Google's autonomous driving technologies.¹⁰⁸ Under California law, Google would appear to be powerless to prevent the employee from working for Uber. Even assuming that Google cannot wield a noncompete covenant, however, Google has several other credible legal threats at its disposal. Given the existence of these additional legal instruments, any *marginal* preclusive effect that can be reasonably attributed to noncompetes appears to be significantly attenuated, and would need to at least be accounted for in any empirical analysis comparing the differential effects of noncompetes on innovation between California and out-of-state firms.

a) Patents. A firm may use patents to protect against knowledge leakage resulting from employee movement. Although a patent may not cover tacit knowledge per se, it may cover a product or method incorporating that tacit knowledge. Assuming the firm can bear the anticipated enforcement costs, the expropriation risk posed by a departing employee would then be limited to informational assets that fall outside the firm's patent portfolio. A patenting strategy makes any departing employee less attractive to competitors, which implies that the employee will receive fewer or lower offers from other firms and is less likely to leave the current employer. Hence, even in a jurisdiction that is hostile to noncompetes, there may be significant patent-based obstacles that discourage employee movement. Consistent with these expectations, a 2009 empirical study found a deterrent effect on labor mobility in the US semiconductor industry proportional to a firm's propensity to bring patent infringement suits.¹⁰⁹ Another study finds that, while the likelihood of an acquisition increases when a target's employees are subject to noncompetes, that effect weakens in the case of targets that hold strong patent

personal service employment contracts to a term of seven years, because the court determined that § 2855 did not apply to the contracts at issue).

¹⁰⁸ See notes 1 and 4.

¹⁰⁹ See Rajshree Agarwal, Martin Ganco, and Rosemarie H. Ziedonis, *Reputations for Toughness in Patent Enforcement: Implications for Knowledge Spillovers via Inventor Mobility*, 30 Strategic Mgmt J 1349, 1366–67 (2009).

portfolios, suggesting that patents substitute in part for noncompetes as a device for protecting against knowledge leakage after consummation of the acquisition.¹¹⁰

b) Breach of contract. If the employee had signed a non-disclosure agreement (NDA) and then took a position with a competing enterprise, Google could potentially bring (or threaten to bring) a breach of contract claim against the employee. As noted earlier, there is no plausible legal challenge under § 16600 to the enforcement of an NDA so long as it is sufficiently tailored to promote the employer's interest in protecting its trade secrets.¹¹¹ The credibility of Google's threat to sue to enforce an NDA would depend on the negotiated scope of the definition of "confidential information" in the NDA and the ease with which Google could demonstrate that the employee had actually breached the NDA's confidentiality provisions at his or her new position. In certain jurisdictions, courts are willing to enforce NDAs that encompass information that would not otherwise qualify as a trade secret;¹¹² in other jurisdictions (including California), Google may be required to show that enforcement of the NDA targets only nonpublic information that would be protected under trade secret law.¹¹³

Alternatively, Google could bring (or threaten to bring) a breach-of-contract claim if it had entered into a long-term employment contract or a shorter-term employment contract with periodic renewal at the employer's option. (The former option may be unattractive to both employers and employees because it locks each party into a potentially unwanted long-term commitment that is difficult to mitigate even through the most carefully

¹¹⁰ See Kenneth A. Younge, Tony W. Tong, and Lee Fleming, *How Anticipated Employee Mobility Affects Acquisition Likelihood: Evidence from a Natural Experiment*, 36 Strategic Mgmt J 686, 691–92 (2015).

¹¹¹ See Part II.A.1.c.

¹¹² See Richard F. Dole Jr, *The Contract Exception to the Uniform Trade Secrets Act and Its Implications for the Federal Defend Trade Secrets Act*, 34 Santa Clara High Tech L J 362, 377 n 80 (2018) (observing that courts in some jurisdictions will enforce NDAs that encompass information that would not qualify as a trade secret, subject to a reasonableness standard); Bishara, Martin, and Thomas, 68 Vand L Rev at 21–23 (cited in note 85) (stating that courts will sometimes enforce an NDA that applies to information that might not otherwise be protected under trade secret law, so long as the NDA is limited in time).

¹¹³ See, for example, *Richmond Technologies*, 2011 WL 2607158 at *19 (noting that a "clause prohibiting use of confidential information is likely enforceable to the extent that the claimed information is protectable as a trade secret"). On this point with respect to California law in particular, see Charles T. Graves, *Nonpublic Information and California Tort Law: A Proposal for Harmonizing California's Employee Mobility and Intellectual Property Regimes Under the Uniform Trade Secrets Act*, 2006 UCLA J L & Tech 1, 37–43.

crafted provisions for early separation under certain circumstances.) In yet another variation, Google could bring a tortious interference with contract claim against Uber, on the ground that Uber was aware of the long-term contract to which the departing engineer was then bound.¹¹⁴

c) *Invention assignment agreements.* In the technology industries, it is typical for employees to enter into invention assignment agreements, under which an employee agrees in advance that all “inventions” (as defined in the governing agreement) developed by the employee during the course of his or her employment are deemed to belong to the employer.¹¹⁵ Under such an agreement, Google could bring a claim against the departing employee if the employee is using an “invention” that the employee made while employed by Google. As long as Google’s claim could at least survive a motion to dismiss, it could credibly threaten to impose significant discovery and other litigation costs on the employee-defendant (or, more typically, the new employer who may have agreed to indemnify the employee-defendant). In a widely followed litigation over ownership of the “Bratz” line of dolls, involving Mattel (as plaintiff), Mattel’s former employee (as codefendant), and a smaller toy manufacturer (as codefendant), an invention assignment agreement provided the basis for several years of protracted litigation that burdened the defendant with substantial legal fees.¹¹⁶

Alternatively, Google and its former employee may have entered into an invention assignment agreement with a “trailer” clause, which would grant Google ownership over any inventions that the former employee developed within a certain amount of time following termination.¹¹⁷ That too may limit the employee’s attractiveness to any potential outside employer. The doctrine of assignor estoppel can have a similar effect in a departing employee scenario. Under that doctrine, some courts have held that

¹¹⁴ In the actual litigation between Google and Uber, this would not have been a feasible claim because Google and the departing employee were apparently not parties to a long-term contract.

¹¹⁵ See Victoria Lee and Mark Lehberg, *Employee Proprietary Information and Inventions Assignment Agreements: What They Do, and What Could Happen Without Them* (DLA Piper, 2018), archived at <https://perma.cc/J5QD-3FXX>.

¹¹⁶ See *Mattel, Inc v MGA Entertainment, Inc*, 616 F3d 904, 909 (9th Cir 2010) (observing that Mattel’s ownership interest in the Bratz line of dolls “turns on the interpretation of Bryant’s [the former employee’s] 1999 employment agreement,” which included an invention assignment clause). For a summary of the litigation, see *Barbie and Bratz: The Feud Continues* (WIPO Magazine, Aug 2011), archived at <https://perma.cc/6RM2-W45Y>.

¹¹⁷ For discussion, see Merges, 13 Harv J L & Tech at 52–53 (cited in note 65).

not only is the employee precluded from arguing against the validity of a patent that the employee assigned to the former employer, but also any new employer of the employee is similarly precluded from doing so. The practical consequence: if the old employer brings a patent infringement suit against the new employer, the latter may be unable to argue in defense that the underlying patent is invalid. Like a trailer clause, this expansive understanding of the assignor estoppel doctrine may limit the attractiveness of an employee to any potential new employer.¹¹⁸

d) Trade secret misappropriation. Google could (and did) bring a trade secret misappropriation claim against the employee and Uber as the new employer, alleging that the employee or Uber had used or disclosed trade secrets belonging to Google.¹¹⁹ In certain states (although not California today), even absent evidence of use or disclosure, Google could seek an injunction to prevent its former employee from joining Uber if the court found that the employee would *inevitably disclose* the employer's trade secrets in his new position.¹²⁰ Trade secret litigation in a departing employee scenario is not an uncommon occurrence in Silicon Valley. Intel, Broadcom, Cisco, Apple, and other Silicon Valley companies have been involved in prominent trade secret disputes involving former employees.¹²¹ Depending on the credibility of any

¹¹⁸ See Mark A. Lemley, *Rethinking Assignor Estoppel*, 54 Houston L Rev 513, 537 (2016) ("[T]he doctrine of assignor estoppel serves effectively as a partial noncompete agreement, preventing inventors from starting new companies or moving to competitors in many circumstances and at least raising the costs of doing so.").

¹¹⁹ Waymo Complaint at *2–5 (cited in note 1).

¹²⁰ Based on a survey of twenty-four states (current as of 2012), courts in only a handful of states explicitly reject the doctrine while the remainder either explicitly recognize the doctrine or, more commonly, apply it occasionally. See Ryan M. Wiesner, *A State-by-State Analysis of Inevitable Disclosure: A Need for Uniformity and a Workable Standard*, 16 Marq Intell Prop L Rev 211, 217–28 (2012). See also M. Claire Flowers, *Facing the Inevitable: The Inevitable Disclosure Doctrine and the Defend Trade Secrets Act of 2016*, 75 Wash & Lee L Rev 2207, 2223 (2018) (finding that not all states bar application of inevitable disclosure doctrine entirely; only those in the Eighth Circuit, California, Kentucky, Louisiana, Maryland, and Massachusetts expressly refused to adopt the doctrine). During the period in which Silicon Valley overtook Route 128 as a technology center, it was uncertain whether a California court could issue injunctive relief under the inevitable disclosure doctrine. See Part II.A.3.

¹²¹ These headline disputes include: Cisco's lawsuit against Arista, a company founded by departing Cisco employees, see Rachael King, *Cisco's Feud with Former Star Executive Turns Personal—and Costly* (Wall St J, Aug 17, 2017), online at <https://www.wsj.com/articles/ciscos-feud-with-former-star-executive-turns-personaland-costly-1502980362> (visited Feb 17, 2020) (Perma archive unavailable); Intel's suit against Broadcom involving the departure of former Intel employees, see Karen Alexander, *Intel, Broadcom Settle Suit over Trade Secrets* (LA Times, Nov 22, 2000), archived at <https://perma.cc/MQ9J-KEZA>; and Apple's suit against Steve Jobs and Next, see Andrew Pollack, *Steven Jobs Settles Suit Filed by Apple* (NY Times, Jan 18, 1986), archived at

such legal threat, and the potential injunction, damages, and litigation costs to which the employee and future employer could be exposed,¹²² Google may be able to dissuade Uber from hiring its employee. This effectively occurred in the Google-Uber litigation: first, Levandowski was barred by court order from working on certain projects at Uber; and, second, Uber fired Levandowski in connection with Google's litigation and related allegations of trade-secret theft.¹²³ Effectively, this approaches the result that would have been achieved if Google had been able to enforce a noncompete covenant against a departing employee.

Aside from these clearly legal mechanisms, Google and Uber might enter into a mutual "no-hire" (also known as antipoaching) agreement. Beginning in 2005, Apple, Google, and other Silicon Valley-based companies reportedly entered into unwritten "no-hire" agreements to protect their trade secrets and to suppress wage competition among one another.¹²⁴ Although these arrangements were ultimately dissolved following a settlement with the Department of Justice for alleged antitrust violations,¹²⁵ they illustrate how firms that are precluded from using noncompetes

<https://perma.cc/5LRN-VK4T>. For discussion of other trade secret suits involving departing employees, see Everett M. Rogers and Judith K. Larsen, *Silicon Valley Fever: Growth of High-Technology Culture* 91–94 (Basic Books 1984).

¹²² Gilson argues that trade secrecy claims are difficult to win (outside of blatant misappropriation) and, as a result, are not typically effective substitutes for noncompetes. Gilson, 74 NYU L Rev at 597–601 (cited in note 8). We feel this understates certain practical and legal realities. Although trade secrecy claims are certainly not as strong as an absolute bar on postemployment opportunities at competitors, they have considerable legal and *in terrorem* force (as Gilson acknowledges to some extent, see *id.* at 600), especially given that, at least during 1984–2002, California law enabled courts to award relief in trade secret cases even in cases of merely "threatened" (rather than actual) misappropriation. See notes 132–34 and accompanying text. For similar views on the potency of California trade secret suits in certain circumstances, see Michael Risch, *Comments on Trade Secret Sharing in High Velocity Labor Markets*, 12 Empl Rts & Empl Pol J 339, 340–42 (2009) (arguing that California trade secret law provides a potent remedy in cases involving the misappropriation of "core" informational assets).

¹²³ Mullin, *Judge's Order Bars Uber Engineer from Lidar Work* (cited in note 5); Marshall, *Uber Fired Its Robocar Guru* (cited in note 6).

¹²⁴ See Lobel, 93 Tex L Rev at 831–35 (cited in note 9) (describing antipoaching cartels entered into by leading Silicon Valley technology firms); Jeff Elder, *Silicon Valley Companies Agree to Pay \$415 Million to Settle Wage Case* (Wall St J, Jan 15, 2015), online at <https://www.wsj.com/articles/silicon-valley-companies-agree-to-pay-415-million-to-settle-wage-case-1421363288> (visited Feb 17, 2020) (Perma archive unavailable) (describing settlement of class-action antitrust lawsuit against major technology companies alleging "antipoaching" agreements).

¹²⁵ US Department of Justice, Press Release, *Justice Department Requires Six High Tech Companies to Stop Entering into Anticompetitive Employee Solicitation Agreements: Settlement Preserves Competition for High-Tech Employees* (Sept 24, 2010), archived at <https://perma.cc/RYG6-VEE5>.

may have strong incentives to use other mechanisms to dampen labor mobility.

e) Economic alternatives to noncompetes. Even in the absence of any alternative legal instrument, employers have another potent mechanism by which to discourage employee movement: they can use deferred compensation mechanisms to encourage employees to remain with the firm.¹²⁶ There are multiple methods. Employers can set the vesting schedules of deferred equity compensation (often a substantial portion of an employee's compensation at high-tech firms) so that departing employees suffer an implicit financial penalty by departing prior to the date on which all their options to acquire stock in the company have been triggered. Cisco, a Silicon Valley incumbent and repeat acquirer of startups, typically requires that a target's employees waive vesting rights (in the target's stock) that accelerate upon an acquisition and adopt a new graduated vesting schedule (in Cisco's stock), precisely in order to deter departures by the target's key employees for a certain period of time following the acquisition.¹²⁷ Alternatively, an acquisition agreement can skew the division of deal consideration such that a small portion is allocated to the up-front purchase price and the remainder is allocated to a future postacquisition date, contingent on the founders and certain other employees remaining with the acquiror post-closing for a certain period of time.¹²⁸ In yet another variation, a recent empirical study shows that S&P 500 firms often pay severance to California-based executives in discretionary installments following separation (as contrasted with lump-sum amounts that the same firms usually pay to non-California-based executives immediately upon separation), subject to compliance

¹²⁶ See Richard A. Booth, *Give Me Equity or Give Me Death—the Role of Competition and Compensation in Building Silicon Valley*, 1 *Entrepreneurial Bus L J* 265, 271 (2006) (arguing that deferred equity compensation is used as a replacement for noncompete agreements for purposes of retaining employees). For empirical evidence that stock options promote employee retention, see Paul Oyer and Scott Schaefer, *Why Do Some Firms Give Stock Options to All Employees?: An Empirical Examination of Alternative Theories*, 76 *J Fin Econ* 99, 109–10, 131–32 (2005) (based on data on firms' stock option grants to middle managers, finding that this practice is primarily used for purposes of retaining employees and "sorting" between higher- and lower-quality employees).

¹²⁷ See David Mayer and Martin Kenney, *Economic Action Does Not Take Place in a Vacuum: Understanding Cisco's Acquisition and Development Strategy*, 11 *Indust & Innovation* 299, 312 (2004).

¹²⁸ See Marita A. Makinen, David B. Haber, and Anthony W. Raymundo, *Acqui-Hires for Growth: Planning for Success* *35 (Lowenstein Sandler PC, 2012), archived at <https://perma.cc/5XBD-2Q76> (noting that certain acquisitions allocate more than 40 percent of the deal consideration to "incentive pool payments" and "equity grant roll overs . . . contingent on key employees staying with the buyer post-closing").

with noncompete provisions in the executives' employment agreements that are not directly enforceable through breach-of-contract suits.¹²⁹

3. Was Massachusetts's noncompete and trade secret law significantly different from California's?

The traditional narrative relies on a significant difference in legal treatment between Massachusetts and California with respect to the enforcement of noncompetes and related doctrines that impact employee mobility. Below we look more carefully at comparative differences between Massachusetts and California law in the enforcement of noncompetes and trade secret law. We do not discern any meaningful differences with respect to trade secret claims. Although we do not contest that there were material differences in the enforceability of noncompetes between the two states during the historical period in question, the comparison is more nuanced than commonly explained, especially taking into account the above-noted exceptions to California's oft-described "ban" on noncompetes.

a) Trade secrets; inevitable disclosure. In general, there are few substantial differences in the trade secret doctrines followed by California and Massachusetts courts.¹³⁰ Where there are fine differences, these do not necessarily support the conventional expectation that Massachusetts provides stronger trade secret protections. To illustrate these tendencies, we look more closely at the inevitable disclosure doctrine and its evolution in California and Massachusetts during the period in which Silicon Valley rose to preeminence. Under this doctrine, a court can enjoin an individual from working for a new employer on the ground that the individual will inevitably disclose trade secrets belonging to the former employer.¹³¹ This represents a plaintiff-favorable extension of trade secret law, which typically requires that the plaintiff show that the defendant has actually used or disclosed the trade secret after having misappropriated it.

¹²⁹ See Sarath Sanga, *Incomplete Contracts: An Empirical Approach*, 34 J L Econ & Org 650, 654, 670–77 (2018) (using a data sample consisting of 852 executive contracts disclosed in SEC filings during 1996–2016 by 75 S&P 500 firms that had employees in California and at least one state other than California).

¹³⁰ See Gilson, 74 NYU L Rev at 602 (cited in note 8) (stating that "[t]he scope of protection provided by trade secret law in California and Massachusetts appears to be roughly the same"). See also Robert G. Bone, *A New Look at Trade Secret Law: Doctrine in Search of Justification*, 86 Cal L Rev 241, 247 (1998) ("Although trade secret doctrine varies from state to state, the general rules are substantially similar in all jurisdictions.").

¹³¹ See Flowers, 75 Wash & Lee L Rev at 2217 (cited in note 120).

As of the late 1970s and early 1980s, we are not aware of any indication in California or Massachusetts case or statutory law that either jurisdiction had explicitly recognized or rejected the inevitable disclosure doctrine or any equivalent under trade secret law. In 1984, however, it was California—not Massachusetts—that signaled openness to the inevitable disclosure doctrine by adopting the Uniform Trade Secrets Act (UTSA), which became effective the following year. California’s version of the UTSA, the California Uniform Trade Secrets Act (CUTSA), follows the language of the model statute and provides that a plaintiff can obtain injunctive relief under trade secret law if the court finds there is “threatened misappropriation.”¹³² Those two words mattered: in 1996, AMD, a leading California semiconductor manufacturer, successfully relied on the inevitable disclosure doctrine to secure a preliminary injunction preventing more than twelve of its former employees from taking certain positions at their new employer, Hyundai.¹³³ Given the language in the CUTSA, and the outcome in the AMD-Hyundai litigation, it can be understood why a Silicon Valley practitioner observed in 1997 that it was unclear whether the inevitable disclosure remedy was available under California law.¹³⁴

In 1998, the author of a leading treatise on trade secret law observed that California law authorized courts generally to intervene to protect against “threatened harm” and concluded: “California has never rejected the fundamental idea that underlies the [inevitable disclosure] doctrine.”¹³⁵ In 1999, a California intermediate appellate court even explicitly adopted the doctrine (although it ruled against the trade secret claimant and the court’s opinion was subsequently “depublished” by the California Supreme Court).¹³⁶ Commentators observed that the court’s opinion reflected the actual law on the ground in some California

¹³² Cal Civ Code § 3426.2.

¹³³ See Benjamin A. Emmert, *Keeping Confidence with Former Employees: California Court Apply the Inevitable Disclosure Doctrine to California Trade Secret Law*, 40 Santa Clara L Rev 1171, 1192–95. The case subsequently settled. See *AMD, Hyundai Unit Settle Trade-Secrets Case* (LA Times, Nov 19, 1996), archived at <https://perma.cc/45XY-GMP8>.

¹³⁴ Terrence P. McMahon, Gary E. Weiss, and Sean A. Lincoln, *Inevitable Disclosure: Not So Sure in the West*, Natl L J C35–36 (May 12, 1997).

¹³⁵ James Pooley, *When It Comes to Trade Secrets and Employee Mobility, a Little Inevitable Disclosure Is Not Such a Bad Thing*, The Recorder 41 (Nov 1998).

¹³⁶ See generally *Electro Optical Industries, Inc v White*, 90 Cal Rptr 2d 680 (Cal App 1999), ordered not to be officially published, 2000 Cal LEXIS 3536 (Cal). Specifically, the Court of Appeal stated: “Although no California court has yet adopted it, the inevitable disclosure rule is rooted in common sense and calls for a fact specific inquiry. We adopt the rule here.” 90 Cal Rptr 2d at 684.

lower courts: “The . . . decision now makes explicit what many trade secret practitioners have known for years: California courts will grant narrowly tailored injunctions in appropriate circumstances to prevent a former employee from performing certain tasks for a new employer to minimize the threat to a former employer’s trade secrets.”¹³⁷

In the immediately ensuing years, the case law shifted in a more defendant-friendly direction, as several federal district courts applying California law¹³⁸—and, in 2002, a California intermediate appellate court—rejected the inevitable disclosure remedy,¹³⁹ specifically distinguishing in the latter case between “inevitable disclosure” and the “threatened misappropriation” language in the CUTSA.¹⁴⁰ Nonetheless, a contemporary observer wrote that it remained uncertain whether a California court might apply the inevitable disclosure doctrine, given that the 2002 case was a ruling by an intermediate appellate court.¹⁴¹ Reflecting this lingering uncertainty, a California court in 2008 recognized the continuing possibility of bringing a trade secret claim based on the “threatened misappropriation” language in the CUTSA.¹⁴² Although it is almost certain today that the inevitable disclosure doctrine is no longer viable in California in view of *Edwards v Arthur Andersen LLP*,¹⁴³ during the ascendancy of Silicon Valley in the 1980s, 1990s, and early 2000s, this was not the case.

During approximately the same period, the development of the law in Massachusetts concerning the inevitable disclosure

¹³⁷ Gary E. Weiss and Sean A. Lincoln, *Accepting the Inevitable: The California Court of Appeal Has Finally Adopted the Doctrine of Inevitable Disclosure* (Supplement to the Recorder, Feb 2000).

¹³⁸ *GlobeSpan, Inc v O'Neill*, 151 F Supp 2d 1229, 1229 (CD Cal 2001); *Danjaq, LLC v Sony Corp*, 1999 WL 317629, *1 n 1 (CD Cal); *Computer Sciences Corp v Computer Associates International, Inc*, 1999 WL 675446, *5 (CD Cal); *Bayer Corp v Roche Molecular Systems, Inc*, 72 F Supp 2d 1111, 1119–20 (ND Cal 1999).

¹³⁹ *Whyte v Schlage Lock Co*, 101 Cal App 4th 1443, 1462–64 (2002).

¹⁴⁰ See *id.*

¹⁴¹ See Hyde, *Working in Silicon Valley* at 33–35 (cited in note 9).

¹⁴² See *Central Valley General Hospital v Smith*, 162 Cal App 4th 501, 524–26 (2008) (stating that the rejection of the inevitable disclosure doctrine in *Whyte* does not imply rejection of trade secret claims based on threatened misappropriation, given that the California code explicitly recognizes such claims).

¹⁴³ 189 P3d 285 (Cal 2008). Reflecting the post-*Edwards* approach toward noncompetes and employee mobility more generally, a California court in 2009 awarded attorneys’ fees as sanctions against a party that sought an injunction based on the inevitable disclosure doctrine (together with other evidence of bad faith). See *FLIR Systems, Inc v Parrish*, 174 Cal App 4th 1270, 1273–74, 1277 (2009). For further discussion, see Charles T. Graves, *Is There an Empirical Basis for Predictions of Inevitable Disclosure?*, 18 Wake Forest J Bus & Intell Prop L 190, 194–96 (2018).

doctrine followed a remarkably similar trajectory, with the only potential difference being that Massachusetts common law provided an even weaker basis for asserting the inevitable disclosure doctrine. Given that Massachusetts (unlike California) had not adopted the UTSA and therefore required that a trade secret claimant show actual use or disclosure by the defendant, there was arguably no basis under Massachusetts common law to issue injunctive relief under a theory of inevitable disclosure. In 1995, a federal district court (applying Massachusetts law) found that it was “inevitable” that a software developer would use his former employer’s information in his new position; however, the case involved a noncompete agreement and therefore it was not necessary for the court to address the inevitable disclosure doctrine.¹⁴⁴ In 2002, a federal district court did address the doctrine directly and rejected it, stating: “Massachusetts law provides no basis for an injunction without a showing of actual disclosure.”¹⁴⁵ As of 2003, a commentator summed up the state of the law by observing that “no Massachusetts appellate court has ruled on the viability of the inevitable disclosure doctrine, and the few Massachusetts trial court decisions dealing with the doctrine have been decidedly lukewarm about it.”¹⁴⁶

Consistent with our general view stated at the outset of this discussion, with respect to the inevitable disclosure doctrine, it was actually California that was more protective of trade secret holders. Any current differences can be dated either to 2008, the year of the *Edwards v Arthur Andersen LLP* decision (insofar as it signaled California courts’ likely rejection of any effort by plaintiffs to seek injunctive relief under the inevitable disclosure doctrine), or 2018, when the Massachusetts legislature adopted its version of the UTSA. This gave rise to the same uncertainty that arose following California’s adoption of the UTSA in 1984. Following the model statute, the Massachusetts version refers to “threatened misappropriation,”¹⁴⁷ which could provide a basis for Massachusetts courts to adopt the inevitable disclosure doctrine, although they may adopt California courts’ now-prevailing understanding that the “threatened misappropriation” language does

¹⁴⁴ *Marcam Corp v Orchard*, 885 F Supp 294, 296–97 (D Mass 1995).

¹⁴⁵ *Safety-Kleen Systems, Inc v McGinn*, 233 F Supp 2d 121, 124 (D Mass 2002).

¹⁴⁶ See Laurence H. Reece III, *Employee Noncompetition Agreements: Recent Developments and Trends*, 88 Mass L Rev 24, 36 (2003).

¹⁴⁷ Massachusetts Trade Secrets Act, Mass HR 4868, § 19 (cited in note 27) (providing that “threatened misappropriation may be enjoined upon principles of equity, including but not limited to consideration of prior party conduct and circumstances of potential use”).

not imply endorsement of the inevitable disclosure doctrine.¹⁴⁸ While that particular point remains unresolved today, it is notable that practitioners have commented that acceptance by Massachusetts courts of the inevitable disclosure doctrine would run counter to those courts' historical tendency to reject or at least resist application of the doctrine.¹⁴⁹

b) *Noncompetes*. During the time in which Silicon Valley overtook Route 128, and continuing through the present, it is certainly the case that Massachusetts law, as compared to California law, provided employers with a higher level of confidence in the enforceability of noncompetes. But the differences should not be exaggerated nor should it be assumed that Massachusetts employers have had unfettered ability to enforce noncompetes without constraint. Like almost all states, Massachusetts applies the common-law reasonableness standard. This standard limits the enforceable scope of a noncompete by duration, scope and geography, provided in all cases that the noncompete is deemed necessary to protect the employer's legitimate business interests.¹⁵⁰ For this purpose, Massachusetts courts have defined the employer's legitimate interest narrowly. In a trilogy of cases decided in 1974, the Massachusetts Supreme Court emphasized that noncompetes were enforceable only to the extent required to protect the employer's goodwill, trade secrets, or confidential information.¹⁵¹ Massachusetts courts apparently took these constraints seriously: writing in 1991, a leading practitioner of trade secret law observed that "Massachusetts courts have often refused to enforce non-competition agreements on the ground that no trade secrets or confidential business information were involved" and that "[i]n

¹⁴⁸ For discussion, see Yekaterina Reyzis, *One Step Away from Uniform: Taking a Closer Look at Massachusetts' New Trade Secrets Law* (JDSupra, Nov 21, 2018), archived at <https://perma.cc/M472-MVPY>.

¹⁴⁹ See *id.* (noting that Massachusetts courts "have long held that the inevitable disclosure doctrine hurts employer mobility and competition"); Andrew T. O'Connor, *New Massachusetts Trade Secret Laws Effective October 1, 2018* (In-House, Sept 12, 2018), archived at <https://perma.cc/834P-GUAN> (noting that Massachusetts courts "were considered to have effectively rejected (or at least discredited) the 'inevitable disclosure' doctrine").

¹⁵⁰ *Alexander & Alexander, Inc v Danahy*, 488 NE2d 22, 29–30 (Mass App 1986); *New England Canteen Service, Inc v Ashley*, 363 NE2d 526, 528 (Mass 1977); *Analogic Corp v Data Translation, Inc*, 358 NE2d 804, 807 (Mass 1976); *Marine Contractors Co, Inc v Hurley*, 310 NE2d 915, 920–21 (Mass 1974).

¹⁵¹ See *All Stainless Inc v Colby*, 308 NE2d 481, 485–86 (Mass 1974); *Marine Contractors Co*, 310 NE2d at 920; *National Hearing Aid Centers, Inc v Avers*, 311 NE2d 573, 576–77 (Mass App 1974).

numerous cases, Massachusetts courts have cut back restrictions to make them reasonable.”¹⁵²

Other obstacles stood in the way of a Massachusetts employer who sought to enforce a noncompete. Since 1968, Massachusetts courts have recognized the material change doctrine, which bars enforcement of noncompetes if the employee’s position and salary changed significantly since starting employment.¹⁵³ In 1979 and 1982, the Massachusetts courts extended the reasonableness standard to employment contracts that required employees to forfeit certain deferred compensation upon termination, on the ground that these provisions implicitly operated as noncompetes.¹⁵⁴ Additionally, Massachusetts courts have held that non-compete agreements are to be construed strictly in favor of the employee and, relatedly, have declined to enforce noncompetes if the contractual language has been deemed to be excessively ambiguous.¹⁵⁵ Contrary to the standard narrative, Massachusetts courts during the decline of Route 128 were far from enthusiastic about noncompetes and applied the common-law reasonableness standard to limit their enforceability.

4. Did weak enforcement of noncompetes really cause the Valley to rise?

The standard narrative correctly observes that Massachusetts was an early pioneer of technological innovation. Ironically, the Boston area essentially originated what is now viewed as the Silicon Valley model consisting of a strong academic research complex coupled with a robust venture capital community and substantial movement of human capital among academia, startups, and large firms. In 1946, a Boston firm (the American

¹⁵² Laurence H. Reece III, *Employee Non-Competition Agreements and Related Restrictive Covenants: A Review and Analysis of Massachusetts Law*, 76 Mass L Rev 2, 11–12 (1991), citing *National Hearing Aid Centers*, 311 NE2d at 576–77 (denying injunctive relief on ground that employee had not used any confidential information belonging to the employer); *Richmond Brothers, Inc v Westinghouse Broadcasting Co, Inc*, 256 NE2d 304, 305–06 (Mass 1970) (declining to enforce noncompete on ground that employee’s success was not attributable to employer’s trade secrets or confidential information).

¹⁵³ *F.A. Bartlett Tree Expert Co v Barrington*, 233 NE2d 756, 758 (Mass 1968).

¹⁵⁴ *Kroeger v Stop & Shop Companies, Inc*, 432 NE2d 566, 568, 571–72 (Mass App 1982); *Cheney v Automatic Sprinkler Corp of America*, 385 NE2d 961, 965 & n 7 (Mass 1979).

¹⁵⁵ See, for example, *Lanier Services, Inc v Ricci*, 192 F3d 1, 4–5 (1st Cir 1999) (finding that the term, “facilities management services,” was ambiguous as a matter of law, interpreting the phrase against the former employer as the drafting party, and declining to enforce the noncompete). For discussion of additional cases during 1999–2002, see Reece, 88 Mass L Rev at 26 (cited in note 146).

Research and Development Corporation, or ARD) established the first major successful venture capital enterprise.¹⁵⁶ Supported by federal defense funding and local VC investors, MIT and Harvard University labs spawned hundreds of spin-offs throughout the 1960s and 1970s.¹⁵⁷ Those spin-offs included firms that later pioneered the “minicomputer”¹⁵⁸ market such as Digital Equipment Corporation (DEC) (founded in 1957 as a MIT startup with funding from ARD), Wang (founded by a Harvard physicist in the 1950s), Data General (founded in 1968 by ex-DEC engineers), and Prime (founded in 1972 by engineers from Honeywell).¹⁵⁹

Contrary to Saxenian’s account of cultural norms, Paul Ceruzzi describes the most important Route 128 firm, DEC, as having been characterized by a nonhierarchical engineer-driven culture that dispensed with the formalities and bureaucracy of incumbents such as IBM.¹⁶⁰ Certainly, as DEC and other large Route 128 firms grew, they tended to adopt vertically integrated structures.¹⁶¹ But it would be inaccurate to describe the Route 128 environment in its heyday as a monolithic industry consisting of

¹⁵⁶ Saxenian, *Regional Advantage* at 15 (cited in note 8).

¹⁵⁷ See *id.* at 16–17; Martin Kenney and Urs von Burg, *Technology, Entrepreneurship and Path Dependence: Industrial Clustering in Silicon Valley and Route 128*, 8 *Indust & Corp Change* 67, 85–87 (1999); Edward B. Roberts, *A Basic Study of Innovators; How to Keep and Capitalize on Their Talents*, 11 *Rsrch Mgmt* 249, 254–55 (1968).

¹⁵⁸ The minicomputer refers to a class of computing devices that delivered computing power at a significantly reduced cost (and physical size) relative to the mainframe market (dominated by IBM). Advances in miniaturization and the development of the microprocessor yielded the “microcomputer” (equivalent to the modern PC), which delivered substantial computer power with a small physical “footprint,” thereby rendering obsolete the minicomputer category. For discussion, see Paul E. Ceruzzi, *A History of Modern Computing* 124–26 (MIT 2d ed 2003).

¹⁵⁹ See *id.* at 127 (noting that DEC was founded in 1957 by former MIT researchers with funding from ARD); *id.* at 195 (stating that Data General was founded in 1968 by three former DEC engineers); Saxenian, *Regional Advantage* at 18–19 (cited in note 8) (noting that in 1951, An Wang, a scientist at Harvard, founded Wang Laboratories; in 1957, three scientists left Lincoln Labs to found DEC; in 1968, Edson DeCastro left DEC to found Data General; in 1972, William Poduska left Honeywell to found Prime); Kenney and von Burg, 8 *Indust & Corp Change* at 85–86 (cited in note 157) (noting that in 1957, Kenneth Olsen, a former MIT researcher, founded DEC with a capital investment from ARD); Lynn E. Browne and Steven Sass, *The Transition from a Mill-Based to a Knowledge-Based Economy: New England, 1940–2000*, in Peter Temin, ed., *Engines of Enterprise: An Economic History of New England* 211–12 (Harvard 2000).

¹⁶⁰ See Ceruzzi, *A History of Modern Computing* at 138 (cited in note 158) (“DEC represented everything that was liberating about computers, while IBM, with its dress code and above all its punched card, represented everything that had gone wrong.”).

¹⁶¹ See Kenney and von Burg, 8 *Indust & Corp Change* at 86–87 (cited in note 157) (stating that many minicomputer pioneers in the Route 128 area integrated vertically in order to reduce turnaround time and protect chip designs); Sarah Kuhn, *Computer Manufacturing in New England: Structure, Location and Labor in a Growing Industry* 29–33 (Joint Center for Urban Studies of MIT and Harvard University 1982).

a handful of vertically integrated incumbents. Although DEC and three other Route 128 firms (plus IBM) dominated the minicomputer segment in the late 1970s and early 1980s,¹⁶² observers and studies systematically documented that those firms spawned a continuing flow of small-firm spin-offs.¹⁶³ An interview-based study of twenty-two Massachusetts-based computer firms between 1965 and 1975 found that half of the firms' products "were the result of direct technology transfer from previous employers and another quarter indirect transfer."¹⁶⁴ A study of patent coauthoring patterns found similarly that Boston innovators were regularly involved in information exchange networks that were comparable in robustness (but not size) to those in Silicon Valley.¹⁶⁵ In a manner akin to accounts of Silicon Valley, qualitative histories observe that Route 128 spin-offs could procure necessary inputs from a disaggregated network of small- to medium-size component producers and suppliers, assemblers, and distributors.¹⁶⁶ A history of the period concludes: "[C]ompanies spinning

¹⁶² See Nancy S. Dorfman, *Massachusetts' High Technology Boom in Perspective: An Investigation of Its Dimensions, Causes and of the Role of New Firms* 2–4 (MIT Center for Policy Alternatives 1982).

¹⁶³ See Michael H. Best, *The New Competitive Advantage: The Renewal of American Industry* 129–30 (Oxford 2001) (describing "genealogies" of firm spin-offs from entrepreneurial "parent" firms in various technology segments of the Route 128 area); Susan Rosegrant and David R. Lampe, *Route 128: Lessons from Boston's High-Tech Community* 153–57 (Basic Books 1992); Dorfman, 12 Rsrch Pol at 310–11 (cited in note 79) (noting that DEC, the leading technology firm in the Boston area, had spawned multiple spin-offs, and that most new technology firms in the Boston area were founded by former employees of other firms or research laboratories); Elaine Romanelli, *New Venture Strategies in the Minicomputer Industry*, 30 Cal Mgmt Rev 160, 167 (1987) (observing that, during the 1960s and 1970s, almost sixty new minicomputer firms were formed, principally by engineers who had worked for DEC and other major minicomputer manufacturers); Roberts, 11 Rsrch Mgmt at 252 (cited in note 157) (observing that thirty-nine companies had been formed during the 1960s by forty-four former employees of one Boston area electronics firm).

¹⁶⁴ See Dorfman, 12 Rsrch Pol at 310, 316 n 40 (cited in note 79) (describing a 1977 study by the MIT Center for Policy Alternatives).

¹⁶⁵ See Lee Fleming, et al, *Why the Valley Went First: Agglomeration and Emergence in Regional Inventor Networks* *29–30 (working paper, Feb 2003), archived at <https://perma.cc/4MA2-KZ5U>.

¹⁶⁶ See Franz Tödtling, *Regional Networks of High-Technology Firms—The Case of the Greater Boston Region*, 14 Technovation 323, 330 (1994) (describing regional network in Boston area comprising electronics, component and software firms, some of which act as "suppliers or subcontractors to the [large] minicomputer firms"); AnnaLee Saxenian, *In Search of Power: The Organization of Business Interests in Silicon Valley and Route 128*, 18 Econ & Society 25, 45 (1989) (stating that "research laboratories and firms producing components and services for each other co-located, and cross-fertilizations between the academic world, the federal government and local industry fuelled an ongoing expansion of technologically innovative activity in the [Route 128] region"); Dorfman, 12 Rsrch Pol at 306 (cited in note 79) (stating that the Boston area provides technology firms with access to a network of parts and components suppliers, "all particularly critical to new

off from other companies were at the very heart of the monumental growth that the Route 128 area experienced from the 1960s through the 1980s.”¹⁶⁷

On the West Coast, Silicon Valley pioneered innovations in the semiconductor field and, by the late 1970s, was the recognized leader.¹⁶⁸ Historical accounts of Silicon Valley’s semiconductor industry typically attribute its origins to the departure in 1957 of leading engineers from Shockley Transistors to form Fairchild Semiconductor, which generated a sequence of leading semiconductor firms.¹⁶⁹ Semiconductor chips are a critical component in a wide array of computing and electronics products and operated as a launching pad for Silicon Valley to achieve dominance in information technology more generally.¹⁷⁰ Even after lower-cost Japanese producers in the 1980s undermined the local memory chip production industry, Silicon Valley adapted by shifting resources to the design and development of customized chips¹⁷¹ and developing strengths in hardware and software markets. By contrast, the Massachusetts minicomputer industry did not recover as quickly from the entry of lower-cost workstations and personal computers.¹⁷² Massachusetts had bet on the wrong horse and was unable to recover the lead.

Unlike the legal literature, the economic history and business management literature shows no consensus view as to the factors that best explain why Silicon Valley overtook Route 128 as an information technology center. Starting with Gilson, the legal literature has focused on the explanation advocated by Saxenian, who

start-ups that are developing prototypes and to manufacturers of customized equipment for small markets”).

¹⁶⁷ See Rosegrant and Lampe, *Route 128* at 154 (cited in note 163).

¹⁶⁸ See Kenney and von Burg, 8 *Indust & Corp Change* at 68, 80–85 (cited in note 157).

¹⁶⁹ See Ceruzzi, *A History of Modern Computing* at 198 (cited in note 158).

¹⁷⁰ See Kenney and von Burg, 8 *Indust & Corp Change* at 78 (cited in note 157) (“In the postwar electronics industry, transistors and then integrated circuits were an enabling technology for nearly every important electronic innovation.”).

¹⁷¹ See AnnaLee Saxenian, *Regional Networks and the Resurgence of Silicon Valley*, 33 *Cal Mgmt Rev* 89, 89–95 (1990) (describing how firms that specialize in the design of customized chips and outsource production enabled Silicon Valley to recover after Japanese firms entered the general-purpose semiconductor markets).

¹⁷² See Ceruzzi, *A History of Modern Computing* at 304–06 (cited in note 158) (describing how minicomputer companies based in the Boston area failed to adapt to the PC revolution); Kenney and von Burg, 8 *Indust & Corp Change* at 87 (cited in note 157) (stating that the minicomputer industry could not compete with “workstations” that offered comparable computing power at a substantially lower price); Richard N. Langlois, *Organizing the Electronic Century*, in Giovanni Dosi and Louis Galambos, eds, *The Third Industrial Revolution in Global Business* 119, 155 (Cambridge 2013) (same).

attributed this development to cultural norms and vertically integrated structures that constrained the flow of intellectual capital.¹⁷³ However, the business management and economic history literature is far less monolithic and identifies other salient reasons why Silicon Valley may have overtaken Massachusetts. Most commonly, these scholars identify factors such as the draw of warm weather, luck (in particular, Shockley Transistors' choice to locate in the Bay Area, which then gave rise to the Fairchild spin-off),¹⁷⁴ and, most compellingly, the fact that Silicon Valley had achieved leadership in a general-purpose technology (namely, the microprocessor pioneered by Intel in the 1970s) that could be applied to a wide variety of industrial, business, and consumer markets.¹⁷⁵ By contrast, the leading Massachusetts firms in the late 1970s and early 1980s had focused on developing specialized minicomputer and other technologies targeted for technical and industrial users.¹⁷⁶ Hence, once-pioneering Massachusetts firms such as DEC tended to focus on technologies that would service existing markets for technical and industrial users, rather than developing innovations—such as the personal computer—that would open up new and much larger markets in the corporate, small business, and home segments.¹⁷⁷

This is not to say that East Coast firms were innovation laggards as compared to their West Coast counterparts. After all, it was IBM, headquartered in New York State, that in 1981 launched the personal computer, which precipitated the movement from closed “end-to-end” hardware systems to modular

¹⁷³ See note 8.

¹⁷⁴ In the words of Intel's cofounder: “[L]uck played a role in nearly every component of this story of semiconductors and the birth of Silicon Valley.” See Gordon Moore and Kevin Davis, *Learning the Silicon Valley Way*, in Timothy Bresnahan and Alfonso Gambardella, eds, *Building High-Tech Clusters: Silicon Valley and Beyond* 7, 36 (Cambridge 2004).

¹⁷⁵ See Kenney and von Burg, 8 *Indust & Corp Change* at 80 (cited in note 157) (noting that “the semiconductor found a far greater variety of applications than did the minicomputer” and “the semiconductor was important because it made so many other products possible”).

¹⁷⁶ See *id* (noting that Route 128 specialized in the minicomputer, which was a finished product, rather than a component that could be used to assemble other products); Dorfman, *Massachusetts' High Technology Boom in Perspective* at 2–4 (cited in note 162).

¹⁷⁷ See Kenney and von Burg, 8 *Indust & Corp Change* at 87 (cited in note 157) (noting the common observation that Route 128 firms such as DEC failed to appreciate the threat posed by workstations and microcomputers, the precursors to the desktop personal computer); Ceruzzi, *A History of Modern Computing* at 243–45 (cited in note 158) (noting DEC's choice to focus on high-performance and larger computers rather than smaller and less expensive personal computers).

“plug-and-play” hardware systems as the standard product architecture in the computing market.¹⁷⁸ That East Coast innovation in turn led to the aforementioned decline of DEC, Wang, and other leading Massachusetts minicomputer firms that operated under closed models in which customers purchased all components from a single firm.¹⁷⁹ IBM’s success is attributable in part to its then-novel decision to outsource design and production of many of the PC’s components—most notably, the operating system (to Microsoft) and the microprocessor (to Intel)—as well as its inadvertent commoditization of the PC’s hardware.¹⁸⁰ But these were strategies that could have been taken by a firm like DEC, which had previously made pioneering contributions to computing technology. In fact, DEC attempted to do just that. In 1988, IBM and DEC collaborated to establish the Open Software Foundation, an effort to develop OS/2, a nonproprietary operating system intended to challenge Microsoft’s Windows system.¹⁸¹ Similarly, some of DEC’s Route 128 peers responded (albeit, somewhat belatedly) to the decline of the minicomputer by adopting alternative organizational structures.¹⁸² Moreover, two Route 128 firms launched the first commercially successful spreadsheet applications (Visicalc, released in 1979, and Lotus 1-2-3, released in 1984),¹⁸³ which are recognized as key factors in the widespread adoption of the Mac and PC, respectively.¹⁸⁴ Hence, there does not seem to be any compelling reason to attribute the decline of DEC and other leading Massachusetts firms substantially to cultural norms or vertically integrated forms of industrial organization.

A similar observation complicates Gilson’s argument that Massachusetts’s willingness to enforce noncompetes suppressed labor mobility, which hindered the region’s innovative performance. Critically, this argument fails to contemplate that

¹⁷⁸ See Langlois, *Organizing the Electronic Century* at 153–54 (cited in note 172).

¹⁷⁹ See Best, *The New Competitive Advantage* at 122 (cited in note 163) (observing that dominant Route 128 firms such as DEC and Wang offered “closed architecture” systems). See also Kenney and von Burg, 8 *Indust & Corp Change* at 87 (cited in note 157) (noting that Wang had dismissed the commercial importance of personal computers).

¹⁸⁰ See Ceruzzi, *A History of Modern Computing* at 277–78 (cited in note 158); Kenney and von Burg, 8 *Indust & Corp Change* at 96 (cited in note 157).

¹⁸¹ See Glenn Rifkin and George Harrar, *The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corporation* chs 24–25 (Contemporary Books 1988); John Steffens, *Newgames: Strategic Competition in the PC Revolution* 183–84, 222–23 (Pergamon 1994).

¹⁸² See Tödtling, 14 *Technovation* at 332 (cited in note 166).

¹⁸³ See M. Mitchell Waldrop, *The Origins of Personal Computing*, 285 *Scientific Am* 84, 90 (Dec 2001).

¹⁸⁴ See James A. Sena, *The PC Evolution and Diaspora*, *CrossTalk* 23 (Mar/Apr 2012); Langlois, *Organizing the Electronic Century* at 152 (cited in note 172).

Route 128 firms could have chosen *not* to request or enforce noncompetes if competitive pressures in the labor market drove them to do so. Gilson argues that collective-action pressures precluded that possibility.¹⁸⁵ But there is compelling evidence that Route 128 firms sometimes, if not *typically*, elected to forgo adoption and enforcement of noncompetes. Contemporary accounts in the early 1980s observed that Route 128 was characterized by frequent spin-offs,¹⁸⁶ talented engineers often left their employees to form start-ups, and large incumbents were typically parents of multiple spin-off firms.¹⁸⁷ One observer records that Route 128 firms tolerated or even welcomed the movement of technical personnel because they “value[d] the knowledge they obtain[ed] by hiring employees from other firms more than they fear[ed] the loss of proprietary information,”¹⁸⁸ and that entrepreneurs often conceived of ideas “in the lab of an employer.”¹⁸⁹ That same observer noted that “[n]ew and expanding firms hire[d] their ‘know how’ by bidding experienced employees away from competing firms.”¹⁹⁰

These accounts make no mention of the use of noncompetes to restrain employee turnover. Rather, firms attempted to retain valued employees by offering superior terms and more interesting work¹⁹¹—something that would have been unnecessary if noncompetes were legally potent. The lesson seems clear: when technical

¹⁸⁵ See Gilson, 74 NYU L Rev at 596 (cited in note 8).

¹⁸⁶ See David A. Garvin, *Spin-Offs and the New Firm Formation Process*, 25 Cal Mgmt Rev 3, 3 (1983) (observing that, as of the early 1980s, in both Silicon Valley and Route 128, new firms are continuously being formed through “spin-offs” founded by “individuals leaving an existing firm in the same industry”).

¹⁸⁷ See Rosegrant and Lampe, *Route 128* at 29, 153–57 (cited in note 163); Dorfman, *Massachusetts’ High Technology Boom in Perspective* at 69 (cited in note 162). Professor Sarah Kuhn observes as follows: (i) “[s]ome firms prefer to hire away employees of other computer manufacturing firms,” Kuhn, *Computer Manufacturing in New England* at 72 (cited in note 161); (ii) Route 128 has “an unusually high turnover rate among its technical employees, see id at 124–25, and (iii) Route 128 firms provided survey responses indicating heavy reliance on hiring employees from competitors, see id at 125. Similarly, Nancy Dorfman remarks that the Route 128 area is characterized by a start-up entrepreneurial culture in which firms bid away experienced employees from competitors. See Dorfman, 12 Rsrch Pol at 308 (cited in note 79). She further observed that “scientists repeatedly leave their employers to commercialize and market new products whose concepts they helped to develop in the laboratory of a former employer” and it is a “challenge to find new enterprises whose founders did not come from an academic laboratory or another high tech firm.” See id at 310.

¹⁸⁸ See Dorfman, *Massachusetts’ High Technology Boom in Perspective* at 9 (cited in note 162).

¹⁸⁹ See id at 69.

¹⁹⁰ See Dorfman, 12 Rsrch Pol at 308 (cited in note 79).

¹⁹¹ See Kuhn, *Computer Manufacturing in New England* at 125 (cited in note 161).

talent is scarce and market demand for that talent is high, bargaining leverage shifts to employees and differences in the enforceability of noncompetes make little practical difference. Any employer who sought to enforce a noncompete would be punished in the labor market.¹⁹²

To be certain, there is no comprehensive quantitative evidence on noncompete usage and enforcement during this historical period. However, in more recent times—notably, after California substantially ratcheted up its aversion to noncompetes in 2008 in *Edwards*—Massachusetts and California have exhibited similar rates of employee noncompete usage, even among wholly in-state firms, according to the most comprehensive survey conducted to date.¹⁹³ Thus, it seems unlikely that during the historical period in question—when Massachusetts and California noncompete law were more similar than today—that the rate of noncompete usage and enforcement between the two states substantially differed.

There may be an additional material factor behind Silicon Valley's ascendance, which existing scholarship has overlooked. In 1979, the Department of Labor modified the “prudence rule” to permit pension fund trustees to invest in venture capital.¹⁹⁴ Based on this signal from federal regulators, state pension fund trustees took the view that it would be consistent with their fiduciary obligations to invest an appropriate portion of a fund's assets in venture capital and other high-risk “alternative” investments.¹⁹⁵ This change triggered a dramatic inflow of capital into VC investments

¹⁹² Of course, monopsonistic labor markets exist, and assuming the predicate conditions for firm coordination in this context are satisfied—small number of employers with large market share, comparable employment positions, observable compensation, and a credible mechanism to punish defections—employers can credibly impose and enforce noncompetes. For discussion, see *Todd v Exxon Corp*, 275 F3d 191, 201–02, 207–14 (2d Cir 2001). However, we have no reason to believe that these challenging conditions were satisfied in the labor markets for highly skilled technical workers in the Route 128 area during this historical period, especially given evidence that this area was characterized by frequent spin-offs during this period. See notes 163–67 and accompanying text.

¹⁹³ Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *45 fig 8 (cited in note 11).

¹⁹⁴ Department of Labor, Rules and Regulations for Fiduciary Responsibility; Investment of Plan Assets Under the “Prudence” Rule, 44 Fed Reg 37221–22 (1979), amending 29 CFR § 2550.404a-1.

¹⁹⁵ See Paul A. Gompers and Josh Lerner, *What Drives Venture Capital Fundraising?* 155 (Brookings Institution 1998).

and, by the late 1980s, the emergence of pension funds as the single largest investor class in VC funds.¹⁹⁶ Presumably, the same is true of California pension funds' increase in VC investment at approximately the same time, given that CalPERS, the principal California state pension fund, followed the lead of the Department of Labor and directed assets toward venture capital funds, formally establishing an Alternative Investment Management program for this purpose in 1990.¹⁹⁷ Like other state pension funds (including Massachusetts), California state pension funds exhibit a significant in-state bias in their investments in VC and private equity funds.¹⁹⁸ VC funds in turn exhibit an in-state bias in the selection of portfolio firms.¹⁹⁹ The much larger size of the California pension system, combined with the in-state biases of California state pension fund managers and California VC principals, implies that Silicon Valley startups likely had access to a much larger pool of capital than Boston-based startups.²⁰⁰

¹⁹⁶ See *id.* at 155–56, 163–66 (observing that change in the Department of Labor's "prudent man rule" led to investment in venture capital funds by pension funds, which became the primary source of capital for these funds).

¹⁹⁷ See *CalPERS Private Equity Investments Infuse Billions into California Businesses; Portfolio Is Positioned to Capitalize on Buying Opportunities* (Business Wire, Oct 17, 2003), archived at <https://perma.cc/4C74-L6R5> (noting the establishment by CalPERS of Alternative Investment Management Program in 1990 as a vehicle for investing in private equity).

¹⁹⁸ See Yael V. Hochberg and Joshua D. Rauh, *Local Overweighting and Underperformance: Evidence from Limited Partner Private Equity Investments*, 26 *Rev Fin Stud* 403, 414–25 (2013).

¹⁹⁹ See Adam Lichtenstein, *Home-State Investment Bias in Venture Capital Funds*, 62 *Fin Analysts J* 22, 23–24 (2006). For further evidence that venture capital funds favor investments in geographically proximate regions, see Claudia B. Schoonhoven and Kathleen M. Eisenhardt, *Regions as Industrial Incubators*, in Edwin S. Mills and John F. McDonald, eds, *Sources of Metropolitan Growth* 210, 244–45 (Transaction 2012).

²⁰⁰ Although data is not available from the time period in question, to get a sense of the sums involved, consider that, during 2007–2014, CalPERS has held between 8.5 percent and 13.5 percent of its private equity investments in California-based firms. In 2014, it held \$31.5 billion of private equity investments, of which 11.5 percent was invested in California-based firms. See CalPERS, *CALPERS Comprehensive Annual Financial Report* *52, 100 (FY 2014); CalPERS, *CALPERS Comprehensive Annual Financial Report* *92 (FY 2010); California State Controller's Office, *CALPERS Comprehensive Annual Financial Report* *83 (FY 2009); CalPERS, *CALPERS Comprehensive Annual Financial Report* *86, 89 (FY 2008). Private equity includes VC investments as well as other investments in firms that are not publicly traded. The Massachusetts Pension Reserves Investment Trust Fund, which manages private equity investments on behalf of the Massachusetts state pension system, reported that, as of June 2014, it held \$6.9 billion in investments in private equity, of which \$1.4 billion was invested in venture capital. See Massachusetts Pension Reserves Investment Trust Fund, *Comprehensive Annual Financial Report* *35 (2014). The report does not disclose what portion of those funds were allocated to Massachusetts-based investment funds, although it does indicate that 27 percent of its private equity investments were made outside the US. See *id.* at *84. Hence, it is extremely

5. Did Massachusetts really decline?

The traditional narrative relies both on the rise of Silicon Valley as a center of innovation in the electronics industry and the decline of Route 128. While it is correct that Silicon Valley has achieved a uniquely preeminent position, this narrative overstates both Massachusetts's relative historical prominence as a technology center and its relative retreat from that position in more recent decades.

While Route 128 was an historical pioneer in the IT industry since World War II, the period during which it was clearly a dominant center was a short period limited to the height of the minicomputer market during the late 1970s and early 1980s.²⁰¹ Even during that time, there was no single, overwhelmingly dominant innovation center akin to Silicon Valley's place today. Relative to the Boston area's important, but less than preeminent, position as of the early 1980s, it does not appear to have suffered a permanent decline in innovative performance since the collapse of the minicomputer industry.²⁰² Rather, the Boston area has recovered its place as a leading regional innovation center, even if it no longer rivals Silicon Valley in the IT market. Multiple innovation metrics provide suggestive evidence in support of this view. During 1985–2013, the Bay Area held and expanded its lead in the volume of VC investments while the New England region consistently occupied the second- or third-place position.²⁰³ From 1987 through 2011, Massachusetts maintained consistently high levels of business-funded R&D intensity (defined as R&D funded by businesses as a percentage of “gross state product”) in a range of approximately 3–4 percent, outperforming California in all years but one.²⁰⁴ From 1997 through 2016, California and Massachusetts

unlikely that Massachusetts pension fund managers invested more capital in Massachusetts-based VC firms, as compared to CalPERS's investments in California-based VC firms.

²⁰¹ See Best, *The New Competitive Advantage* at 120 (cited in note 163).

²⁰² See id. at 126–27.

²⁰³ National Venture Capital Association, *Yearbook* *35–37 fig 3.08–09 (Thomson Reuters, 2015), archived at <https://perma.cc/Y5G3-6DJA>.

²⁰⁴ Authors' calculations, based on (i) data on state-level R&D expenditures extracted on an alternating year basis from the National Center for Science and Engineering Statistics, *Industrial Research and Development Information System* (National Science Foundation, July 2011), archived at <https://perma.cc/82ZP-4YS2>, and (ii) data on “gross state product” available from the Bureau of Economic Analysis, *Comprehensive Revision of Gross State Product, 1977–2002, and Accelerated GSP Estimates for 2003* (US Department of Commerce, Dec 15, 2004), archived at <https://perma.cc/28C3-RCTV>. With respect to item (i), we excluded federal R&D expenditures in order to avoid reflecting any federal subsidies that might understate regional markets' ability to sustain innovation.

have appeared every year among the top three states in terms of business-performed R&D intensity (defined as R&D performed by businesses as a percentage of “private-industry output”).²⁰⁵ After the San Francisco area, the Boston area is the second-most popular location in the US that companies select for their primary R&D center (selected by 230 firms as of 2011, compared to 380 firms for San Francisco).²⁰⁶

The Boston area has preserved or regained a significant presence in biotechnology and the life sciences, computer systems design, telecommunications equipment, data storage, technical instruments, and industry-oriented software tools.²⁰⁷ In fact, the success of the Boston area as a technology cluster since the collapse of the minicomputer industry has now lasted longer than the period during which DEC and its peers were dominant.²⁰⁸ Notwithstanding Massachusetts’s formal tolerance of noncompetes, multiple leading firms in various information technology sectors have spawned a steady flow of new firms providing complementary products and services.²⁰⁹ In the life sciences (including biotechnology) and medical devices sector in particular, the Boston area is especially prominent (in 2015, biotech firms based in New England raised approximately \$10.6 billion from outside investors, while biotech firms based in the San Francisco Bay Area raised approximately \$6.5 billion).²¹⁰ Trade and scholarly commentary typically situates the Boston area among a triplet of

²⁰⁵ National Center for Science and Engineering Statistics, *Industrial Research and Development Information System* (cited in note 204).

²⁰⁶ Raymond Wolfe and Brandon Shackelford, *2011 Data Show U.S. Business R&D Highly Concentrated by State and Metropolitan Location* (National Science Foundation, Aug 2014), archived at <https://perma.cc/NJC9-TAJU>.

²⁰⁷ See Best, *The New Competitive Advantage* at 126, 127–48, 154, 157 (cited in note 163) (describing “resurgence” of Route 128 area as the local technology industry transitioned from vertically integrated to an “open system . . . model of industrial organization”); Michael Best, Albert Paquin, and Hao Xie, *Discovering Regional Competitive Advantage: Massachusetts High-Tech*, 2 Bus & Econ Hist On-Line 1, 2, 7–21 (2004), archived at <https://perma.cc/C6X4-7HAN> (describing “resurgence” of the Boston area as an innovation center in the 1990s and providing extensive data showing that the Boston area continues to excel in its historical strengths in complex systems software and engineering); Jason S. Wood, *A Comparison of the Enforceability of Covenants Not To Compete and Recent Economic Histories of Four High-Technology Regions*, 5 Va J L & Tech 14, ¶ 38 (2000) (noting that, contrary to “Gilson’s dark portrait of Massachusetts’ lack of knowledge spillover effects, the greater Boston area, including Route 128, has recovered nicely from the dark days of the 1980s and early 1990s, and has been a leader in the technology revolution of the mid and late-1990s”).

²⁰⁸ See Best, *The New Competitive Advantage* at 121 (cited in note 163).

²⁰⁹ See id at 129–30.

²¹⁰ See *Beyond Borders 2016: Biotech Financing* *15 (Ernst & Young, 2016), archived at <https://perma.cc/C3SS-4CZZ>.

leading biotechnology clusters along with the Bay Area and San Diego,²¹¹ in some cases ranking it as the leader among those three locations.²¹² As of 2015, the Massachusetts Biotechnology Council stated that Massachusetts employed more personnel in biotechnology R&D than any other state and an MIT report found that, on a per capita basis, Massachusetts received significantly more funding (\$351 per capita) from the National Institutes of Health than California (\$88 per capita).²¹³ During 2012–2014, San Francisco firms received each quarter approximately 30–50 percent of funding in the national life sciences industry, while Boston firms received each quarter approximately 20–40 percent of funding.²¹⁴

On a state-to-state level comparison, it may be surprising to learn that Massachusetts and California do not materially differ by multiple measures of innovative health. The State Technology and Science Index, which ranks states' innovation capacities by various objective measures, has ranked Massachusetts in first place since the index was inaugurated in 2002 and through its latest release in 2018.²¹⁵ In 2018, California ranked fourth, after having held fourth, third, and third places in 2016, 2014, and 2012, respectively.²¹⁶ According to the State New Economy Index, both California and Massachusetts are among the country's leading states on multiple innovation measures (reflecting data as of the years 2012 through 2016), including:

- (i) industry-funded R&D as a percentage of total state GDP (CA: 2.5 percent (ranked third); MA: 2.1 percent (ranked fourth));

²¹¹ See Shiri M. Breznitz and William P. Anderson, *Boston Metropolitan Area Biotechnology Cluster*, 28 Can J Regional Sci 249, 249 (2005) (noting that Boston, San Diego, and the San Francisco Bay Area "account for a disproportionately high share of total employment and investment" in the US biotechnology industry); Toby Stuart and Olav Sorenson, *The Geography of Opportunity: Spatial Heterogeneity in Founding Rates and the Performance of Biotechnology Firms*, 32 Rsrch Pol 229, 236–37, 249 (2003) (showing that for the period 1983–1995, the Boston area, Southern California, and Northern California exhibited the largest number of new biotechnology firms).

²¹² *Clusterluck: Boston's Biotech Hub Is Surviving the Challenge from Silicon Valley* (The Economist, Jan 16, 2016), online at <https://www.economist.com/business/2016/01/16/clusterluck> (visited Feb 17, 2020) (Perma archive unavailable).

²¹³ See *id.*

²¹⁴ See *Biotech Funding Surges* *6 fig 13 (PricewaterhouseCoopers, Feb 2015), archived at <https://perma.cc/23MW-BQEK>.

²¹⁵ *Massachusetts: State Technology and Science Index* (Milken Institute, 2018), archived at <https://perma.cc/WYZ4-AVL6>.

²¹⁶ See *2018 State Technology and Science Index: State Overall Ranking* (Milken Institute, 2018), archived at <https://perma.cc/7Z7D-EQX5>.

- (ii) patents awarded to companies per one thousand private-sector workers (CA: 14.6 (ranked thirteenth); MA: 15.7 (ranked ninth));
- (iii) venture capital invested as a percentage of state GDP (CA: 1.28 percent (ranked first); MA: 1.27 percent (ranked second)); and
- (iv) employment in high-technology industries as a percentage of total private-sector employment (CA: 6.8 percent (ranked fifth); MA: 7.9 percent (ranked first)).²¹⁷

B. Empirical Studies: Noncompetes, Mobility, and Innovation

Even if the Silicon Valley / Route 128 narrative were more robust, it would be imprudent to base any policy conclusions on a single historical example. While Japan was once widely viewed as a model of a successful innovation economy, a regime characterized by lifetime job security and oligopolistic market structures would hardly be viewed today as an attractive innovation ecosystem.²¹⁸ Recently, empirical and experimental researchers have sought to move beyond the Silicon Valley example and, in doing so, have produced a sizeable body of studies concerning the effect of noncompetes on labor mobility and, in some cases, innovation. Unlike the literature that relies on the Silicon Valley / Route 128 narrative, these studies usefully apply formal methods to a broad sample of state jurisdictions, seeking to exploit interstate differences, or intrastate changes in, the legal treatment of noncompetes to identify the effects of such differences and changes on employee turnover and certain innovation indicators.

These studies fall into two categories. The larger category addresses only or principally whether noncompetes (or specifically, the enforceability of noncompetes) reduce labor mobility. In a companion paper, we review these studies comprehensively and provide a detailed discussion of the contributions and limitations of the most widely cited studies.²¹⁹ In that review, we describe significant methodological limitations and identify factual errors

²¹⁷ *The 2017 State New Economy Index* *10, 44, 47, 50 (Information Technology & Innovation Foundation, Nov 2017), archived at <https://perma.cc/B8R7-CXAV>.

²¹⁸ On the folly of these once-popular views, see Brink Lindsey and Aaron Lukas, *Revisiting the "Revisionists": The Rise and Fall of the Japanese Economic Model* (Cato Institute, July 31, 1998), archived at <https://perma.cc/3GZN-SDGH>.

²¹⁹ See Jonathan M. Barnett and Ted Sichelman, *Revisiting Labor Mobility in Innovation Markets* *12–29 (USC Gould School of Law Center for Law and Social Science Research Paper Series No CLASS16-13, May 26, 2016), archived at <https://perma.cc/V2T9-6UGC>.

concerning important points of state law. These shortcomings cast serious doubt on these studies' claims purporting to show a broad causal relationship between the enforcement of noncompetes and reduced labor mobility. For purposes of the review below, however, we will accept as given the findings of this first category of studies—that is, we will assume that the enforceability of noncompetes has some significant incremental effect on labor mobility. This assumption will enable us to focus our review below on a second and smaller group of studies that address the more fundamental question whether the enforceability of noncompetes has a detrimental effect on innovation.

1. Nonexperimental studies.

Several empirical studies have sought to test for a relationship between noncompetes, employee mobility, and innovation. Here, we address in detail four of the studies that scholars and policymakers have most heavily cited and relied upon. First, a 2003 study by Professors Toby Stuart and Olav Sorenson (the “Stuart and Sorenson study”) examined biotechnology startups founded in the wake of an initial public offering (IPO) or acquisition of a previous company, finding a significant inverse relationship between in-state noncompete enforceability and overall startup formation. Specifically, in the absence of state-level fixed effects, the authors find that “states with weak non-compete regimes realize 217 percent higher founding rates than those that enforce non-compete covenants.”²²⁰ Additionally, taking account for state-fixed effects, Stuart and Sorenson find that the median IPO “occurring in . . . a weak enforcement state increases the founding rate [of new biotech firms] . . . by 26 percent.”²²¹ Second, a 2011 study by Professor Mark Garmaise (the “Garmaise study”) found that stronger noncompete enforceability, interacted with a measure of in-state competition, tends to suppress R&D spending and that increased enforceability reduces capital investment per

Our analysis in that paper focuses on the most widely cited studies, which include: Matt Marx, Jasjit Singh, and Lee Fleming, *Regional Disadvantage? Employee Non-compete Agreements and Brain Drain*, 44 Rsrch Pol 394 (2015); Garmaise, 27 J L Econ & Org 376 (cited in note 63); Matt Marx, Deborah Strumsky, and Lee Fleming, *Mobility, Skills, and the Michigan Non-compete Experiment*, 55 Mgmt Sci 875 (2009); Bruce Fallick, Charles A. Fleischman, and James B. Rebitzer, *Job-Hopping in Silicon Valley: Some Evidence Concerning the Microfoundations of a High-Technology Cluster*, 88 Rev Econ & Stat 472 (2006).

²²⁰ See Toby Stuart and Olav Sorenson, *Liquidity Events and the Geographic Distribution of Entrepreneurial Activity*, 48 Admin Sci Q 175, 193 (2003).

²²¹ Id at 195.

employee.²²² Third, a 2011 study by Professors Sampsa Samila and Olav Sorenson (the “Samila and Sorenson study”) found that states that enforce noncompetes dampen the effects of venture capital investment on firm formation and patenting rates.²²³ Based on these findings, Samila and Sorenson conclude that the enforceability of noncompetes “significantly impedes entrepreneurship and employment growth.”²²⁴ Fourth, a 2015 study by Professors Matt Marx, Jasjit Singh, and Lee Fleming (the “Marx et al. study”) found a “brain drain” of inventors from Michigan to states that do not enforce noncompetes after 1985, the year in which Michigan law restored the enforceability of noncompetes.²²⁵ Moreover, the Marx et al. study found that this effect was strongest for more highly skilled inventors.²²⁶ We now address substantial limitations and, in some cases, outright flaws of these studies. Although we do not have space to address every study examining the relationship between noncompetes and innovation, our critique applies to the vast majority of lesser-cited studies on the issue.

a) *Improper characterization of how strongly states enforce noncompetes.* First, all four of these studies, as well as many other studies, oversimplify and largely misjudge the variation in the strength of state-by-state enforcement of noncompetes. Specifically, these studies classify strength of enforcement either (1) in a binary fashion as “enforcing” or “non-enforcing” states, developed from the study by Stuart and Sorenson; or (2) according to a twelve-factor scale developed by Garmaise.²²⁷

Specifically, Stuart and Sorenson classify each state as “non-enforcing” or “enforcing.”²²⁸ They identify six states that, during the period 1985–1996, purportedly “preclude[d] the enforcement of *all* noncompete agreements” and five states that “only enforce[d] non-compete covenants under very specific circumstances.”²²⁹ These eleven states are considered nonenforcing.²³⁰ In

²²² See Garmaise, 27 J L Econ & Org at 408–10 (cited in note 63).

²²³ See Samila and Sorenson, 57 Mgmt Sci at 432, 436 (cited in note 9).

²²⁴ See id at 425.

²²⁵ See Marx, Singh, and Fleming, 44 Rsrch Pol at 397 (cited in note 219).

²²⁶ See id at 402. Inventive skill is measured by the number of citations to an inventor’s patents.

²²⁷ See Garmaise, 27 J L Econ & Org at 421–22 (cited in note 63); Stuart and Sorenson, 48 Admin Sci Q at 190 (cited in note 220).

²²⁸ Stuart and Sorenson, 48 Admin Sci Q at 190 (cited in note 220).

²²⁹ Id (emphasis added).

²³⁰ Id.

contrast, they identify twenty-six enforcing states that purportedly placed “no restrictions” on the enforcement of noncompetes, as well as thirteen other nonenforcing states that followed a “reasonable[ness]” approach or enforced noncompetes limited in time or space.²³¹ The Samila and Sorenson study as well as the Marx et al. study both rely on Stuart and Sorenson’s classification system for their analyses.²³²

This binary approach is inherently inaccurate—all states enforce some noncompete provisions and no states enforce all noncompete provisions. Other than California, North Dakota, and Oklahoma (until 1989), all states during that time period essentially adopted a reasonableness approach to the enforcement of noncompetes, subject to variation in application.²³³

Even if one were to draw an arbitrary line between states, it would result in at most two nonenforcing states during this time period. Consistent with both Professor Norman Bishara’s comprehensive state-by-state review²³⁴ and our own independent review, we find that during the relevant time periods, other than California and North Dakota, none of the purported nonenforcing states in the Stuart and Sorenson study—namely, Alaska, Connecticut, Michigan, Minnesota, Montana, Nevada, Oklahoma, Washington, and West Virginia—can plausibly be classified in this manner.

It appears that Stuart and Sorenson primarily examined the language of specific state statutes as reproduced in the 1996 edition of the Malsberger treatise on state enforcement of covenants not to compete,²³⁵ without carefully reviewing the descriptions of actual case law in the same treatise. Critically, any state’s effective noncompete regime cannot be accurately described without taking into account *both* applicable statutes and judicial interpretation of those statutes. Montana is a case in point. Apparently on the basis of the Montana statute voiding “contracts in restraint

²³¹ Id (emphasis added).

²³² Samila and Sorenson, 57 Mgmt Sci at 430 (cited in note 9); Marx, Singh, and Fleming, 44 Rsrch Pol at 396 n 2 (cited in note 219).

²³³ See Brian Malsberger, *Covenants Not to Compete: A State-by-State Survey* xxv (BNA Books 2004) (“Malsberger 2004”); Brian Malsberger, *Covenants Not to Compete: A State-by-State Survey* xxiii (BNA Books 1996) (“Malsberger 1996”); Norman D. Bishara, *Fifty Ways to Leave Your Employer: Relative Enforcement of Covenants Not to Compete, Trends, and Implications for Employee Mobility Policy*, 13 U Pa J Bus L 751, 757 (2011) (“While the majority of states provide some enforcement of noncompete agreements . . . there are only two extreme outliers in terms of restrictions on any noncompete enforceability: California and North Dakota.”).

²³⁴ See Bishara, 13 U Pa J Bus L at 767, 771–81, 786–87 (cited in note 233).

²³⁵ See Stuart and Sorenson, 48 Admin Sci Q at 190 (cited in note 220).

of trade,”²³⁶ which has common origins with California’s statute, Stuart and Sorenson classify it as a state that “precludes the enforcement of *all* noncompete agreements.”²³⁷ Yet, the Malsberger treatise expressly states that “[d]espite subsection 703, Montana courts have upheld restrictive covenants in employment contracts” under a general reasonableness standard.²³⁸

For states without statutes, Stuart and Sorenson’s summary of the Malsberger treatise is also inaccurate. Our detailed review of the treatise, including cases cited therein, shows that all of their study’s supposed nonenforcing states lacking statutes—Alaska, Connecticut, Minnesota, and Washington—are misclassified.²³⁹ Again, these states essentially enforce noncompetes under a reasonableness standard. Indeed, Bishara—completely contrary to Stuart and Sorenson—classifies Connecticut and Washington as the fourth and eighth *strongest* enforcing states in 1991, respectively.²⁴⁰

In response to an earlier draft of this Article, Sorenson ran robustness checks to the main estimates in the initial study with Stuart using the Bishara measure of enforceability as well as a separate binary coding scheme in which North Dakota and California are the only nonenforcing states.²⁴¹ In these revised models, the results are substantially similar to, and in some cases stronger than, Stuart and Sorenson’s initial results.²⁴²

We are heartened by the fact that Sorenson—unlike Marx et al. or Garmaise—chose to revise his study’s initial model to take into account our criticisms. However, even these new results are subject to substantial limitations. First, the major result—that the states with weak noncompete enforcement regimes experience higher absolute founding rates than states with strong regimes that abstract away from state fixed effects—is not determinative because other regional factors may correlate between

²³⁶ Mont Code Ann §§ 28-2-703 to -704.

²³⁷ See Stuart and Sorenson, 48 Admin Sci Q at 190 (emphasis added) (cited in note 220).

²³⁸ See Malsberger 1996 at 674–75 (cited in note 233). See also *Dobbins, DeGuire & Tucker, PC v Rutherford, MacDonald & Olson*, 708 P2d 577, 580 (Mont 1985) (adopting a three-part reasonableness test to determine whether to enforce a noncompete).

²³⁹ Specifically, we reviewed Malsberger 1996 at 98–99, 192–94, 604–05, 1136 (cited in note 233).

²⁴⁰ See Bishara, 13 U Pa J Bus L at 786–87 (cited in note 233) (reviewing Richey and Malsberger’s 1991 treatise on noncompete covenants).

²⁴¹ See E-mail from Olav Sorenson to Ted Sichelman (Oct 19, 2016) (on file with authors).

²⁴² See *id.*

the weak regime and the level of new firm foundings in the region.²⁴³ Second, for the models that take into account state fixed effects by examining new firm foundings following IPOs and acquisitions, the effects with the greatest magnitude are centered in California.²⁴⁴ This may reflect the fact that California operates in a unique environment not applicable to other states. Third, even though weak enforcement states other than California showed significant declines in new firm foundings following IPOs and interindustry acquisitions, this does not account for the quality of the new firms.²⁴⁵ As we note below, a more recent study by Starr and others finds that firms founded in strong enforcement states are of higher quality than those in weak enforcement states.²⁴⁶ Fourth, even the Bishara scale faces significant methodological limitations and has not been independently verified.²⁴⁷

The Garmaise study replaces the oversimplified binary approach of Stuart and Sorenson with a graduated twelve-point scale that assigns equal weight (one or zero) to the answers (yes or no) to twelve questions based on those in a later version of the Malsberger treatise²⁴⁸ regarding the strength and scope of non-compete law in various states.²⁴⁹ While this is an improvement, this scale is still problematic because there is no legitimate legal or other basis to *equally* weight each of the twelve factors. Comparing two of the factors as an example, it is arguably much more important how a plaintiff must prove the existence of an enforceable covenant not to compete than what counts as sufficient postemployment consideration in considering the strength of a state's noncompete regime.

There are other problems with the Garmaise scale.²⁵⁰ Garmaise's initial factor—whether the state has a statute bearing on the enforceability of noncompetes (as opposed to mere common law)—does not strike us as indicative one way or the other as to whether the state more strongly enforces noncompete law.²⁵¹ Although some very strict states (for example, California and North Dakota)

²⁴³ See Stuart and Sorenson, 48 Admin Sci Q at 193–94 (cited in note 220) (“[A] number of omitted regional factors might correlate with both the weak non-compete enforcement dummy and the level of entrepreneurial activity in the region.”).

²⁴⁴ See Sorenson E-mail (cited in note 241).

²⁴⁵ See note 312 and accompanying text.

²⁴⁶ See *id.*

²⁴⁷ See note 296 and accompanying text.

²⁴⁸ See Malsberger 2004 at xvii–xviii (cited in note 233).

²⁴⁹ See Garmaise, 27 J L Econ & Org at 420–22 (cited in note 63).

²⁵⁰ See *id.*

²⁵¹ See *id.*

have adopted statutes, so have some states following the flexible, common law reasonableness standard (for example, North Carolina and Ohio).

Next, arbitrary thresholds—such as whether a state has upheld a statewide three-year restriction versus only a two-year one—are not particularly meaningful in the overall scheme of noncompete enforcement. The Malsberger treatise does not of course catalog all the noncompete opinions in a given state—thus, Garmaise could not even answer correctly whether “3-year statewide restrictions have [ever] been upheld” in a particular state.²⁵² For instance, the applicable Malsberger treatise lists no cases in Wisconsin in which a three-year statewide noncompete was upheld;²⁵³ rather, the treatise cites only a case in Wisconsin for which a three-year noncompete was found unreasonable.²⁵⁴ But, contrary to Garmaise’s scoring, Wisconsin courts in fact had upheld a six-year noncompete and suggested that a three-year noncompete would be reasonable.²⁵⁵

Last, for perhaps the most important question—“What is an employer’s protectable interest and how is it defined?”—instead of examining the full range of protectable interests, Garmaise curiously focuses on whether an “employer can prevent the employee from future independent dealings with all the firm’s customers, not merely with the customers with whom the employee had direct contact.”²⁵⁶ Besides omitting important protectable interests—such as trade secrets, training and development, and ordinary competition—customer relationships are not the type of interest that would typically be of great concern to the top executives at the large, publicly traded firms examined in Garmaise’s study. Rather, customer relationships and list restrictions—at least at a large public firm—are more likely to apply to sales personnel, who have direct relationships with the firm’s customers, but these personnel were not examined by Garmaise. Variation

²⁵² Id at 422. See Malsberger 2004 at 3332–37 (cited in note 233).

²⁵³ See Malsberger 2004 at 3332–37 (cited in note 233).

²⁵⁴ See id at 3336, citing *Mutual Service Casualty Insurance Co v Brass*, 625 NW2d 648 (Wis App 2001).

²⁵⁵ See *Reiman Associates, Inc v R/A Advertising, Inc*, 306 NW2d 292, 296 (Wis App 1981) (upholding a six-year noncompete as reasonable); *Fullerton Lumber Co v Torborg*, 70 NW2d 585, 589–92 (Wis 1955) (remanding for determination of the extent of time as to which a noncompete covenant is reasonable, and suggesting that a minimum period of three years would be supported by the evidence).

²⁵⁶ See Garmaise, 27 J L Econ & Org at 421 (cited in note 63).

among states in a factor not relevant to the examined class of employees may of course—like Stuart and Sorenson’s scale—produce spurious results.

Ultimately, the ideal metric for evaluating a state’s noncompete regime is the probability that a typical employee move that *would* be allowed in a hypothetical nonenforcing state *would not* be allowed in any given state. Although it is clearly impossible to achieve such accuracy, neither Stuart and Sorenson nor Garmaise provide sufficient verification for the legitimacy of their indices, such as an empirical analysis of actual cases. Such untested and rough assessments do not make for valid studies.²⁵⁷

This concern is confirmed by examining the correlations between the available enforcement scales. The correlation between the Stuart and Sorenson binary scale and the Garmaise twelve-point scale is only 0.43. Bishara constructs an alternate scale²⁵⁸—using seven of the twelve questions in the 1991 Richey and Malsberger treatise and the 2009 Malsberger treatise²⁵⁹—which, although it raises similar issues as the Garmaise scale, in our opinion is somewhat more likely to be accurate because it uses a graduated scale (unlike Stuart and Sorenson) and differentially weights different factors in the scale (unlike Garmaise). The correlation between the Bishara and Garmaise scales is 0.66, and the correlation between the Bishara and Stuart and Sorenson scales is 0.42.²⁶⁰

We recognize that some type of quantitative ranking is a necessary precondition to undertake systematic analysis of the economic effects of noncompete laws. However, given the clear errors in categorization and relatively low correlations among different scales, we are doubtful that the results of studies using the Stuart

²⁵⁷ Garmaise additionally examines individual changes in law in three states by using time-series estimations, see Garmaise, 27 J L Econ & Org at 390–93 (cited in note 63), the limitations of which we address in Barnett and Sichelman, *Revisiting Labor Mobility in Innovation Markets* at *24, Part 3.2.7 (cited in note 219).

²⁵⁸ See Bishara, 13 U Pa J Bus L at 771, 786–87 (cited in note 233). For an alternate scale modeled on the Bishara scale, see Evan Starr, Natarajan Balasubramanian, and Mariko Sakakibara, *Screening Spinouts? How Noncompete Enforceability Affects the Creation, Growth, and Survival of New Firms*, 64 Mgmt Sci 552, 558 (2018). The Starr and Bishara scales are correlated at 0.94; hence, we ignore the Starr scale.

²⁵⁹ See Brian Malsberger, *Covenants Not to Compete: A State-by-State Survey* xvii–xviii (BNA Books 2009) (“Malsberger 2009”); P. Jerome Richey and Brian M. Malsberger, *Covenants Not to Compete: A State-by-State Survey* xvi–xvii (BNA 1991).

²⁶⁰ We thank Norman Bishara for providing the data underlying his scale.

and Sorenson²⁶¹ or Garmaise²⁶² scales to measure the effects of noncompetes on labor mobility can be properly relied upon for empirical study.²⁶³

A better approach to construct an enforcement scale in our view would be to undertake a comprehensive assessment of the actual extent and conditions in which courts enforce (or not) noncompetes. A large number of actual cases should be randomly selected in each state across a time period of interest. The assessment would identify the outcome in the case along with key factors in each case, including occupation, at-will vs. contract employee, employer- vs. employee-driven termination, industry, term of the noncompete, geographic scope of the noncompete, and other key circumstances, such as whether trade secrets, sale of a business, dissolution of a partnership, choice of law or forum, and substantial employee training were present. Multivariate, logistic regressions could then be constructed to compare how different factors affect outcomes across states. These results could then be substituted, where appropriate, for factors like those in Bishara to construct more accurate scales.

b) Failure to properly reflect cross-border enforcement of noncompetes. Garmaise and Marx et al. include cross-state border job changes in their datasets.²⁶⁴ The Marx et al. study focuses on the supposed “brain drain” from Michigan to “non-enforcing” states following its decision to enforce noncompetes.²⁶⁵ Such cross-border moves are complex from a legal perspective, because, as

²⁶¹ Studies that rely on the Stuart and Sorenson scale include: Kenneth A. Younge and Matt Marx, *The Value of Employee Retention: Evidence from a Natural Experiment*, 25 J Econ & Mgmt Strategy 652, 658–70 (2016); Younge, Tong, and Fleming, 36 Strategic Mgmt J at 692 (cited in note 110).

²⁶² Studies that rely on the Garmaise scale include: I.P.L. Png and Sampsa Samila, *Trade Secrets Law and Mobility: Evidence from “Inevitable Disclosure”* *20 appx 2 (working paper, Feb 14, 2015), archived at <https://perma.cc/MH8D-VWYS>; Raffaele Conti, *Do Non-competition Agreements Lead Firms to Pursue Risky R&D Projects?*, 35 Strategic Mgmt J 1230, 1234–35 (2014); Bill Francis, et al, *When Finding a New Job Is Not Easy: The Influence of the State Law of Non-Competition Agreements on the Characteristics of M&As* *9 (working paper, Dec 2007), archived at <https://perma.cc/U7JW-3V7A>; Sharon Belenzon and Mark Schankerman, *Spreading the Word: Geography, Policy, and Knowledge Spillovers*, 95 Rev Econ & Stat 884, 895 (2013).

²⁶³ Even Sorenson’s revised results are subject to substantial qualifications. See notes 241–47 and accompanying text. Nor, as far we know, have these revised results been published in any form.

²⁶⁴ See Marx, Singh, and Fleming, 44 Rsrch Pol at 394–95 (cited in note 219); Garmaise, 27 J L Econ & Org at 396–97 (cited in note 63).

²⁶⁵ See Marx, Singh, and Fleming, 44 Rsrch Pol at 394 (cited in note 219).

Garmaise properly notes, the law of the state of the former employer will sometimes apply and, in other instances, the law of the state of the new employer will apply.²⁶⁶

Marx et al., however, overlook this complexity and erroneously assume that nonenforcing states *always* apply their own law so as to void a noncompete agreement that falls under the law of another state.²⁶⁷ Even assuming that Marx et al.'s list of ten "nonenforcing" states is correct—which it is not, as we discussed above—the only nonenforcing states that generally refuse to enforce out-of-state noncompetes on public policy grounds are California and North Dakota.²⁶⁸ Yet, even California does not always void out-of-state noncompete agreements. California courts sometimes transfer cases to another state or stay proceedings so those in another state can proceed, particularly when the employment agreement selects that other state's law and courts.²⁶⁹

Furthermore, and perhaps more importantly, all states—including California—will generally enforce a *prior* judgment of another state that afforded the parties a full and fair opportunity to litigate the matter. Thus, if an employee is subject to jurisdiction in the state of the former employer, which often will be the case, then the former employer can sue the employee in its home state. If the employee is not subject to an exclusive choice-of-forum clause, the employee may then sue for a declaratory judgment in

²⁶⁶ The law of the state of the former employer may either be the state in which the employee was located or some other state, to the extent the employer uses a choice-of-law provision specifying the law of a different state (for example, its state of incorporation or headquarters). See Garmaise, 27 J L Econ & Org at 390 n 9 (cited in note 63); Gillian Lester and Elizabeth Ryan, *Choice of Law and Employee Restrictive Covenants: An American Perspective*, 31 Comp Labor L & Pol J 389, 396–97 (2009) (discussing the situation in which the choice-of-law clauses select the employer's place of incorporation).

²⁶⁷ See Marx, Singh, and Fleming, 44 Rsrch Pol at 395, 403 (cited in note 219).

²⁶⁸ We use the 1996 Malsberger treatise to make this determination, see Malsberger 1996 at 102, 136–37, 156–57, 201–02, 618, 684, 719, 857–58, 907, 1147, 1160 (cited in note 233) (citing various cases), as the 2015 Marx, Singh, and Fleming study relies on the same treatise to classify state enforcement regimes. See Marx, Singh, and Fleming, 44 Rsrch Pol at 396 n 2 (cited in note 219), citing Stuart and Sorenson, 48 Admin Sci Q at 190 (cited in note 220) (relying on the 1996 Malsberger treatise for data on states that do not enforce noncompetes).

²⁶⁹ California substantially restricted the situations in which it will enforce out-of-state noncompetes starting in 2017, but during the time periods in question of these studies, California courts were sometimes amenable to enforcing, directly or indirectly, out-of-state noncompetes. See notes 105–06 and accompanying text.

the state of the new employer. Although there are important nuances, essentially, whichever court enforces judgment first will typically bind the employee.²⁷⁰

The simplification of these doctrinal complexities in the Marx et al. study renders that study's key assumption—namely, that nonenforcing states always apply their own law—flawed, and thus confounds its causal identification strategy. As we explain below, given the small number of annual employee moves out of Michigan to nonenforcing states measured in the Marx et al. study, this flaw could lead to substantial overestimates of the measured effects of noncompetes.

The Garmaise study also suffers from difficulties relating to the treatment of out-of-state moves. Specifically, Garmaise includes within his analysis out-of-state moves, and, unlike the Marx et al. study, assumes for simplicity that these moves are always governed by the law of the state of the *former* employer.²⁷¹ Because Garmaise's dataset contains only a little over six hundred within-industry transfers (out-of-industry transfers would generally not be governed by noncompetes), it is essential to know what percentage of those transfers were out-of-state (and Garmaise does not disclose as much). If the percentage is large, then some results in the Garmaise study may not be accurate.

c) No data on actual usage of noncompete agreements by state. Even if one believes these studies accurately categorize strength of enforcement, no study—other than Garmaise's—provides any measure of the actual usage of noncompete agreements within their sample set or how often employers actually enforce noncompetes. Available evidence suggests widely varying use of noncompete agreements among various executive and technical employee groups,²⁷² and while there is new evidence regarding

²⁷⁰ See Lester and Ryan, 31 Comp Labor L & Pol J at 405–20 (cited in note 266); Timothy P. Glynn, *Interjurisdictional Competition in Enforcing Noncompetition Agreements: Regulatory Risk Management and the Race to the Bottom*, 65 Wash & Lee L Rev 1381, 1385–86, 1418–28 (2008).

²⁷¹ See Garmaise, 27 J L Econ & Org at 396 n 15 (cited in note 63).

²⁷² Based on a sample of top-level executives, Garmaise finds a roughly 70 percent usage rate, see Garmaise, 27 J L Econ & Org at 396 (cited in note 63). Based on a sample of CEOs at S&P 1500 companies, Bishara, Martin, and Thomas, 68 Vand L Rev at 2 (cited in note 85), find an 80 percent rate. Based on a sample of founders of VC-backed firms, Professors Steven Kaplan and Per Strömberg find a roughly 70 percent rate. Steven N. Kaplan and Per Strömberg, *Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts*, 70 Rev Econ Stud 281, 289 (2003). An IEEE study of engineers reports a 47 percent rate. See Matt Marx, *The Firm Strikes Back: Noncompete Agreements and the Mobility of Technical Professionals*, 76 Am Sociological Rev 695, 702 (2011). A 2015 study finds lower usage rates, reporting about 30 percent for managers and about 35 percent in the engineering, computer, and mathematical fields, see

noncompete usage (which we discuss below),²⁷³ there is no evidence to our knowledge of the rate of enforcement across states. This inability to differentiate firm-level usage and enforcement behavior among states introduces the possibility that the observed variation in mobility is not the result of differing state-level enforcement regimes but rather unobserved variation of firm-level usage and enforcement of noncompete agreements and substitutes for noncompetes, such as trade secret actions.²⁷⁴ If firms in different states substantially vary in their propensity to use and enforce noncompetes and noncompete substitutes, and this variance is not highly correlated with enforcement strength, regressing on enforcement indices may yield spurious results.

Relatedly, none of these studies attempted to control for the variation in state-level enforceability, much less usage and enforcement of noncompete substitutes, such as patents, trade secrets, stock options, long-term contracts, invention assignments, and the like, which we described earlier.²⁷⁵ This omission alone can substantially confound any possible causal link between results and noncompete enforceability, usage, and enforcement.²⁷⁶

d) Measurement errors are exacerbated by small data sets.

The previous criticisms are especially salient for the Marx et al. study (as well as a previous study performed by Marx and others in 2009) given the relatively small incremental decrease in absolute terms in labor mobility in Michigan identified in the 2009 and 2015 Marx et al. studies. The 2009 Marx et al. study considers 98,468 inventors and 27,478 inventor moves within Michigan

Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *43 fig 4 (cited in note 11). These differences are arguably explained by the different datasets—the studies by Kaplan and Strömberg; Garmaise; and Bishara, Martin, and Thomas focus on the most sophisticated companies, while Starr, Prescott, and Bishara’s findings are likely more reflective of firms as a whole. Additionally, Garmaise and Bishara, Martin, and Thomas focus on top-level executives.

²⁷³ See Part III.C.

²⁷⁴ See Robert W. Gomulkiewicz, *Leaky Covenants-Not-to-Compete as the Legal Infrastructure for Innovation*, 49 UC Davis L Rev 251, 256–57, 277–80 (2015) (arguing that Washington technology firms rarely enforce noncompetes); Risch, 12 Empl Rts & Empl Pol J at 346 (cited in note 122) (acknowledging Gilson’s theory that trade secret actions might be substitutes for noncompete actions for firms).

²⁷⁵ See Part II.A.2. Although some of these instruments fall under federal law, there remains effective variation in state-level enforcement of these instruments due to differing applications of the law at a regional level. See, for example, Mark A. Lemley, *Where to File Your Patent Case*, 38 AIPLA Q J 1, 28–37 (2010).

²⁷⁶ See Part II.A.2 (noting that any empirical study examining the marginal effects of noncompetes would need to take into account these substitute mechanisms).

over the period 1963–2006.²⁷⁷ Labor mobility actually increased following the enactment of the Michigan Antitrust Reform Act²⁷⁸ (MARA) over the full time period from 7.18 percent to 8.98 percent, whereas in other nonenforcing states there was a larger increase, from 7.95 percent to 10.80 percent.²⁷⁹

While the Marx et al. studies never report these differences in absolute numbers, they are easy to calculate. Specifically, the difference of in-state mobility in Michigan versus nonenforcing states in absolute terms was roughly 1 percent, equating to an absolute difference of about 100–200 moves per year purportedly lost within Michigan due to the enforcement of noncompetes. For inventors moving out of Michigan, the numbers are much lower—the purported difference of inventors moving out of Michigan to nonenforcing states pre- and post-MARA is in the range of merely twenty to twenty-five inventor moves per year. Given the very small number of job changes upon which the results of these studies are premised, the potentially negating effects of the shortcomings identified above cannot be easily dismissed.²⁸⁰

e) Unique problems of the Michigan studies. The 2009 and 2015 Marx et al. studies²⁸¹ have attracted particular attention because they exploit an apparently exogenous change to the legal treatment of noncompetes in a particular jurisdiction, which therefore provides an opportunity to study the effect of noncompete enforceability on inventor mobility and, potentially, innovation. As noted earlier, the legal change was effected by enactment of MARA, which restored the enforceability of noncompetes under Michigan law.

²⁷⁷ See Marx, Strumsky, and Fleming, 55 Mgmt Sci at 880 (cited in note 219). The 2015 Marx, Singh, and Fleming study examines the period 1975–2005. See Marx, Singh, and Fleming, 44 Rsrch Pol at 396 (cited in note 219).

²⁷⁸ Michigan Antitrust Reform Act § 4a (1987), codified at Mich Comp Laws § 445.774a.

²⁷⁹ See Marx, Strumsky, and Fleming, 55 Mgmt Sci at 884 (cited in note 219).

²⁸⁰ Moreover, the Marx et al. studies track the mobility of employees to any firm, rather than mobility to competing firms. No state enforces noncompetes that purport to proscribe employment at *non*competing firms. Thus, in order to isolate the effects of noncompetes, it is essential to track labor mobility solely among competing firms. In empirical terms, an employee who makes an out-of-industry move to a noncompeting firm is, contrary to the implicit assumption of the Marx et al. study, not effectively subject to a noncompete restriction, and hence should not be classified within a “treatment” group. Thus, the number of inventor “moves” of interest to these studies is even lower than the numbers we calculate in the text.

²⁸¹ Marx, Singh, and Fleming, 44 Rsrch Pol 394 (cited in note 219); Marx, Strumsky, and Fleming, 55 Mgmt Sci 875 (cited in note 219).

The striking results of the Marx studies—a state restores the enforceability of dormant noncompete provisions, inventor mobility slows down, and inventors flee the jurisdiction for states without enforceable noncompetes (essentially, California)—are commonly cited, including in federal government reports,²⁸² to support the view that noncompetes are unwise public policy for jurisdictions that seek to cultivate the next Silicon Valley.

However, beyond the serious shortcomings we have already described in these studies, the Marx et al. studies make an erroneous assumption that wholly undermines their identification methodology and hence, their results. Specifically, both the 2009 and 2015 studies assume that, following Michigan's regime change in 1985, preexisting noncompete provisions automatically became enforceable.²⁸³ *This is not the case.* The study authors appear to overlook that MARA included a savings clause providing that the statute repealed by MARA would “remain in force for the purpose” of enforcing any liability under the repealed act.²⁸⁴ Consistent with this saving clause, Michigan courts declined to enforce noncompetes that were entered into prior to MARA.²⁸⁵

In other words, *no* existing employee with noncompete clauses in employment agreements governed by Michigan law became bound by those clauses following MARA. Rather, any employer seeking to bind an existing employee would need to have that employee sign a new agreement or affirmatively assent to a prior agreement, which would generally result in employers incurring transaction costs and possibly providing additional compensation. As a result, one would expect that the number of employees in Michigan actually subject to enforceable noncompetes

²⁸² See, for example, Office of Economic Policy, *Non-compete Contracts* at *18 (cited in note 36); White House, *Non-Compete Agreements* at *7 (cited in note 36). While relying on the Marx et al. “Michigan” studies to support the view that noncompetes depress “labor market dynamism,” the White House report did mention that “other authors dispute these findings.” White House, *Non-Compete Agreements* at *7 (cited in note 36). This is most likely a somewhat oblique reference to our companion paper on noncompetes. See generally Barnett and Sichelman, *Revisiting Labor Mobility* (cited in note 219).

²⁸³ For instance, the Marx et al. 2015 study states: “Given that the repeal of Public Act No. 05 merely removed the ban and did not stipulate any governing timeframe, all such contracts [i.e., preexisting noncompetes] would have become immediately enforceable.” Marx, Singh, and Fleming, 44 Rsrch Pol at 396 (cited in note 219).

²⁸⁴ Michigan Antitrust Reform Act § 18 (1985), codified at Mich Comp Laws § 445.788. For a detailed description of the history leading up to the passage of MARA, see *Bristol Window and Door, Inc v Hoogenstyn*, 650 NW2d 670, 673–79 (Mich App 2002).

²⁸⁵ See, for example, *Compton v Joseph Lepak, DDS, PC*, 397 NW2d 311, 316 (Mich App 1986) (“When an agreement or contract is entered into in violation of the statute, repeal of that statute does not make the agreement valid because the Legislature cannot validate a contract which never had a legal existence.”).

would be quite low for a considerable period following MARA's passage.

During this transition period, one cannot legitimately consider all Michigan inventors as being subject to enforceable non-competes—a critical assumption in both papers. The true regime change (that is, taking into account both nominal and effective changes to noncompete enforceability) most likely took considerable time to impact contracting behavior in the market. As a result, the number of inventors who were immediately affected by MARA was small (which impacts the statistical force of the studies' results),²⁸⁶ and a sizable portion of the studies' results are unlikely to be causally linked to the legal change effected by MARA.

Yet, the 2009 Marx et al. study finds the exact *opposite* of the effects one would expect from a gradual adoption of noncompetes after the enactment of the MARA statute, stating that “the effect of the policy reversal remained strong for several years and then weakened, both in terms of the magnitude and statistical significance of the coefficient on the interaction variable.”²⁸⁷ Thus, it is extremely likely in our view that factors unrelated to the change in noncompete law in Michigan explain the results, if they are at all correct, of the 2009 study. At a bare minimum, the factual misunderstanding of the *nonretroactive* effect of the MARA change casts great doubt on the reliability of using the Marx et al. studies as a basis for substantive policy recommendations.

f) Correlation, not causality. Even if the results in these studies were somehow correct, none of these studies can show causation between noncompete enforcement and their findings of reduced innovation (as indicated by various proxy measures). Other than the Marx et al. study, they are all cross-sectional regressions and cannot rule out omitted variables to explain the observed variation. Additionally, Stuart and Sorenson's major finding (including, as noted earlier, Sorenson's revised major finding) abstracts away from state-level fixed effects, and they properly note that they “must interpret this result cautiously, as a number of omitted regional factors might correlate with both the weak non-compete enforcement dummy and the level of entrepreneurial activity in the region.”²⁸⁸ Stuart and Sorenson's models that take account of state-level fixed effects do not account for unique

²⁸⁶ For further discussion, see Barnett and Sichelman, *Revisiting Labor Mobility* at *22 (cited in note 219).

²⁸⁷ See Marx, Strumsky, and Fleming, 55 *Mgmt Sci* at 883 (cited in note 219).

²⁸⁸ See Stuart and Sorenson, 48 *Admin Sci Q* at 194 (cited in note 220).

within-state, regional omitted variables that may explain the observed patterns, plus are subject to a number of additional limitations.²⁸⁹ The Samila and Sorenson study is subject to similar limitations, as well as another endogeneity concern. Specifically, this study uses the number of patents to measure innovative output, but patenting is in part a substitute for noncompete enforcement.²⁹⁰ Thus, finding increased patenting in states with weak nonenforcement, such as California, is not necessarily meaningful. The Marx et al. study, despite the fact that it examines a seemingly exogenous shock to Michigan law, also suffers from causality concerns because—as explained in the previous Section—the regime change did not apply retroactively.

Aside from causality, some of the studies use rough proxies for innovative activity. Stuart and Sorenson merely examine the relationship of noncompetes to the absolute number of spin-offs following IPOs and acquisitions. Studies on patent value have indicated that a small number of high-quality innovations disproportionately account for the total value of all innovations; in other words, not all innovations—and, hence, not all innovative companies—are created equally.²⁹¹ Thus, it is not surprising that a more recent study finds that, while noncompetes may depress the absolute number of same-industry spin-offs, increased enforcement is associated with the founding of higher quality firms, particularly ones that began and continued with more employees and survived for longer periods.²⁹² Relatedly, another recent study finds that, while noncompetes reduce employee mobility and depress certain indicators of entrepreneurship, increased enforceability is associated with an increase in capital investment at existing “knowledge-intensive” firms,²⁹³ suggesting that noncompetes sometimes support investment incentives consistent with theoretical expectations.

²⁸⁹ See notes 241–47 and accompanying text.

²⁹⁰ Samila and Sorenson, 57 *Mgmt Sci* at 430 (cited in note 9). As noted previously, Agarwal and coauthors found that aggressive patent litigation by US semiconductor firms discourages labor mobility (presumably, because potential new employers fear litigation and elect not to hire from those firms). See note 109 and accompanying text.

²⁹¹ See John R. Allison, et al, *Valuable Patents*, 92 *Georgetown L J* 435, 448–65 (2004).

²⁹² See Starr, Balasubramanian, and Sakakibara, 64 *Mgmt Sci* at 567 (cited in note 258). Although this Starr study does not compare the total innovative activity of the startups in nonenforcing and enforcing states, a smaller number of highly innovative startups in enforcing states could outweigh the innovative activity of a larger number of less innovative startups in nonenforcing states.

²⁹³ See Jessica S. Jeffers, *The Impact of Restricting Labor Mobility on Corporate Investment and Entrepreneurship* *3–5, 20–21 (working paper, Jan 3, 2018), archived at <https://perma.cc/9EQX-GDTU>.

g) Why the limitations of these studies likely affect the validity of their results. To be certain, the limitations we have discussed above do not mandate that the results in these studies are incorrect. It may be the case that some studies suffer from ordinary measurement error, which would underestimate the size of the effects found in those studies, or the errors we have identified are too minor to plausibly change these studies' results. However, there are strong reasons to doubt that the limitations described above are ordinary measurement errors or essentially trivial, implying that they *are* likely to alter these studies' results—either their size or significance, or even the direction and nature of the effects measured.

First, and perhaps most importantly, the Stuart and Sorenson scale misclassifies eight of ten states as “nonenforcing” but does not misclassify any of the “enforcing” states.²⁹⁴ Such misclassification is not random, but rather is a one-way systemic error. Stuart and Sorenson's misclassification of “enforcing” and “nonenforcing” states lies at the heart of the empirical instruments in the Marx et al. studies used to measure worker mobility and the potential effects on innovative activity.²⁹⁵

Although Garmaise's scale appears to suffer more from random error than systemic error—because in our view, there is no scale, even Bishara's scale,²⁹⁶ that has been definitively validated—it may be the case that Garmaise's results are subject to the same limitations as the Marx et al. studies. So while the results set forth in the Garmaise study and the Marx et al. studies may be statistically significant, they are not necessarily *meaningful* when determining the role noncompetes play in suppressing innovative activity.

Second, the failure to properly take account of the nonretroactivity of Michigan's change in law via MARA also casts considerable doubt on the reliability of the differences-in-differences methodology employed by the Marx et al. studies. Specifically, it confounds these studies' claims to causal identification, because the only Michigan employees not entering entirely new jobs subject to enforceable noncompetes post-MARA were those selected by their employers for “treatment,” in other words, the signing of a noncompete provision. Such selection would not be random, but instead would turn on factors such as whether the employee was

²⁹⁴ See Stuart and Sorenson, 48 Admin Sci Q at 190 (cited in note 220).

²⁹⁵ See Marx, Singh, and Fleming, 44 Rsrch Pol at 396 n 2, 396–97 (cited in note 219); Marx, Strumsky, and Fleming, 55 Mgmt Sci at 880 (cited in note 219).

²⁹⁶ See Bishara, 13 U Pa J Bus L at 786–87 (cited in note 233).

at-will, had knowledge of company trade secrets, was highly skilled, and the like.

Third, the failure of the Garmaise study and the Marx et al. studies to properly take account of cross-border moves, as we note above, may systematically overestimate the effects of noncompetes on labor mobility because in some situations these moves would have been governed by a contrary set of laws than assumed in the empirical approaches in these studies.

Fourth, even if these studies' findings are nominally correct, because of various implicit assumptions about the law and external factors that are certainly or very likely inaccurate, one cannot casually attribute decreases in labor mobility wholly to noncompete enforcement trends. For instance, one or more of these studies wrongly assumes that noncompetes govern moves outside of an industry, that firm-level usage and enforcement of noncompetes is constant across states, that high-level executives' mobility would be prone to court decisions regarding the role of customer lists, and that nonretroactive changes in certain laws were exogenous "shocks."

In sum, of the four major nonexperimental studies examining the effects of noncompetes on innovation that we reviewed in detail, all suffer from multiple infirmities. In our view, these infirmities cast substantial doubt on the validity of the findings in these studies. In other words, there is a strong possibility that these errors would reduce the size of the effects in these studies, result in opposite effects, or potentially eliminate statistically significant effects entirely. Although Sorenson's revision of his earlier study nominally confirmed his earlier results, it remains subject to substantial limitations.²⁹⁷ As such, none of these studies can be relied upon for a general assessment of the role noncompetes play in the innovative process.

All of the additional studies we could locate that find a negative effect on innovation from noncompetes appear to suffer from one or more of these limitations.²⁹⁸ Given the theoretical reasons to doubt that noncompetes always have a negative effect on innovation, we believe that there is little to no empirical evidence that noncompetes necessarily retard innovation.²⁹⁹ Rather, as explained later in the Article, noncompetes will sometimes hinder and sometimes foster innovative activity depending on a variety of contextual circumstances.

²⁹⁷ See notes 241–47 and accompanying text.

²⁹⁸ See notes 261–62 (listing studies relying on flawed scales).

²⁹⁹ See Barnett and Sichelman, *Revisiting Labor Mobility* at *29 (cited in note 219).

2. Experimental studies.

Professors On Amir and Orly Lobel conducted an experimental study that found that participants in simulated noncompete treatment groups exerted less effort and made more errors than a restriction-free control group.³⁰⁰ The study's experimental design abstracts away from the limitations of the empirical studies but introduces its own concerns that cast serious doubt on its applicability to any actual technology environment.

In the experimental setup, participants are informed that they will potentially complete two rounds of a given task. Each participant is paid \$0.50 for the completion of each task plus a potential bonus. However, individuals in the "full noncompete" group are told they cannot participate in the second round. Individuals in the "partial noncompete" group are told they will receive 20 percent less payment in the second round. Individuals in the "no noncompete" group are given no restrictions. Participants either perform a creative, word association task or an effort-based, matrix addition task. Each participant performs only the first round.³⁰¹ Amir and Lobel find a large negative effect on completing the first round of tasks in the full noncompete group, but not the partial noncompete group, for both the creative and effort-based tasks. Additionally, they find a significantly larger error rate on the effort-based task for the full and partial noncompete group.

Based on this experimental result, Amir and Lobel conclude that "[o]ur behavioral experiment demonstrates that certain postemployment contractual restrictions may negatively impact motivation and performance, as evidenced by the greater rates at which individuals abandon tasks."³⁰² Although we agree that noncompetes may provide some incentives for employees to underinvest in their own human capital, Amir and Lobel's experimental setup does not take into account important real-world mechanisms to offset these effects.

First, as we discussed earlier, one of the major reasons for the use of noncompetes is to provide incentives for firms to invest in the human capital of their employees.³⁰³ Consistent with that theoretical expectation, a study by Starr finds that stronger noncompete enforcement regimes are associated with increased

³⁰⁰ See Amir and Lobel, 16 *Stan Tech L Rev* at 866 (cited in note 63).

³⁰¹ See *id.* at 852–53, 870–74.

³⁰² *Id.* at 863.

³⁰³ See Part I.B.2.

employee training.³⁰⁴ Amir and Lobel's setup does not allow for any firm-sponsored training.

Second, the flat payment scheme of \$0.50 per task plus a bonus in Amir and Lobel abstracts away from the numerous other performance incentive mechanisms we discussed above—such as vesting options, deferred compensation, and the simple ability for star employees to renegotiate—that are present in a typical employment situation.³⁰⁵

Third, contrary to Amir and Lobel's setup, a noncompete agreement *never* means that there is no second round of performance. Employees are engaged in a repeat-play game with employers, who rationally reward high-performing employees and penalize low-performing employees. Simultaneously, employees are engaged in a repeat-play game with potential outside employers. Given the discipline imposed by the common-law reasonableness constraint and competitive labor markets, noncompetes are always limited in duration, geography, and industry scope. As a result, employees may port their industry-specific skills to competitors after a certain amount of time and may port their non-industry-specific skills to noncompetitors at any time. Even during the term of a noncompete, an employee can move to any firm that is willing to pay the price demanded by the existing employer to waive the noncompete.

These three reasons are likely to substantially dampen, if not eliminate, any incentives that noncompetes might otherwise create for employees to underinvest in their own human capital. Indeed, a more recent experimental study performed a similar experiment but found that those in the noncompete group exerted no less effort than those in the control group.³⁰⁶ Using a more realistic setup, this experiment paid the noncompete group more to compensate for any disincentives created in the noncompete treatment—which is precisely what would be expected to occur in any rational employer-employee bargaining situation.

³⁰⁴ See Evan Starr, *Consider This: Training, Wages and the Enforceability of Covenants Not to Compete*, 72 *Indust & Labor Rel Rev* 783, 785, 814 (2019).

³⁰⁵ See Norman D. Bishara and Evan Starr, *The Incomplete Non-compete Picture*, 20 *Lewis & Clark L Rev* 497, 522–23 (2015).

³⁰⁶ See Guido Bünstorf, et al, *Win Shift Lose Stay—An Experimental Test of Non-Compete Clauses* *18–19 (Max Planck Institute for Research on Collective Goods Preprint No 2013/17, Sept 2013), archived at <https://perma.cc/K2NM-4L4V>.

3. Evaluation.

In current policy discussions concerning noncompetes, it is common to find statements referring to empirical studies “showing” that noncompetes depress inventor mobility and, as a result, reduce innovation in general. This interpretation is simply not supported by a close examination of the methodologies and substance of the empirical studies upon which these statements typically rely.³⁰⁷ Even assuming without further examination that noncompetes have some appreciable marginal effect on inventor mobility—a proposition as to which there is considerable doubt³⁰⁸—there is no compelling basis to conclude that any such effect results in reduced innovation compared to a legal environment in which noncompetes had no legal force.

The most recent empirical research on the effects of noncompetes provides even more ground to doubt the conventional characterization of the evidence. That research has reached more nuanced results that are consistent with the older law-and-economics analysis that, as discussed earlier, had emphasized how noncompetes have the potential both to impede employee mobility *and* enhance firms’ incentives to invest in cultivating employee capital.³⁰⁹ In particular, these recent studies have found that the ability to enforce noncompetes can increase incentives at medical practices to make intrafirm client referrals (and thereby increase overall returns),³¹⁰ increase capital investment at knowledge-intensive firms while reducing the entry of new firms,³¹¹ and result in the establishment of fewer but higher quality spin-offs from parent firms.³¹² Another study finds that legal limitations on

³⁰⁷ For a similar view, see Bishara and Starr, 20 Lewis & Clark L Rev at 498–502, 534–40 (cited in note 305) (finding that existing empirical literature suffers from methodological imperfections and cannot currently support policy actions to impose limitations or outright bans on the use of noncompetes).

³⁰⁸ See Barnett and Sichelman, *Revisiting Labor Mobility* at *29 (cited in note 219) (stating that, due to methodological and other shortcomings, no existing empirical study can “be relied upon for a general assessment of the role noncompetes play in restricting labor mobility”).

³⁰⁹ See Part I.B.

³¹⁰ See Kurt Lavetti, Carol Simon, and William D. White, *The Impacts of Restricting Mobility of Skilled Service Workers: Evidence from Physicians* *21, 34 (working paper, June 2018), archived at <https://perma.cc/4CU3-LZE5>. Specifically, the authors find that practices that used noncompetes for physicians enjoyed greater overall returns, even controlling for physician quality and other potentially relevant factors, which the authors attribute to stronger incentives to invest in advertising and making intrafirm client referrals (given the reduced risk of losing clients in the event of a physician departure).

³¹¹ See Jeffers, *The Impact of Restricting Labor Mobility* at *22–23 (cited in note 293).

³¹² See Starr, Balasubramanian, and Sakakibara, 64 Mgmt Sci at 563 (cited in note 258).

worker mobility can increase investment at firms that rely on higher-skill workers.³¹³ While we do not separately review these more recent studies, it would not be surprising if the empirical literature on noncompetes ultimately established that they result in a mixed bag of welfare effects that vary across firms and industries. That would be fully consistent with theoretical expectations that noncompetes can both promote and dampen overall innovation, and it is therefore indeterminate as to which effect will dominate in any particular case.

III. MAKING NONCOMPETE POLICY UNDER UNCERTAINTY

The substantial theoretical and empirical literature on noncompetes (and, by implication, other restraints on employee mobility in innovation markets) appears to arrive at a dead end. Even if it were conceded that noncompetes have some marginal effect on labor mobility, neither the canonical Silicon Valley / Route 128 narrative nor the empirical literature provides support for then drawing an adverse connection between noncompetes and innovation outcomes in general. As a practical matter, however, the law cannot be neutral: it must take *some* position on whether noncompetes should be enforced. In this Part, we offer some tentative conclusions concerning the appropriate legal treatment of noncompetes, applying the error-cost approach from antitrust law that explicitly embeds uncertainty into policy analysis and the adjudicative process.³¹⁴

In the course of this exercise, we identify certain variables that may impact the use and efficiency effects of noncompetes across different industries, firms, and even employee types. While this analysis is preliminary, it conforms to evidence on the rates of use of noncompetes, which suggests that markets tailor the use of noncompetes across employee categories, rather than chronically overusing them as assumed in the collective-action problem that drives Gilson's and the follow-on literature's laudatory characterization of California's noncompete policy. Given that this critical assumption appears to have a limited scope of application as an empirical matter, and in light of the material uncertainties that we identified in the empirical studies that are routinely cited

³¹³ See Ali Sanati, *How Does Labor Mobility Affect Corporate Leverage and Investment?* *3–4 (working paper, Mar 2018), archived at <https://perma.cc/NU6M-6DNR>.

³¹⁴ For the leading statements of this approach in the antitrust literature, see note 38.

in support of precluding noncompetes more broadly (and, by implication, other constraints on employee mobility),³¹⁵ we ultimately conclude that the reasonableness standard, applied on a case-specific basis through common law adjudication, is likely the best approach of all.

A. Policy Continuum

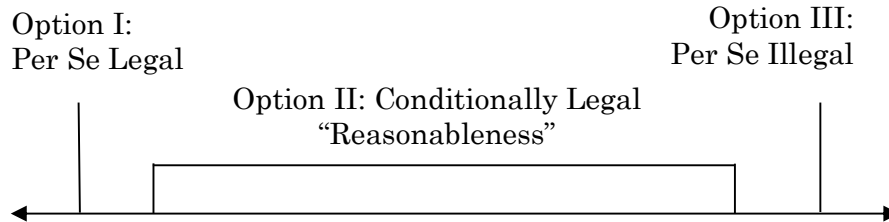
Throughout our discussion, we keep in mind three categories of policy options. As shown in the graphic below, these options can be located on a continuum extending from full enforcement (Option I), which we call the “per se legal” option, to zero enforcement (Option III), which we call the “per se illegal” option. Note that Option II, which corresponds to the common law’s reasonableness standard, encompasses in practical terms a range of more and less stringent variants, which push the option closer toward the full- or zero-enforcement poles of the policy continuum. In practical terms, this intermediate range could encompass a number of different principles under which courts could adjudicate the enforceability of a particular noncompete provision and, in doing so, reflect the complex policy trade-off implicated by the enforcement of these provisions. To take just one example, a state may elect to enforce noncompetes subject to a reasonableness limitation but apply that limitation so that noncompetes are enforced only when the plaintiff shows that the noncompete promoted either the protection of trade secrets or the recovery of a training investment.³¹⁶ Such an approach would tend to push the law closer toward zero enforcement (at least in the case of noncompetes that do not generate any offsetting social advantage in the form of increased R&D or training incentives). Alternatively, a state may elect to enforce noncompetes subject to a “blue pencil” rule, according to which a court can “rescue” an otherwise invalid noncompete clause by restricting its durational, geographic or industry scope so that it falls within the boundaries of what the court determines to be reasonable.³¹⁷ Such an approach would tend to push the law closer toward full enforcement.

³¹⁵ See Part II.B.

³¹⁶ For example, New York courts will enforce a noncompete if it “(1) is no greater than is required for the protection of the legitimate interest of the employer, (2) does not impose undue hardship on the employee, and (3) is not injurious to the public.” *BDO Seidman v Hirshberg*, 712 NE2d 1220, 1223 (NY 1999).

³¹⁷ See, for example, *Coates v Heat Wagons, Inc.*, 942 NE2d 905, 914–15 (Ind App 2011) (endorsing the blue pencil doctrine).

FIGURE 1: POLICY CONTINUUM OF NONCOMPETE ENFORCEMENT



B. The “Free Contracting” Baseline

From an economic point of view, a noncompete is a voluntary transaction involving a human capital asset being exchanged for some form of monetary or other compensation. As such, any efficiency analysis must start from the free contracting baseline—that is, the well-established view that voluntary exchanges result in mutual welfare gains for the contracting parties, absent evidence of market failure, such as fraud, coercion, or information asymmetries. Those private welfare gains represent social welfare gains so long as the parties’ exchange transaction does not generate negative third-party externalities. The presumptive efficiency of voluntary exchange transactions accounts for the common law’s traditional indifference to the substantive fairness of contracts; rather, courts generally determine enforceability based on whether an agreement meets certain formal procedural criteria.³¹⁸ While there are limited exceptions to this principle (for example, the unconscionability doctrine, although courts rarely accept it as a defense³¹⁹), it holds true across contract law as a general matter.³²⁰

From this starting point, the per se legal option is the default policy approach, and California’s refusal to enforce the noncompete clause demands justification from an efficiency or other perspective. In fact, based on the free contracting benchmark, even

³¹⁸ See Alan Schwartz and Robert E. Scott, *Contract Theory and the Limits of Contract Law*, 113 Yale L J 541, 546, 556 (2003) (arguing that “efficiency is the only institutionally feasible and normatively attractive goal for a contract law that regulates deals between firms”); id at 555 (rejecting the “externality objection” to restricting commercial contract law to the pursuit of welfare-maximization, on the ground that “most commercial contracts affect only the parties to them”).

³¹⁹ See Colleen McCullough, *Unconscionability as a Coherent Legal Concept*, 164 U Pa L Rev 779, 785–87 (2016).

³²⁰ See Schwartz and Scott, 113 Yale L J at 555 (cited in note 318) (noting that contract law rarely creates “systematic distributional benefits for particular classes of parties”).

the reasonableness principle used by the common law to assess the enforceability of noncompetes is suspect. Ignoring circumstances involving fraud, coercion, information asymmetries, or similar market defects, any economic justification for even qualified enforcement of noncompete clauses—let alone a blanket refusal to enforce—must identify significant third-party externalities that are not reflected in the terms of the noncompete clause and the broader employment agreement of which it is typically a part. Efficiency-based arguments for California's aversion toward enforcing noncompetes therefore rely on the reduction in knowledge spillovers, and collective reduction in innovative vigor in general, that would potentially result if noncompetes were enforced. This was precisely the basis for Gilson's characterization of California's refusal to enforce noncompetes as an efficient legal solution to a collective-action problem.

As we have discussed in detail, it is not clear that this theory has a sound basis in fact. Specifically, the extent to which noncompetes *actually* impede efficient human capital transfers and associated knowledge spillovers is empirically contestable and depends on the transaction costs involved in negotiating waivers of noncompetes, the extent to which noncompetes are actually enforced, and the availability of alternative mechanisms to regulate human capital flows. At a minimum, however, it is at least reasonable to assume that noncompetes impose *some* incremental transaction-cost burden relative to a zero-enforcement regime and thereby may have some incremental adverse effect on impeding the agglomeration economies and similar benefits that can promote innovation activity. Additionally, noneconomic considerations of personal autonomy and distributive justice that play an important role in real-world policy debates over noncompetes strongly disfavor a rule of per se legality. Consequently, we set aside per se legal as a policy option and consider the remaining possibilities that efficiency would be maximized by treating noncompetes as either (i) per se illegal (Option III) or (ii) conditionally legal subject to the reasonableness standard (Option II).

C. Is There Really a Collective Action Problem?

Any argument in favor of zero enforcement must rest on Gilson's justification for California's general refusal to enforce the noncompete clause (the closest real-world approximation of the per se illegal policy option), taking note that Gilson himself cautioned against reflexive application of the California model to all

states and industries.³²¹ Recall that this argument supposes a world in which all (or at least most) firms would be better off if noncompetes were deemed unenforceable. Without coordination, it is in each firm's individual interest to include a noncompete clause (since it would otherwise unilaterally forfeit human capital assets to its competitors), which ultimately operates to all firms' collective detriment by impeding the flow of human capital and the innovation process in general. Under those assumptions, abolishing noncompetes saves firms from this collectively irrational outcome, which in turn enhances knowledge spillovers, fosters agglomeration economies, and accelerates innovation in the industry as a whole.

This line of argument relies heavily on a single assumption: namely, that when the law enforces noncompetes, firms widely, if not universally, adopt noncompetes, resulting in socially excessive constraints on the circulation of human capital. That is a theoretically plausible but empirically untested assumption, especially given the fact that almost all empirical studies compare mobility and innovation outcomes as a function of noncompete enforceability rather than use. Fortunately, recent empirical work has supplied data that can provide some insight into actual use of noncompetes in real-world technology markets.

Available data on the actual use of noncompetes in employment agreements demonstrate significant variation across different subsets of the labor market. As noted previously, two studies that survey CEOs and other top-level executives find usage rates ranging from 70–84 percent.³²² Another study finds comparable usage rates among venture capital-backed firms: in a sample of 213 venture capital investments in 119 firms during 1987–1999, founders were subject to noncompetes in 70.4 percent (or 73.5 percent excluding California firms) of total investments.³²³ Those figures are compatible with the assumption that underlies the efficiency argument against noncompetes: without legal intervention, markets tend toward high, and potentially excessive, use of noncompetes. However, a survey study of engineers in the information technology industry report a lower rate of almost 47 percent.³²⁴ A recent and much larger study by Professor

³²¹ See Gilson, 74 NYU L Rev at 629 (cited in note 8).

³²² See note 85 and accompanying text.

³²³ Kaplan and Strömberg, 70 Rev Fin Stud at 289 (cited in note 272).

³²⁴ See Marx, 76 Am Sociological Rev at 702 (cited in note 272). The sample consisted of 1,029 technical personnel (all members of the Institute of Electrical and Electronics Engineers) from a variety of industries.

Evan Starr and colleagues that surveys 11,505 workers across a broader range of industries finds even lower usage rates, reporting usage rates ranging from 31–36 percent in engineering positions, computer and mathematical positions, information industries, and professional and scientific industries.³²⁵ The Starr et al. study further finds significant variation based on the relevant business interest that the employer may have in a noncompete with respect to a particular employee. For example, about one-third of employees subject to noncompetes work with trade secrets, as compared to about 15 percent of employees who only “work with clients or who have client-specific information.”³²⁶

These data have been cited by scholars and policymakers who argue that significant numbers of employees are encumbered by these provisions.³²⁷ One scholar claims that employees are now stuck in a “thicket” and that “[n]oncompete agreements are now required in almost every industry and position.”³²⁸ We interpret the data differently. The variation in reported usage rates across occupational and industry categories raises serious doubt as to whether it is reasonable to assume that, when noncompetes are enforceable, employers blindly use them in all circumstances. Consider the finding above that approximately one-third of technical personnel are subject to noncompetes. While that is a significant percentage, it means that approximately *two-thirds* of that work force is *not* subject to any such constraint. Even the high usage rates among top-level executives imply that about *one-third* of the relevant labor pool did not agree to a noncompete. Additionally, it is important to keep in mind that *effective* use of noncompetes almost certainly falls well below *nominal* use. A recent study finds that, in the state of Washington, which enforces noncompetes subject to the reasonableness standard, technology firms cultivate a reputation for nonenforcement³²⁹—meaning, that the actual use of noncompetes is far less common than the nominal use of noncompetes. That finding is consistent with prior reports (as discussed earlier) that firms in the Route 128 area widely tolerated employee departures and spin-offs during the

³²⁵ See Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *43–44 (cited in note 11).

³²⁶ See id at *19.

³²⁷ See, for example, Lobel, *Companies Compete but Won't Let Their Workers* (cited in note 19); White House, *Non-Compete Agreements* at *5–7 (cited in note 36); Office of Economic Policy, *Non-compete Contracts* at *11–13 (cited in note 36).

³²⁸ Lobel, 93 Tex L Rev at 791 (cited in note 9).

³²⁹ See Gomulkiewicz, 49 UC Davis L Rev at 256–57, 277–80 (cited in note 274).

economic heyday (and, presumably, competitive market for technical talent) of the 1970s and 1980s, even though Massachusetts law nominally tolerated enforcement subject to the reasonableness standard.³³⁰ Rather than being driven toward widespread use of noncompetes to constrain the outflow of human capital to competitors, actual market behavior shows that firms sometimes or usually *decline* to use or enforce noncompetes.

D. Why Employers Decline to Use Noncompetes

Significant variation in the use and enforcement of noncompetes does not favor the thesis that markets are prone to suffer from a collective-action problem resulting in inefficient overuse of noncompetes. Rather, it is more consistent with a standard competitive market model in which employers bid for managerial and technical talent by offering different packages of price and nonprice terms. Under competitive conditions, firms seek to attract the most highly valued labor by offering different types of employment agreements, some with and some without noncompetes.

It is entirely plausible that an employer may prefer to offer an employment package without a noncompete. The reason is simple: noncompetes are costly to employers and will not always be worth the price. Prospective employees anticipate that noncompetes will limit postemployment opportunities, which means that employees may be unable to access more lucrative outside employment options during the term of the noncompete and, as a result, will have reduced capacity to renegotiate the terms of employment with the employer in the future. The prospective employee may further anticipate that, given a limited set of outside employment options, the employer could hold up the employee and unilaterally degrade the terms of employment.³³¹ Based on these expectations, the prospective employee will demand either compensation up-front or, more plausibly, credible assurance that the firm will allocate internal rewards for strong performance that mimic the rewards that would be allocated in the external

³³⁰ See notes 186–90 and accompanying text.

³³¹ See Margaret M. Blair, *Firm-Specific Human Capital and Theories of the Firm*, in Margaret M. Blair and Mark J. Roe, eds, *Employees and Corporate Governance* 58, 64–65, 72 (Brookings Institution 1999). Professor Oliver Williamson, the originator of the hold-up concept in the institutional economics literature, makes the same observation but argues that repeat-play forces would typically dissuade employers from engaging in this behavior. See Oliver E. Williamson, *Economic Institutions of Capitalism* 248–49, 259–60 (Free Press 1985).

labor market.³³² If the employer is unwilling to pay the required up-front compensation, cannot credibly commit to reward employees' relative contributions to the firms' team product, or has other mechanisms by which to regulate human capital outflow or protect against knowledge leakage in the event of an employee departure, then, in any of those cases, it may decline to "purchase" a noncompete obligation from the employee.

The "talent wants to be free" school implicitly assumes a world in which employers unilaterally impose or dictate noncompetes and therefore the law must intervene. But that implausibly assumes that employers always or typically are price-setters in the labor market. In most markets, that would typically not be the case and, in technology markets in particular, the very opposite is more likely given the widespread observations that, in many technology market segments, skilled technical labor is scarce and employers bid aggressively to recruit them.³³³ Absent market power, we should therefore expect to observe variation in the mix of postemployment constraints as employers compete over a limited talent pool.

More specifically, any such variation in the use of noncompetes will reflect different values placed by employers and employees on two variables:

- (i) G_f : the *firm's* net expected future gains from employee training and knowledge internalization attributable to a noncompete; and
- (ii) G_e : the *employee's* net expected future gains from postemployment opportunities at competitors within the typical duration of a noncompete.³³⁴

The value of G_f and G_e impacts the firm's and the employee's respective negotiating positions: as the value of G_f rises, the firm

³³² See Blair, *Firm-Specific Human Capital* at 66, 72–73 (cited in note 331). As Blair notes, the latter solution is more plausible because full up-front compensation would induce shirking on the part of the employee. See *id.* at 62, 73. Note that assurance of an internal compensation system would be credible only if an employer entered into a contractual commitment to do so or, in the absence of a contract, pledged reputational capital to support any such assurance.

³³³ For a review of the evidence, see National Science Board, *Revisiting the STEM Workforce* *9 (Feb 4, 2015), archived at <https://perma.cc/S9GE-S5WA>.

³³⁴ In some situations, the employee may prefer a noncompete because gains to the employee's human capital from training—which could not occur absent a financing commitment—outweigh anticipated losses from foreclosing potential postemployment opportunities. See Rubin and Shedd, 10 *J Legal Stud* at 96–97 (cited in note 56). Indeed, a recent study finds that noncompetes are associated with a 5.5 percent increase in the likelihood

is willing to pay a higher price for a noncompete; as the value of G_e rises, the employee will demand a higher price for agreeing to a noncompete. The interaction between these two variables influences the likelihood that any given employer-employee negotiation is likely to yield a noncompete. As the value of G_f rises in value relative to G_e , we would expect to see greater adoption of noncompetes since employers value the noncompete highly and employees are willing to “sell” it at a low price; as that ratio is reversed, we would expect to see the opposite outcome. When the values of G_f and G_e are both high (or low), results are likely to be mixed.

We recognize that this model is inherently stylized and, in particular, is vulnerable to the objection that employers and employees in real-world contracting environments do not engage in customized negotiation—rather, employers sometimes include noncompetes in a “take-it-or-leave-it” employment package that does not facilitate term-specific negotiation.³³⁵ This is especially so if the employer demands a noncompete not in the original employment agreement or terms, but only after the employee begins work.³³⁶

While some evidence supports the view that, in certain market segments, noncompete clauses are not typically negotiated,³³⁷ it should not be automatically concluded that rational negotiation models have no descriptive force in this setting or, equivalently, that employers are free to “impose” noncompetes without paying any price for doing so. First, in the case of top-level executives, the full negotiation assumption almost always holds true as these

of receiving training on the job. Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *3 (cited in note 11). In order to address the strongest argument made against noncompetes, we nevertheless assume here that there is a net cost to the employee from agreeing to the noncompete.

³³⁵ See White House, *Non-Compete Agreements* at *9–10 (cited in note 36); Office of Economic Policy, *Non-compete Contracts* at *12–13, 24 (cited in note 36); Marx, 76 Am Sociological Rev at 696 (cited in note 272).

³³⁶ See, for example, Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *52 (cited in note 11) (indicating that only 6.3 percent of survey respondents who reported being asked to sign a noncompete after accepting their job offers attempted to negotiate the noncompete’s terms, while this percentage was nearly twice as high for those who had received the noncompete before accepting their job offers).

³³⁷ See Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *21 (cited in note 11) (finding that only 10 percent of noncompete signers attempt to negotiate the noncompete); Marx, 76 Am Sociological Rev at 706 tbl 4 (cited in note 272) (finding that 31 percent of surveyed employees received the noncompete request with the job offer, 22 percent received the request after the offer was accepted but prior to the start of work, 24 percent received the request on the first day of work, and 23 percent sometime after the starting work).

agreements are typically entered into with the advice of highly sophisticated counsel specialized in executive compensation matters.³³⁸ Second, in the case of lower-level technical and managerial talent who may well not have the opportunity to negotiate customized terms of employment, the competitive model still has descriptive force even in the absence of transaction-specific negotiation over noncompetes, so long as at least some portion of the market observes employer behavior and disseminates information concerning the terms of employment.³³⁹ Assuming competitive market conditions, that monitoring function may be filled by other employers who have a rational incentive to monitor the use or enforcement of noncompetes by competitors and offer prospective employees an employment package without such restrictions or a demonstrated enforcement record that tolerates employee departures notwithstanding a noncompete.

1. Variation in use of noncompetes across employee types.

While further theoretical refinement and empirical inquiry is warranted, this competitive bidding model anticipates the variation observed in available data on the use of noncompetes among executive and technical personnel populations. In particular, it explains the significantly higher usage of noncompetes among top-level executives as compared to lower-level technical personnel. The most comprehensive empirical study on the use of noncompetes finds a correlation between income (which often correlates with higher-skilled occupations) and the incidence of noncompetes. More specifically, that study finds that, whereas 37 percent of employees earning over \$100,000 a year are subject

³³⁸ Statement made based on one of the authors' personal experiences as a practicing transactional attorney.

³³⁹ For the original version of this argument, made in the debate over the efficiency of contracts of adhesion, see Alan Schwartz and Louis L. Wilde, *Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis*, 127 U Pa L Rev 630, 637–38 (1979) (arguing that the presence of consumers who engage in “moderate search” can protect consumers who engage in no search from “overreaching firms”). For an application to related debates in copyright-related settings, see Frank H. Easterbrook, *Contract and Copyright*, 42 Houston L Rev 953, 969–70 (2005). As Judge Easterbrook observes, the fact that a particular attribute of a product or service is not routinely negotiated on a transaction-specific basis does not imply that that attribute is being dictated by the supplier. Rather, that question is more profitably analyzed by asking whether the supplier possesses sufficient market power to be in a position to dictate any such term. Nonetheless we recognize that, in the noncompete context, this argument is predicated on the assumption that information is being disseminated in the market concerning a specific employer's noncompete policy, which we recognize may vary from case to case.

to a noncompete, this is only true of 14 percent of employees earning up to \$40,000.³⁴⁰ These findings conform to the expectations of rational bargaining between employers and employees. In the case of a higher-level executive, the employer most likely assigns a high value to G_f —that is, the firm prioritizes internalizing the valuable knowledge assets to which a top-level executive would be exposed and is therefore typically prepared to pay a substantial price for obtaining that concession from the employee. By contrast, a lower-level employee may not have comparable exposure to the highest-value knowledge assets, in which case the firm assigns a low value to G_f and is typically willing to forego the noncompete (or, what is functionally equivalent, foregoes enforcement even if a noncompete clause appears in the employment package).

2. Variation in the use of noncompetes across industry types.

The competitive bidding model not only anticipates variation in the use and enforcement of noncompetes across employee types, but also across industries. Using this framework, we can roughly anticipate the expected use of noncompetes in different industry types (a research path that may prove fruitful in future empirical inquiries). Industries that exhibit some or all of the following characteristics are less likely to adopt noncompetes: (i) low capital requirements; (ii) short product development times; (iii) rapid product obsolescence; (iv) strong intellectual property protection (including patents, copyrights, and trade secrets); (v) robust complementary assets (such as strong marketing or manufacturing capabilities); and (vi) high levels of industry-specific product interoperability.³⁴¹

Under those conditions, the employer assigns a low value to G_f . A firm in industries with these characteristics is less likely to prioritize maintaining control over its knowledge assets because those assets are not particularly costly to develop, even successful

³⁴⁰ See Starr, Prescott, and Bishara, *Noncompetes in the U.S. Labor Force* at *17–18 (cited in note 11).

³⁴¹ In industries involving high levels of interoperability, presumably there is substantial information sharing among firms, which is either protected by patents and other forms of intellectual property rights or not at all, at least within the circle of relevant competitors. Either way the gains from internalizing R&D via noncompetes are reduced in this situation. Additionally, interoperability implies that training results in industry-specific capital, which makes the value of intra-industry postemployment opportunities more valuable for employees. Thus, on balance, industries characterized by high levels of interoperability will, all other factors equal, typically fall into this category.

products have short lifetimes, and, in some cases, the product is embedded in a portfolio of IP assets and/or supported by complementary production and distribution assets that are difficult to replicate. For the same reason, employees in this setting are likely to place a high value on G_e . In a fast-paced market segment characterized by short product-development times and rapid product obsolescence, employees are likely to demand a high price for accepting noncompetes due to the expectation that a current employer's project is likely to conclude rapidly, in which case the employee may be compelled to seek employment elsewhere. Employment contracts in that type of industry are less likely to include a noncompete clause, and if they do, employers are unlikely to enforce them vigorously given the potential adverse consequences in the ability to recruit talent in the future. The software industry, particularly the Internet-based sector, tends to fit this mold.

Noncompetes are more likely to be selected in markets that exhibit the opposite characteristics. In the biopharmaceutical sector, capital requirements are enormous (approaching or exceeding \$1 billion in the case of an FDA-approved drug³⁴²), product development is long (about ten years on average), product obsolescence is slow, and interoperability is minimal. Given those considerations, the employer is likely to place a high value on internalizing the gains from its R&D investment and therefore should be willing to pay a relatively high price for achieving that objective through restrictions on departing employees. Moreover, the potential costs to a biopharmaceutical employee from a noncompete are presumably lower than in the software industry given longer product development cycles, which—in view of the importance of project-specific knowledge to biopharmaceutical development—tend to ensure longer employee tenures and diminish the number of potential opportunities at competing firms. Consistent with this expectation, empirical evidence shows low levels of employee movement in the Canadian biotechnology industry as compared to the free flow of human capital associated with the semiconductor and other IT industries in Silicon Valley.³⁴³ This observed

³⁴² See Joseph A. DiMasi, Ronald W. Hansen, and Henry G. Grabowski, *The Price of Innovation: New Estimates of Drug Development Costs*, 22 J Health Econ 151, 180–81 (2003). The development cost estimate includes the costs of failed projects previously funded by the pharmaceutical firm. See *id.*

³⁴³ See Hugh P. Gunz, Martin G. Evans, and R. Michael Jalland, *Career Boundaries in a "Boundaryless" World*, in Maury A. Peiperl, et al, eds, *Career Frontiers: New Conceptions of Working Lives* 24–53 (Oxford 2000).

pattern in human capital flows may be in part a function of institutional design: empirical evidence shows that California biotechnology firms issue stock options with long vesting periods and employees of those firms hold large percentages of firm equity,³⁴⁴ suggesting that, even when firms operate in a jurisdiction in which noncompetes are unenforceable, they adopt alternative tools to constrain the outflow of human capital.

E. Error Costs and Noncompete Policy

Economically informed policymaking on noncompetes, and other constraints on employee mobility in innovation markets, must recognize the fundamental uncertainty that attends the selection of any particular point on the policy continuum ranging from full enforcement (equivalent to Option I) to zero enforcement (equivalent to Option III). This is akin to the concept of error cost that occupies a central place in antitrust law and policy: the policymaker recognizes the inevitability of erroneous decisions in general and then selects a legal standard that minimizes the sum of error costs less the administrative costs of implementing any particular standard.³⁴⁵ Hence, antitrust law reserves per se illegal standards, which have low administrative costs, for practices that usually, or almost always, are expected to result in net social harms (principally, horizontal price-fixing), while retaining rule of reason standards, which have high administrative costs, for practices that do not usually result in net social harms (for example, below-cost predatory pricing).³⁴⁶ In the case of noncompetes, each option on the policy continuum raises the risks of both under- and over-enforcement relative to the socially optimal level of noncompete enforcement that would be costlessly and perfectly implemented by a hypothetical omniscient regulator. In the case of a per se legal policy (Option I), the market is immune from the risk of underuse of noncompetes but may be exposed to overuse, resulting in suppressed knowledge spillovers and a slowdown in innovation, not to mention concerns regarding personal autonomy and distributive justice. In the case of a per se illegal policy (Option III), the market is immune to the risk of overuse of noncompetes but may be exposed to underuse, resulting in reduced employer incentives to invest in employee training and certain types

³⁴⁴ See Julia Porter Liebeskind, *Ownership, Incentives, and Control in New Biotechnology Firms*, in Margaret M. Blair and Thomas A. Kochan, eds, *The New Relationship: Human Capital in the American Corporation* 299, 306 (Brookings Institution 2000).

³⁴⁵ See note 38 (listing the leading sources).

³⁴⁶ See Easterbrook, 63 Tex L Rev at 3 (cited in note 38).

of R&D projects. The intermediate range of policy options (Option II), which correspond to the real-world variants of the common-law reasonableness standard, result in some mix of aggregate overuse or underuse of noncompetes relative to the social optimum.

It is important to appreciate that the error-cost approach contemplates that courts and other policymakers may make mistakes with respect to any individual enforcement action, but, in the aggregate, courts and other policymakers will maximize net social gains over time relative to any other enforcement methodology, taking into account legal transaction costs. Following this long-term net-welfare-maximization standard, the efficient legal regime with respect to noncompetes maximizes over time (i) the gains generated by net-welfare-increasing noncompetes, less (ii) the losses generated by net-welfare-decreasing noncompetes, less (iii) the legal transaction costs incurred to distinguish between “good” and “bad” noncompetes. The selection of any option on the noncompete policy continuum inherently involves the task of distinguishing between net-welfare-increasing and net-welfare-decreasing noncompetes, subject to some positive administrative cost and taking into account some positive probability that any legal rule will sometimes make errors in individual cases in distinguishing between good and bad noncompetes. Options I (per se legal) and III (per se illegal) both have the advantage of low administrative costs as compared to Option II (some version of the reasonableness standard), but take extreme views with respect to the likely distribution of good and bad noncompetes and therefore run the risk of significant error costs in the form of overuse or underuse of noncompetes. Option I (“per se legal”) is predicated on the view that noncompetes are always or typically efficient market choices, in which case it is not worthwhile to incur the administrative costs of case-specific adjunction and occasional erroneous enforcement of a “bad” noncompete would be immaterial in the long term. Option III (per se illegal) takes the opposite view with respect to each parameter, except that it agrees that it is not worthwhile to incur the administrative costs of case-specific adjudication. By contrast, Option II takes the intermediate position that the distribution of “good” and “bad” noncompetes may vary sufficiently across industries, employee populations and even individual transactions, so that it is worthwhile to incur the administrative costs required to engage in case-specific adjudication and thereby reduce erroneous enforcement and invalidation

of noncompete clauses. This option is also best in our view for taking account of personal autonomy and distributive justice concerns, which vary depending on the specific circumstances of the employer, employee, and industry.

The earlier generation of law-and-economics scholarship had essentially expressed agnosticism as to the appropriate policy options, on the reasonable ground that available evidence did not provide any firm ground on which to make a choice.³⁴⁷ Today, we are in a position to take an incrementally firmer view on the efficient legal treatment of noncompetes, grounded in the accumulated body of theoretical and empirical analysis of noncompetes, as well as the larger literature on human capital and agglomeration economies.

An error-cost approach to noncompete policy favors the pliable reasonableness standard set forth several centuries ago in *Mitchel v Reynolds*.³⁴⁸ While it carries a higher administrative-cost burden compared to Options I and III, the range of more and less generous reasonableness standards encompassed by Option II exhibits a close fit with our best theoretical and empirical understanding—which is to say, our self-acknowledged limited understanding—of the complex efficiency trade-offs involved in enforcing noncompete clauses in any particular case. Moreover, we note that courts' application of the common-law reasonableness standard may not be especially costly given that that inquiry has historically been limited to a defined set of factors, usually limited to duration, geography, and industry scope.³⁴⁹ Relatedly, we note that the administrative costs under Option III (per se illegality) may in practice be appreciably greater than zero insofar as an absolute ban on noncompetes may lead parties to challenge legal arrangements that arguably mimic the effect of noncompetes but serve legitimate economic functions. This contingency has already been realized in California, where a lower court recently applied the statutory prohibition of noncompetes to an exclusivity clause in a business-to-business agreement, which has never been considered to fall within the purview of that statute.³⁵⁰

In sum, the reasonableness limitations that the common law places on the durational, geographic, and industry scope of noncompete obligations may be interpreted as an indirect instrument

³⁴⁷ See Part I.B.5.

³⁴⁸ 24 Eng Rep 347, 347 (KB 1711).

³⁴⁹ See note 150 and accompanying text.

³⁵⁰ See notes 29–30 and accompanying text.

for limiting error costs under conditions of uncertainty with respect to the socially optimal enforcement policy in the case of any particular noncompete. By tolerating noncompetes subject to fairly strict limitations on duration, geographic reach, and industry scope, courts may effectively minimize the expected error costs inherent to the enforcement or nonenforcement of the total population of noncompetes over time, as compared to a regime in which noncompetes were either flatly enforced or prohibited in all cases without qualification. Additionally, if and when evidence concerning the net welfare effects of noncompetes achieves greater certainty, a reasonableness approach provides policymakers with latitude to adjust the permitted scope of noncompetes, an option that is unavailable under either the full-enforcement or zero-enforcement options. While the extreme poles of the policy continuum largely eliminate administrative costs, each is likely to result in significantly higher error costs over time absent extreme and, based on a close reading of the empirical evidence, factually unjustified assumptions with respect to the likely distribution of efficient and inefficient noncompetes in the marketplace.

CONCLUSION

Much of current scholarly and policy commentary asserts, often with little qualification, that prohibiting enforcement of noncompetes and other contractual limitations on employee mobility promotes innovation. As one scholar has stated: “[T]here remain no persuasive arguments in favor of enforcing [noncompete] agreements.”³⁵¹ Based on these types of unqualified statements in the scholarly literature, US senators have proposed—and multiple state legislatures have already taken or are actively considering—actions to substantially limit or even prohibit noncompetes.³⁵²

We respectfully dissent. The case against noncompetes is typically illustrated by reference to the standard narrative of the rise of Silicon Valley and the decline of Route 128. A close review shows that this historical episode is substantially more complex than has been commonly understood. Technological and economic fundamentals, rather than fine differences in state contract law, most likely account for each region’s different innovation trajectories—which, in the medium to long term, has been positive in

³⁵¹ See Moffat, 52 Wm & Mary L Rev at 879 (cited in note 9).

³⁵² See notes 19–28 and accompanying text.

both cases.³⁵³ The most widely cited empirical studies of a broader sample of jurisdictions suffer from material limitations and, contrary to repeated characterizations in the policy debate, do not provide compelling support for the view that noncompetes inhibit innovation.³⁵⁴ Moreover, more recent empirical work has uncovered evidence supporting theoretical claims that noncompetes sometimes induce firms to invest in cultivating employees' human capital.³⁵⁵

The current state of our empirical understanding thus continues to track the most refined theoretical analysis of the complex economics of human capital markets, which suggests that the net efficiency effects of noncompetes—and other constraints on employee mobility—in innovation markets will vary across industry types, employee types, and other market parameters.³⁵⁶ Some market segments may benefit from a high incidence of noncompetes, while others may suffer. Contrary to the direction of recent scholarship, popular commentary, and policy activity, there is little certainty concerning the net efficiency effects of noncompetes in general and reasonable grounds to believe they have a net positive effect in certain innovation environments. If that is the case, then, from an economic point of view, the common law's admittedly uncertain reasonableness standard likely represents the best available approach for balancing the complex trade-offs raised by noncompetes and other constraints on the mobility of human capital in innovation markets.

³⁵³ See Part II.A.

³⁵⁴ See Part II.B.

³⁵⁵ See notes 310–13 and accompanying text.

³⁵⁶ See Part II.B.3.

APPENDIX

Changes to State Laws Affecting Noncompetes (2014–2019)³⁵⁷

State (Year)	Change	Reduces Enforceability?
Delaware (2014)	Bars noncompetes for home inspector trainees.	Y
New Hampshire (2014)	Employee must agree to noncompete prior to start of employment.	Y
Arkansas (2015)	Specifically authorizes noncompetes in certain circumstances.	N
Hawaii (2015)	Prohibits enforcement of noncompetes by “technology businesses.”	Y
Alabama (2016)	Specifically authorizes noncompetes in certain circumstances.	N
Connecticut (2016)	Limits enforceable geographic scope and duration of noncompetes involving physicians.	Y
Idaho (2016) (repealed 2018)	Specifically authorizes noncompetes in certain circumstances.	N
Illinois (2016)	Bars noncompetes for “low-wage” employees.	Y
Oregon (2016)	Maximum term of noncompete limited to eighteen months.	Y
Utah (2016)	Maximum term of noncompete limited to twelve months.	Y

³⁵⁷ Note that this Table does not cover judicial decisions that may have effectively changed an individual state’s treatment of noncompetes. Relevant statutes (with the exception of the 2018 Idaho and Utah amendments) are as follows (corresponding to states listed above from top to bottom): 28 Del Code Ann § 4109; NH Rev Stat Ann § 275:70; Ark Code Ann § 4-75-101 (2015); Hawaii Rev Stat Ann § 480-4; Ala Code § 8-1-190; Conn Gen Stat § 20-14p; Idaho Code § 44-2704(6); 820 ILCS 90/10; Or Rev Stat § 653.295; Utah Code Ann § 34-51-201; Cal Labor Code § 925; Nev Rev Stat § 613.195; Colo Rev Stat § 8-2-113; Neb Rev Stat § 87-404(2); Mass Gen Laws Ann ch 149, § 24L; Washington Substitute HB 1450, Washington House of Representatives, 66th Regular Legislative Sess (Mar 12, 2019); Connecticut Bill No 7424, Connecticut General Assembly, Jan Sess (2019); 26 Me Rev Stat Ann § 599-A(1); Md Labor & Empl Code Ann § 3-716 (as amended); NH Rev Stat Ann § 275-70-a (as amended); North Dakota HB 1351, North Dakota Legislative Assembly, 66th Sess (Jan 9, 2019), codified as amended at ND Cent Code § 9-08-06; RI Gen Laws § 28-58-1 et seq.

State (Year)	Change	Reduces Enforceability?
California (2017)	Limits ability of employers to require employees to litigate disputes outside of California or under the laws of another state.	Y
Nevada (2017)	Limits noncompetes to terms that are “no greater than is required for the protection of the employer.” Authorizes courts to reform noncompetes that are unreasonable.	Y, N ³⁵⁸
Colorado (2018)	Bars noncompetes for physicians.	Y
Idaho (2018)	Repeals Idaho 2016 statute relating to noncompetes.	Y
Nebraska (2018)	Provides that arbitrator or court may “reform” noncompete provisions in a franchise agreement.	N ³⁵⁹
Utah (2018)	Curtails enforcement of noncompetes in the broadcasting industry.	Y
Massachusetts (2018)	Prohibits noncompetes for employees subject to the Fair Labor Standards Act and all other employees terminated without cause.	Y ³⁶⁰

³⁵⁸ While the limitations on the enforceability of noncompetes would appear to moderately reduce enforceability relative to the existing reasonableness standard, the specific authorization of courts to reform noncompetes that have excessive duration, scope, or other unreasonable terms tends to enhance enforceability.

³⁵⁹ This change increases enforceability because it specifically authorizes a court to “blue pencil” a noncompete provision if it is found to be unreasonable in its existing form, rather than ruling the provision to be unenforceable in its entirety.

³⁶⁰ Note that, while the Massachusetts statute reduced the enforceability of noncompetes in certain cases, it also codified the inevitable disclosure doctrine (which Massachusetts courts have historically resisted), which enables employers to partially mimic the effect of a noncompete. See note 149 and accompanying text.

State (Year)	Change	Reduces Enforceability?
Washington (2019)	Imposes high salary and compensation minimums on employees and contractors who may be subject to noncompetes; sets presumptive eighteen-month limit on term; requires agreement at time of acceptance of employment or additional compensation; requires additional payment to employees terminated without cause.	Y
Connecticut (2019)	Bars noncompetes in home health services industry.	Y
Maine (2019)	Bars noncompetes for certain lower-wage workers and, in all cases, requires that employers disclose noncompete prior to offer of employment.	Y
Maryland (2019)	Bars noncompetes for certain lower-wage workers.	Y
New Hampshire (2019)	Bars noncompetes for certain lower-wage workers.	Y
North Dakota (2019)	Clarifies that “goodwill sale” exception to ban on noncompetes can extend to firm’s partners, members, or shareholders.	N
Rhode Island (2019)	Bars noncompetes for certain lower-wage workers, employees subject to the Fair Labor Standards Act, students, and workers age eighteen or younger.	Y