The Case for Noncompetes

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ABSTRACT

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 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.

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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, Levandowski (who was later fired by Uber⁶) is still involved in an arbitration proceeding with Google over $120 million in “incentive payments” (that is, payments designed to reward and retain an employee) he received prior to

¹ COMPLAINT, WAYMO LLC V. UBER TECHNOLOGIES, INC. ET AL., N.D. CAL. (filed Feb. 23, 2017), at 2-5 (stating various causes of action against Uber relating to alleged actions by former Waymo employee in connection with departure from Waymo to Uber’s self-driving car project).
² See id. at 3 (describing evidence showing that Levandowski, former Waymo engineer, misappropriated information from Waymo upon departure from company).
³ See id. at 2 (stating trade secret, patent infringement and unfair competition causes of action).
⁵ See Joe Mullin, Judge’s order bars Uber engineer from Lidar work, demands return of stolen files, arstechnica.com, May 15, 2017.
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departing for Uber.\(^7\)

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 counter-example 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 for a certain period of time and a certain geographic area. 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 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’ willingness to enforce noncompetes spurred the purported decline of the Route 128 area around Boston.\(^9\) Following this view, California has enjoyed a

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\(^7\) See Joel Rosenblatt, Google Takes Aim at Engineer Left Untouched by Suit Against Uber, BLOOMBERG, Apr. 30, 2018.

\(^8\) On cultural norms and organizational practices, see ANNALEE SAXENIAN, REGIONAL ADVANTAGE: CULTURE AND COMPETITION IN SILICON VALLEY AND ROUTE 128, at 1-9 (1994) (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 Gilson, The Legal Infrastructure of High-Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not To Compete, 74 N.Y.U. L. REV. 575, 578-79, (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, supra note 8, at 578-79. In the legal literature, representative contributions that have adopted and
healthy circulation of human capital, while Massachusetts has been deprived of the “agglomeration economies” that promote robust innovation clusters. 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

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 (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) [hereinafter “Lobel 2015”] (stating that the enforcement of noncompetes “creates a thick cluster of property rights that rigidifies the market and reduces the ability to move forward.”); Viva Moffat, Making Non-Compete Agreements Unenforceable, 50 ARIZ. L. REV. 939, 979-80 (2012) [hereinafter “Moffat 2012”] (arguing for a uniform rule of non-enforceability on the ground that noncompetes skew the balance in intellectual property policy between protecting R&D incentives and the public domain); Viva Moffat, The Wrong Tool for the Job: The IP Problem with Non-Competition Agreements, 52 WILLIAM & MARY L. REV. 873, 911 (2010) [hereinafter “Moffat 2010”] (arguing that noncompetes are a poor tool for protecting IP rights). In the economics literature, see Sampsa Samila and Olav Sorenson, Non-compete Covenants: Incentives to Innovate or Impediments to Growth, 57 MGMT. SCI. 425, 426 (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, 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 33-40 (2003).
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% of all U.S. workers (roughly, 30 million people), and approximately one-third of workers in professional, scientific and technical occupations, are subject to noncompetes. The extent to which the law should enforce these contractual instruments is a matter of fundamental importance.

In recent years, a growing number of scholars and policymakers have adopted a simple answer to this question: Never. 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. 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”

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

12 For representative sources that express this view, see LOBEL, supra note 9, at 27-30 (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 ANNUAL REV. L. & SOCIAL SCIENCE 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 2013, supra note 9, at 893-97 (arguing that firms that advocate for noncompete enforcement “would likely benefit from the very movement they are trying to limit”); Moffat 2012, supra note 9, at 893-97 (“n]oncompetes are at odds with both the fair bargaining process and efficiency underpinnings of the freedom of contract rationale”); Moffat 2010, supra note 9, at 878-879 (arguing that the “IP justification” for noncompetes is insufficient and advocating a policy of zero enforcement); Alan Hyde, Should Noncompetes Be Enforced?, REGULATION (Winter 2010-11), at 9 (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, supra note 8, at 629.
standard currently used by 46 states to adjudicate the enforceability of noncompetes.\(^\text{13}\) (The current exceptions are California, North Dakota and Oklahoma, which bar noncompete enforcement against individuals in most circumstances; recently, Hawaii, barred noncompetes for “technology businesses.”\(^\text{14}\)) To be clear, even under the long-standing common law doctrine (dating from an English precedent in 1711\(^\text{15}\)), noncompete clauses are enforceable only if they set forth “reasonable” temporal, geographic and scope-of-industry limitations.\(^\text{16}\) For the “talent wants to be free” school of 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 ban, the enforcement of noncompetes.\(^\text{17}\) On March


\(^{14}\) HAW. REV. STAT. ANN. §480-4.

\(^{15}\) Mitchel v. Reynolds, (1711) 24 ENG. REP. 347 (K.B.) (stating that a “bond or promise to restrain oneself from trading in a particular place, if made upon a reasonable consideration, is good”).

\(^{16}\) 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 a particular place”, which may be deemed reasonable). For more detailed discussion of the reasonableness standard, see infra Part II.A.3.b.

\(^{17}\) 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, e.g., Orly Lobel, Companies Compete but Won’t Let Their Workers Do the Same, N.Y. TIMES, May 4, 2017 [hereinafter “Lobel 2017”] (discussing states’ differences in enforcing noncompetes, federal proposals to limit noncompetes, and the harmful effects of noncompetes on employees); Steven Greenhouse, Non-Compete Clauses Increasingly Pop Up in Array of Jobs, N.Y. TIMES, June 8, 2014 (discussing proposed legislation in Massachusetts limiting enforcement of noncompetes); Neil Irwin, When the Guy Making Your Sandwich Has a Non-Compete Clause, N.Y. TIMES, Oct. 14, 2014 (discussing the economic, legal, and moral issues raised by noncompetes); Ruth Simon and Angus Loten, Litigation Over Non-Compete Clauses is Rising, WALL ST. J., Aug. 14, 2013 (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 (discussing cases in which employers declined to enforce noncompetes when executives departed for other large corporations); Eric Goldman, Why Congress Should Restrict Employee Non-Compete Clauses, FORBES, June 30, 2015 (supporting federal legislation to limit enforcement of noncompetes); Claire Zillman, Are Non-
7, 2019, a bipartisan group of six Democratic and Republican U.S. 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.”

Citing academic research that “California’s ban on non-compete agreements has been a prime factor in the state’s innovative and growing economy,” three Democratic U.S. Senators introduced legislation in April 2018, to impose a ban on noncompetes nationwide. Like these U.S. 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. 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.” In 2018, the influential Economist magazine endorsed only a slightly more qualified position, arguing that noncompetes should only be enforced in narrow circumstances and similarly referring to academic research to support this position.

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Compete Agreements Hurting Tech Innovation?, FORTUNE, July 1, 2015 (discussing differing views on enforceability of noncompetes, their impact on innovation, and proposed state legislation to limit enforceability); John McEleney, Non-Competes Hurt Workers and their Employers, BOSTON GLOBE, June 28, 2015 (CEO of Massachusetts-based company arguing that noncompetes should “go away all together”).


See, e.g., Lobel 2017, supra note 17. 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. See http://www.loriehrlich.com/noncompete-agreements-40.html.

See Lobel 2017, supra note 17.

Restrain the Restraints: The Case against Non-compete Clauses, THE ECONOMIST, May 19, 2018 (supporting a requirement for employers to
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A sizeable number of state legislatures have derived similar conclusions. Since 2014, the legislatures of 37 states have formally considered laws that would affect the enforceability of noncompetes in employment agreements.\textsuperscript{23} Of those proposed bills, all but six proposed to limit enforceability (up to and including outright bans). In 21 states, these debates have translated into action. This includes Massachusetts, which in 2018 enacted a statute prohibiting noncompetes for certain categories of employees\textsuperscript{24} and, in most other cases, imposes notice obligations on employers.\textsuperscript{25} The Appendix shows all statutory changes to state noncompete laws in the past five years. Nineteen changes reduced demonstrate genuine harm in noncompete litigation, as well as arguing that noncompetes should only be enforced if they apply for a short time and they are negotiated before employee accepts a job offer).

\textsuperscript{23} These states are Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Hawaii, Idaho, Illinois, Indiana, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nevada, New Hampshire, New York, Ohio, Pennsylvania, New Jersey, North Dakota, Ohio, Oregon, Pennsylvania, 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 Lexis-Nexis databases. \textit{See also APPENDIX.}

\textsuperscript{24} The statute primarily captures workers who are “nonexempt under the Fair Labor Standards Act” (see MGL c.149, §24L), which generally targets salaried workers employed on a fixed hourly basis and most likely would not target managerial and other professional employees. However, there may be ambiguities in certain cases. For further discussion, see Stephen T. Melnick, Chris Kaczmarek, and Melissa L. McDonagh, \textit{Frequently Asked Questions About the New Massachusetts Noncompetition Agreement Act}, LITTLER, Sept. 5, 2018, https://www.littler.com/publication-press/publication/frequently-asked-questions-about-new-massachusetts-noncompetition.

\textsuperscript{25} MGL c.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 \textit{infra} notes 144-145 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 (subject to a seven-day period during which the employee can rescind acceptance), \textit{see id.}, and (ii) Massachusetts simultaneously codified the “inevitable disclosure” doctrine, which entitles employers to seek injunctions against departing employees in the case of “threatened misappropriation”, \textit{see MASSACHUSETTS TRADE SECRET ACT, H.4868, SECTION 19.} For further discussion, see \textit{infra} note 125.
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.\textsuperscript{26} 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.\textsuperscript{27} In 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.\textsuperscript{28} While the appellate court reversed this ruling, it is nonetheless indicative of an increasingly dogmatic approach against the enforcement of noncompetes or other


\textsuperscript{27} These decisions purport to apply the California Supreme Court’s 2008 decision in \textit{Edwards v. Arthur Andersen LLP}, 44 Cal. 4th 937 (2008). See, e.g., \textit{Barker v. Insight Global LLC}, 2019 WL 176260 (N.D. Cal. Jan. 11, 2019) (declining to enforce an employee and customer non-solicitation clause against a former employee, on the grounds that doing so would violate California’s ban on noncompetes); \textit{AMN Healthcare, Inc. v. Aya Healthcare Socs., Inc.}, 2018 Cal. App. LEXIS 989 (Ct. App. Nov. 1, 2018) (holding that a firm could not enforce a non-solicitation clause against a former recruiter employed by the firm, on the grounds that doing so would violate California’s ban on noncompetes); \textit{Golden v. Cal. Emergency Physicians Med. Grp.}, No. 16-17354 (9th Cir., July 24, 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 \textit{Barker} and \textit{AMN Healthcare} decisions conflict with long-standing California Supreme Court precedent upholding the enforceability of post-employment non-solicitation covenants subject to a reasonableness standard, see \textit{Loral Corp. v. Moyes}, 174 Cal.App.3d 268, 278-79 (1985).

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contractual provisions deemed to have a comparable effect.29

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 non-economic concerns concerning personal autonomy and distributive justice.30 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 bans31), 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 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 tradeoffs between employers’ training and R&D incentives (generally favored by noncompetes) and employee mobility

30 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); 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 policymaking calculus.
31 See, e.g., Kevin Derby, Marco Rubio Introduces Freedom to Compete Act, FLORIDA DAILY, Jan. 16, 2019 (describing bill proposed by U.S. Senator Marco Rubio to ban noncompetes nationwide for employees who are eligible for protection under federal overtime eligibility laws).
(generally disfavored by noncompetes). 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.

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 spinoff formation associated with Silicon Valley. Fourth, Silicon Valley’s rise over Route 128 most likely stemmed far more from technological and 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

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

33 See infra Part II.A.
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, 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 countervailing efficiency effects of noncompetes and other constraints on employee mobility. The free movement of talent implies efficiency 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.

See, e.g., LOBEL, supra note 9, at 67-72 (describing empirical studies that purportedly have confirmed Ronald 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 (May 2016) [hereinafter “WHITE HOUSE”], at 2, 5-7 (discussing empirical studies measuring the prevalence and economic effects of noncompetes on employee mobility and start-up formation); U.S. DEPT. OF THE TREASURY, OFFICE OF ECONOMIC POLICY, NON-COMPETE CONTRACTS: ECONOMIC EFFECTS AND POLICY IMPLICATIONS (March 2016) [hereinafter “TREASURY”], at 11-13, 18-23 (reviewing research on use and effects of noncompetes and concluding that economic justifications for noncompetes have weak support); Lobel 2017, supra note 17 (same); Lobel 2015, supra note 9, at 67-72 (describing empirical studies suggesting that noncompetes reduce employee mobility, depress employee effort and reduce innovation); Benkler, supra note 12, at 235 (describing empirical research purporting to show that enforcing noncompetes depresses employee mobility, reduces knowledge spillovers and undermines innovation); Hyde, supra note 12, at 9 (“Study after study shows how much more productive firms will be if they can hire, free of lawsuits, someone who worked at a rival”).
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 tradeoff 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 Ronald Gilson made when he originally attributed Silicon Valley’s success to California’s refusal to enforce noncompetes.35 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,36 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 tradeoff between efficiency gains and losses inherent to limitations on employee mobility in innovation markets.

In sum, our Article makes three important contributions to the literature. First, it exhaustively reviews the widespread contention that noncompetes thwart innovation.37 Our detailed

35 See Gilson, supra note 8, at 629.
36 For the leading sources, see Frank H. Easterbrook, Workable Antitrust Policy, 84 Mich. L. Rev. 1696, 1712 (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”).
37 See infra Parts I, II.
analysis shows that neither theory nor empirics supports the economic arguments commonly wielded in favor of prohibiting noncompetes.\(^{38}\) 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.\(^{39}\) 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.\(^{40}\) 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.\(^{41}\) Second, we uncover serious factual and other deficiencies in several widely-cited empirical studies, which casts substantial doubt on those studies’ findings and policy implications.\(^{42}\) 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.\(^{43}\)

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 re-examines 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.

\(^{38}\) See infra Part II.
\(^{39}\) See infra Parts II.B, III.
\(^{40}\) See infra Part II.A.
\(^{41}\) See id.
\(^{42}\) See infra Part II.B.
\(^{43}\) See infra 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 observations 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. 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.

44 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. 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. General human capital refers to technical, managerial and other skills and knowledge that have value across a broad pool of firms or industries. Firm-specific human capital refers to the narrower set of technical, managerial, and other skills and knowledge that only have value (or have significantly greater value) at a particular firm. 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. 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.

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See BECKER, supra note 45, at 33-51 (defining, and distinguishing between, the categories of general and firm-specific human capital assets).

See id. at 33-34.

See id. at 40.

See, e.g., Derek Neal, Industry-Specific Human Capital: Evidence from Displaced Workers, 13 J. LABOR ECON. 653, 653-54 (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).

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*, published in 1890.\(^{50}\) 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. In Marshall’s famous words: “The mysteries of the trade become no mysteries; but are as it were in the air . . .”\(^{51}\) 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.\(^{52}\)

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.

\(^{50}\) ALFRED MARSHALL, PRINCIPLES OF ECONOMICS (1890).

\(^{51}\) See id. at 198.

\(^{52}\) See generally Rainer van Hofe, Whither or Not Industrial Clusters: Conclusions or Confusions?, 4 INDUSTRIAL GEOGRAPHER 2 (2006) (reviewing the literature on “agglomeration economies”).
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, thereby conferring an advantage on a competitor.53 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.54

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 post-employment value) and the development and transmission of

53 See Paul Rubin & Peter Shedd, Human Capital and Covenants Not to Compete, 10 J. LEG. STUD. 93, 101-02 (1981) (arguing that courts’ actions to protect workers from noncompetes are not economically sound and overlook that employers will reduce investment in employee training absent noncompetes); Edmund Kitch, The Law and Economics of Rights in Valuable Information, 9 J. LEG. STUD. 683, 685-86 (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, 78 HARV. L. REV. 625, 647 (1960) (contending that the objective of post-employment restraints is “to prevent the 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”).

54 See supra note 53.
proprietary, often innovative, information. 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. 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.

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. 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 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

56 See Rubin & Shedd, supra note 53, at 93 (arguing that covenants not to compete do not, as earlier scholars assumed, necessarily reflect an exercise of monopoly power by employers).
57 See supra note 9.
and separate teams that work on different projects so as to minimize information transfer between them. 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. Third, the firm may underinvest in R&D by re-allocating 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.

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 post-employment opportunities. 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

59 See Nicola Meccheri, A Note on Non-competes, Bargaining and Training by Firms, 102 ECON. LETTERS 198, 199 (2009).
60 See On Amir & Orly Lobel, Driving Performance: A Growth Theory of Non-compete Law, 16 STANFORD TECH. L. REV. 833, 846 (2013) (stating that 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: Non-Compete Agreements, Executive Compensation, and Firm Investment, 27 J. L. ECON. & ORG. 376, 377-78 (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).
are inherent measurement and verification difficulties in assessing employees’ relative contributions in a team environment, firms clearly use a variety of compensation systems to at least approximately reward employee performance, including promotion, monetary bonuses, and more tailored compensation mechanisms. 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. Market forces reward firms who do so successfully and discipline those who do not.

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. 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 a resource-constrained employee can credibly commit to indirectly compensate its employer for training and knowledge leakage costs in the event the employee departs for a

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61 For the classic treatment, see Armen A. Alchian & Harold Demsetz, Production, Information Costs and Economic Organization, 62 AMER. ECON. REV. 777, 779 (1972) (discussing the difficulties of determining each individual’s contribution when observing a team’s output).


63 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 infra note 293 and accompanying text.

64 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.
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 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.

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 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

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65 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, January 2017). 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% 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 et al. 2018, supra note 10, at 24-25.
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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.\textsuperscript{66} 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 only yield a net social gain over time 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.

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

\textsuperscript{66} See supra note 53.
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 U.S. 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 analysis and a legal ban on noncompetes in Gilson’s analysis—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 of knowledge spillovers. 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. Nonetheless a significant body of commentary by legal scholars and economists has endorsed this proposition in stronger formulations and made largely unqualified policy assertions that enforcing noncompetes and other restraints on employee mobility

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67 See Saxenian, supra note 8, at 1-9, 29, 59.
68 See Gilson, supra note 8, at 578-79, 602-09.
69 See id. at 596.
70 See id. at 629.
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depress innovation. 71 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.

A recent economic model formulated by James Rauch shows that this loss can extend well beyond just one employment transaction. 72 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 spinoff transactions involving employees who depart from the parent firm to form or join or spinoff firm, and then depart from the spinoff 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 spinoff transactions. That is the focus of the “talent wants to be free” literature. However, it is important

71 See Lobel, supra note 9, at 64-72 (arguing that empirical evidence supports California’s “zero tolerance” policy for noncompetes); Lobel 2017, supra note 17 (same); Benkler, supra note 12, at 235 (arguing that empirical evidence suggests that contractual and other legal constraints on employee mobility undermine innovation); Hyde, supra note 12, at 10-11 (arguing that balance of evidence supports adopting California’s policy of zero enforcement toward noncompetes); Moffat 2012, supra note 9, at 965 (advocating for a zero-enforcement policy toward noncompetes); Moffat 2010, supra note 9, at 921 (same).

not to ignore the possibility that the inability to enforce a noncompete may preclude the initial hire by restoring the credible commitment problem, in which case the subsequent stream of spinoff transactions could be stunted or blocked entirely. Moreover, if noncompetes are not enforceable, even a certain portion of the set of spinoff may face the same credible commitment dilemma and may be wholly precluded or move forward under distorted terms. 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. 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

73 See id. (showing formally that the efficiency of noncompetes depends in part on a tradeoff between these two countervailing effects on the parent firm and spinoff firms).
74 See supra note 34.
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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. 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. Starting in the 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

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75 See Wim Hulsink, Dick Manuel & Harry Bouwman, Clustering in ICT, in PATHWAYS TO HIGH-TECH VALLEYS AND RESEARCH TRIANGLES: INNOVATIVE ENTREPRENEURSHIP, KNOWLEDGE TRANSFER AND CLUSTER FORMATION IN EUROPE AND THE UNITED STATES 53-55 (eds. Wim Hulsink and H. Dons 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 RESEARCH POLICY 299, 300 (1983) [hereinafter “Dorfman 1983”] (observing that, as of the late 1970s, the Boston area and Silicon Valley had the same number of high-tech employees, and the greater San Francisco Bay Area had “about 30 percent more”).

76 See Hulsink et al., supra note 75, at 59 (describing how the “minicomputer manufacturers of Route 128 quickly lost ground to the manufacturers of the fast-emerging PCs and workstations in Silicon Valley”).
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decline of Route 128, to differences in industrial organization and cultural norms. The West Coast environment was characterized by a constant flow of technical personnel among a network of loosely connected firms, which spawned spinoffs 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’ insistence on enforcing noncompetes may have stagnated the flow of human capital, resulting in a slowdown in innovation. 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. 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.

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77 See Saxenian, supra note 8, at 1-9.
78 See Gilson, supra note 8, at 602-09.
79 Based on Google Scholar (as of June 20, 2018), Saxenian’s leading contribution in the area, the book-length Regional Advantage, has been cited 12,107 times and Gilson’s 1999 NYU article on Silicon Valley and Route 128 has been cited 833 times. See also supra note 9 (listing specific 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.” 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% of agreements with firms headquartered in California, as compared to rates of 70%-84% at the same types of firms headquartered in other states (which generally enforce noncompetes subject to the reasonableness standard). Even more surprisingly, a broader study involving all types of employees finds that the incidence of noncompetes in California (19%) is approximately the same as observed in states that enforce noncompetes.

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80 CALIFORNIA BUSINESS AND PROFESSIONS CODE § 16600.

81 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% (compared to 84% for the sample as a whole). See Norman D. Bishara, Kenneth J. Martin & Randall S. Thomas, An Empirical Analysis of Noncompetition Clauses and Other Restrictive Postemployment Covenants, 68 VAND. L. REV. 1, 34 (2015) [hereinafter “Bishara et al. 2015”]. Garmaise finds that, in a sample of executives at large, publicly traded firms, approximately 70% were subject to noncompetes, including 58% of executives at California-based firms. Garmaise, supra note 60, at 396. Garmaise does not specifically identify the rate of noncompete adoption among firms located in the 48 non-enforcing states, although it would be expected that that rate would be somewhat higher than the 70% rate reported for the full sample of all firms in all states. See id.

82 See Starr et al. 2018, supra note 10, at 16. We note two additional points concerning the methodology and findings of the Starr et al. 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. On substance, we note that the authors do not find any significant change in the incidence of noncompetes in
This discrepancy between law and practice might be attributed to the possibility that technical personnel are unaware 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.” 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 post-employment opportunities, as distinguished from comparing “multi-unit” firms, which have operations in California and other states, and “single-unit” firms, which only operate 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.

a “general” restraint that barred entry into an entire profession.84 From the 1970s through the 2000s, litigants that pursued variants of the narrow restraint exception achieved mixed results, sometimes achieving success in (mostly) federal courts but usually not faring well in California state courts.85 In 1997 and 1999, the Ninth Circuit again applied the exception to uphold a noncompete covenant.86 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.87

84 Campbell v. Board of Trustees of Leland Stanford Univ., 817 F.2d 499, 502 (9th Cir. 1987) (citing California law for the proposition that the statutory ban on noncompetes only precludes 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”). The court purported to apply state law precedent, as set forth in Boughton v. Socony Mobil Oil Co., 41 Cal. Rptr. 714, 716 (Ct. App. 1964), which in turn relied on King v. Gerold, 240 P.2d 710 (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 F.2d 650, 660 (9th Cir. 1981).


86 General Commercial Packaging Int’l v. TPS Package Eng’g, Inc., 126 F.3d 1131 (9th Cir. 1997) (enforcing a one-year noncompete between a contractor and sub-contractor with respect to the contractor’s clients); IBM v. Bajorek, 191 F.3d 1033 (9th Cir. 1999) (holding that noncompete obligation in stock option agreement did not violate the California statutory ban on noncompetes).

b. Sale of a Business.

Based on a statutory exception, 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. 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 acquisitions from noncompete enforcement limitations (which is the case 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, California law has recognized that the statutory bar against noncompetes does not extend to certain post-employment restrictions (most typically, non-disclosure and non-solicitation covenants) that are enforced for the purpose of protecting an employer’s trade secrets or confidential information. Since the 1980s, California courts

88 CALIFORNIA BUSINESS AND PROFESSIONS CODE § 16601.
89 It is not clear how large that equity interest must be. Rulings have been mixed. See Hilb, Rogal & Hamilton Ins. Servs. v. Robb, 39 Cal. Rptr. 2d 887, 889-90 (1995) (in connection with merger of insurance company, upholding noncompete entered into with employee of the merged company, who had held a 35% ownership interest in the company, on ground that sufficient transfer of goodwill had taken place); Vacco Inds., Inc. v. Van Den Berg, 6 Cal. Rptr. 2d 602, 610 (1992) (finding that a 3% interest, which was the ninth largest shareholder interest, in conjunction with an officer position, constituted a substantial shareholder).
90 Gordon v. Landau, 49 Cal. 2d 690, 694 (1958) (upholding non-solicitation clause because “it did not prevent defendant from” engaging in the same or similar business as his former employer).
91 See JAGER, supra note 83, at §13.01[2], at 13-13 (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., 62 Cal.2d 239, 242-43 (1965) (stating that Section 16600
have periodically applied the trade secret exception to enforce non-solicitation and non-disclosure obligations (and, in one recent case, even a noncompete clause “construed to bar only the use of confidential source code, software or techniques”92) that were found to be narrowly tailored to protect a trade secret.93

In 2008, the Supreme Court of California specifically declined to affirm or reject the trade secret exception.94 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 . . . ‘[a]n 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." Simply put: Section 16600 does not preclude an employer from preventing a departing employee via injunctive relief from joining a new employer by enforcing non-disclosure, non-solicitation, or other similar post-employment 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 1974 ("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. In 1981 and 1987, the Ninth Circuit held that ERISA preempts state law, specifically including noncompete restrictions. California state courts have adopted the same position. This enforcement strategy is only limited by the ERISA

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98 See Clark v. Lauren Young Tire Center Profit Sharing Trust, 816 F.2d 480, 481 (9th Cir. 1987) (involving noncompete under Oregon law); Lojek v. Thomas, 712 F.2d 675, 678 (9th Cir. 1983) (involving 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, *supra* note 8, at 607 n.100 (citing Muggill v. Reuben H. Donnelly Corp., 398 P.2d 147, 149 (Cal. 1965)). However, Muggill would not appear to survive the Ninth Circuit’s interpretation of ERISA, enacted in 1974.
requirement that a noncompete forfeiture clause cannot be applied to deprive the employee of benefits accrued after ten years of service.¹⁰⁰

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,¹⁰¹ prior to 2017, they often respected an out-of-state choice of forum clause, even if the other state potentially applied its own law.¹⁰² 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 2017.¹⁰³

¹⁰² Compare Davis v. Advanced Care Techs., Inc., 2007 WL 2288298 (E.D. Cal. Aug. 8, 2007) (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 (N.D. Cal. July 9, 2012) (enforcing a forum selection clause despite the strong possibility that the forum state would uphold the covenant not to compete).
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. Under California law, Google would appear to be powerless to prevent the employee from working for Uber. Even assuming 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 through 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

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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 U.S. semiconductor industry proportional to a firm’s propensity to bring patent infringement suits.104 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 portfolios, suggesting that patents substitute in part for noncompetes as a device for protecting against knowledge leakage after consummation of the acquisition.105

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 Section 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.106 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

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106 See supra Part II.A.1.c.
jurisdictions, courts are willing to enforce NDAs that encompass information that would not otherwise qualify as a trade secret;\textsuperscript{107} in other jurisdictions (including California), Google may be required to show that enforcement of the NDA only targets nonpublic information that would be protected under trade secret law.\textsuperscript{108}

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 given that it locks each party into a potentially unwanted long-term commitment, which is difficult to mitigate even through the most carefully 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.\textsuperscript{109}

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

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107 \textit{See} Richard F. Dole, Jr., \textit{The Contract Exception to the Uniform Trade Secrets Act and Its Implications for the Federal Defend Trade Secrets Act}, 34 \textit{Santa Clara High Tech. L. J.} 362, 377 (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 et al. 2015, \textit{supra} note [ ], at 21-23 (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).


109 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.
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agreement) developed by the employee during the course of his or her employment are deemed to belong to the employer. 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 summary judgment, 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 co-defendant), and a smaller toy manufacturer (as co-defendant), an invention assignment agreement provided the basis for several years of protracted litigation that burdened the defendant with substantial legal fees.

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. 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 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

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111 See Mattel, Inc. v. MGA Entm’t, Inc., 616 F.3d 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, August 2011.

attractiveness of an employee to any potential new employer.\textsuperscript{113}

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.\textsuperscript{114} 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.\textsuperscript{115} 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.\textsuperscript{116} Depending on the credibility of any such legal threat, and the potential injunction, damages, and litigation costs to which the

\textsuperscript{113} See Mark A. Lemley, Rethinking Assignor Estoppel, 54 Hous. L. Rev. 513, 537 (2016) (“the 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”).
\textsuperscript{114} Complaint, Waymo, LLC v. Uber Technologies et al., N.D. Cal. (filed Feb. 23, 2017), at 2-5.
\textsuperscript{115} Based on a survey of 24 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 Marquette Intellectual Prop. L. Rev. 211, 217-28 (2012). 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 infra Part II.A.3.
\textsuperscript{116} 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; Intel’s suit against Broadcom involving the departure of former Intel employees, see Karen Alexander, Intel, Broadcom Settle Suit Over Trade Secrets, L.A. Times, Nov. 22, 2000; and Apple’s suit against Steve Jobs and Next, see Andrew Pollack, Steven Jobs Settles Suit Filed by Apple, N.Y. Times, Jan. 18, 1986. 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 24-36 (1984).
employee and future employer could be exposed. 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 for working on certain projects at Uber; and, second, Uber fired Levandowski in connection with Google’s litigation and related allegations of trade-secret theft. 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 “anti-poaching”) agreements. 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. Although these arrangements were ultimately dissolved following a settlement with the Department of Justice for alleged antitrust violations, they illustrate how firms that are precluded from using noncompetes may have strong incentives to use other mechanisms to dampen labor mobility.

117 Ronald 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. See Gilson, supra note 8, at 597-601. We feel this understates certain practical and legal realities. Although trade secrecy claims are certainly not as strong as an absolute bar on post-employment 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 infra notes 126-128 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 EMPLOYEE RIGHTS & EMPLOYMENT POL’Y J. 339, 340-42 (2009) (arguing that California trade secret law provides a potent remedy in cases involving the misappropriation of “core” informational assets).

118 See Mike Isaac, Uber Executive Steps Back From Self-Driving Cars During Waymo Legal Fight, N.Y. TIMES, Apr. 27, 2017.

119 See Lobel 2015, supra note 9, at 830-33 (describing “anti-poaching 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 (describing settlement of class-action antitrust lawsuit against major technology companies alleging “anti-poaching” agreements).

120 See Elder, supra note 119.
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.\(^\text{121}\) 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.\(^\text{122}\) 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 post-acquisition date, contingent on the founders and certain other employees remaining with the acquiror post-closing for a certain period of time.\(^\text{123}\) In yet another

\(^{121}\) See Richard 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 more effective than noncompete agreements for purposes of retaining employees). For empirical evidence that stock options promote employee retention, see Paul Oyer & Scott Schaefer, *Why Do Some Firms Give Stock Options to All Employees?: An empirical examination of alternative theories*, 76 J. FIN. ECON. 99, 99-101 (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).


\(^{123}\) See Marita Makinen, David Haber, & Anthony Raymundo, Lowenstein Sandler LLP, *Acqui-Hires for Growth: Planning for Success* (2012), at 35 (noting that certain acquisitions allocate more than 40% of the deal consideration to “incentive pool payments” and “equity grant roll overs . . . contingent on key employees staying with the buyer post-closing”).
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 with noncompete provisions in the executive's employment agreement that are not directly enforceable through a breach of contract suit.\textsuperscript{124}

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-stated "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.\textsuperscript{125} Where there are fine differences, these do not necessarily


\textsuperscript{125} See Gilson, supra note [8], at 602 (stating "[t]he scope of protection provided by trade secret law in California and Massachusetts appears to be roughly the same"). See generally Robert G. Bone, A New Look at Trade Secret Law: Doctrine in Search of Justification, 86 CALIF. L. REV. 241, 247 (1998) ("Although trade
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. 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.

As of the late 1970s and early 1980s, neither jurisdiction 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.”

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 12 of its former employees from taking certain positions at their new employer, Hyundai. Given the language in the CUTSA statute, and the outcome in the AMD v. 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

secret doctrine varies from state to state, the general rules are substantially similar in all jurisdictions”).

In 1998, the author of a leading treatise on trade secret law observed that California law authorized courts generally to intervene to protect “threatened harm” and concluded: “California has never rejected the fundamental idea that underlies the [inevitable disclosure] doctrine.” 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). Commentators observed that the court’s opinion reflected the actual “law on the ground” in some California 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.”

In the immediately ensuing years, the case law shifted in a more defendant-friendly direction as several federal district courts applying California law and, in 2002, a California intermediate appellate court, rejected the inevitable disclosure remedy, specifically distinguishing in the latter case between “inevitable

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129 James Pooley, When It Comes to Trade Secrets and Employee Mobility, A Little Inevitable Disclosure Is Not Such a Bad Thing, THE RECORDER, Nov. 1998.
130 Electro Optical Industries, Inc. v. White, 90 Cal. Rptr.2d 680 (Ct. App. 1999), ordered not to be officially published by Electro Optical Indus., Inc. v. White, 2000 Cal. LEXIS 3536 (Apr. 12, 2000). Specifically, the court 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.” See id. at 684.
disclosure” and the “threatened misappropriation” language in the CUTSA. 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. 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.

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 during the ascendance 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 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 would be “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.

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134 See id.
135 See HYDE, supra note [9], at 33-35.
136 See Central Valley General Hospital v. Smith et al., 75 Cal. Rptr.3d 771, 789-90 (2008) (stating that the rejection of the inevitable disclosure doctrine in Schlage does not imply rejection of trade secret claims based on threatened misappropriation, given that the California code explicitly recognizes such claims).
doctrine.\(^{138}\) 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.”\(^ {139}\) 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.”\(^ {140}\)

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,”\(^ {141}\) 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 not imply endorsement of the inevitable disclosure doctrine.\(^ {142}\)

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


\(^{141}\) See MASSACHUSETTS TRADE SECRETS ACT, H.4868, SECTION 19 (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”).

\(^{142}\) For discussion, see Yekaterina Reyzis, One Step Away from Uniform: Taking a Closer Look at Massachusetts’ New Trade Secrets Law, ORRICK, Nov. 20, 2018.
resist application of the doctrine.\textsuperscript{143}

\textbf{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.\textsuperscript{144} 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 only enforceable to the extent required to protect the employer's goodwill, trade secrets, or confidential information.\textsuperscript{145} 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 numerous cases, Massachusetts courts have cut back restrictions

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\textsuperscript{143} See Revzis, supra note [148](noting that Massachusetts courts “have long held that the inevitable disclosure doctrine hurts employer mobility and competition”); Goulston & Storrs PC, \textit{New Massachusetts Trade Secret Laws Effective October 1, 2018}, Sept. 21, 2018 (noting that Massachusetts courts “were considered to have effectively rejected (or at least discredited) the ‘inevitable disclosure’ doctrine”).


to make them reasonable.”

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. In 1979 and 1982, the Massachusetts Supreme Court 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 a noncompete. Additionally, Massachusetts courts have held that noncompete 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. 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


149 See, e.g., Lanier Services Inc. v. Ricci, 192 F.3d 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 Reese, supra note [145].
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 1945, a Boston firm established the first major successful venture capital enterprise (the American Research and Development Corporation (“ARD”)). Supported by federal defense funding and local VC investors, MIT and Harvard university labs spawned hundreds of spinoffs throughout the 1960s and 70s. 150 Those spinoffs included firms that later pioneered the “minicomputer” 151 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). 152

Contrary to Saxenian’s account of cultural norms, Paul Cerruzzi describes the most important Route 128 firm, DEC, as having been characterized by a non-hierarchical engineer-driven culture that dispensed with the formalities and bureaucracy of

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151 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 Cerruzzi, A History of Modern Computing 124-26 (2003).

152 See CERRUZZI, supra note 151, at 127 (noting that DEC was founded in 1957 by former MIT researchers with funding from ARD) and 195 (Data General founded in 1968 by two former DEC engineers); SAXENIAN, supra note 8, at 18-19 (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 & Von Burg, supra note 150, at 85-86 (noting that in 1951, An Wang opened Wang Laboratories and, in 1957, Kenneth Olsen, a former MIT researcher, founded Digital Equipment Corporation with a capital investment from ARD); Lynn Elaine Browne and Steven Sass, The Transition from a Mill-Based to a Knowledge-Based Economy: New England, 1940-2000, in ENGINES OF ENTERPRISE: AN ECONOMIC HISTORY OF NEW ENGLAND 211-12 (ed. Peter Temin 2000) (DEC founded in 1957 by Kenneth Olsen, a former researcher at MIT; Wang founded in 1951 by former researcher at Harvard).
incumbents such as IBM. 153 Certainly, as DEC and other large Route 128 firms grew, they tended to adopt vertically integrated structures. 154 But it would be inaccurate to describe the Route 128 environment in its heyday as a monolithic industry consisting of 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, 155 observers and studies systematically documented that those firms spawned a continuing flow of small-firm spinoffs. 156 An interview-based study of 22 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.” 157 A study of patent co-authoring 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

153 See Cerruzzi, supra note 151, at 138 (“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”).


156 See Michael H. Best, The New Competitive Advantage: The Renewal of American Industry 129-30 (2001) (describing “genealogies” of firm spinoffs from entrepreneurial “parent” firms in various technology segments of the Route 128 area); Susan Rosegrant & David R. Lampe, ROUTE 128: LESSONS FROM BOSTON’S HIGH-TECH COMMUNITY 154-57 (1992); Dorfman 1983, supra note 75, at 310-11 (noting that DEC, the leading technology firm in the Boston area, had spawned multiple spinoffs, 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 CALIF. MGMT. REV. 160, 167 (1987) (observing that, during the 1960s and 1970s, almost 60 new minicomputer firms were formed, principally by engineers who had worked for DEC and other major minicomputer manufacturers); Roberts, supra note 150, at 252 (observing that 39 companies had been formed during the 1960s by 44 former employees of one Boston area electronics firm).

157 See Dorfman 1983, supra note 75, at 310 (describing a 1977 study by the MIT Center for Policy Alternatives).
Valley. In a manner akin to accounts of Silicon Valley, qualitative histories observe that Route 128 spinoffs could procure necessary inputs from a disaggregated network of small to medium-size component producers and suppliers, assemblers, and distributors. A history of the period concludes: “[C]ompanies spinning 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.”

On the West Coast, Silicon Valley pioneered innovations in the semiconductor field and, by the late 1970s, was the recognized leader. 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. 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. Even after lower-cost Japanese producers in the 1980s undermined the


159 See Franz Todtling, *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 ECONOMY & SOCIETY 25, 45 (1989) [hereinafter “Saxenian 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 fueled an ongoing expansion of technologically innovative activity in the [Route 128] region”); Dorfman 1983, *supra* note 75, at 306 (stating that Boston area provides technology firms with access to a network of parts and components suppliers, “all particularly critical to new start-ups that are developing prototypes and to manufacturers of customized equipment for small markets”).


162 See CERRUZZI, *supra* note 151, at 198.

163 See Kenney & Von Burg, *supra* note 150, at 77 (“In the postwar electronics industry, transistors and then integrated circuits were an enabling technology for nearly every important electronic innovation”).
local memory chip production industry, Silicon Valley adapted by shifting resources to the design and development of customized chips 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. 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 attributed this development to cultural norms and vertically integrated structures that constrained the flow of intellectual capital. 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), 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

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164 See AnnaLee Saxenian, *Regional Networks and the Resurgence of Silicon Valley*, 33 CALIF. MONT. REV. 89, 89-95 (Fall 1990) (describing how firms that specialize in the design of customized chips and outsource production drove Silicon Valley to recover after Japanese firms captured the general-purpose semiconductor markets).

165 See CERRUZZI, supra note 151, at 304-06 (describing how minicomputer companies based in Boston area failed to adapt to the “PC revolution”); Kenney & Von Burg, supra note 150, 87-88 (stating that the minicomputer industry could not compete with “workstations” that offered comparable computing power at substantially lower price); Richard N. Langlois, *Organizing the Electronic Century, in The Third Industrial Revolution in Global Business* 155 (eds. Giovanni Dosi and Louis Galambos 2013) (same).

166 See supra note 8.

markets. 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. 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.

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 “plug and play” hardware systems as the standard product architecture in the computing market. 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. 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. But

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168 See Kenney & Von Burg, supra note 150, at 80 (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”).

169 See Kenney & Von Burg, supra note 150, at 80 (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 1982, supra note 155.

170 See Kenney & Von Burg, supra note 150, at 87 (noting 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); CERRUZZI, supra note 151, at 243-45.

171 See Langlois, supra note 165, at 153-54.

172 See BEST, supra note 156, at 122 (observing that dominant Route 128 firms such as DEC and Wang offered “closed architecture” systems); see also Kenney & Von Burg, supra note 150, at 87 (noting that Wang had dismissed the commercial importance of personal computers).

173 See CERRUZZI, supra note 151, at 277-78; Kenney & Von Burg, supra note 150, at 96.
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 non-proprietary operating system intended to challenge Microsoft’s Windows system. Similarly, some of DEC’s Route 128 peers responded (albeit, somewhat belatedly) to the decline of the minicomputer by adopting alternative organizational structures. Moreover, two Route 128 firms launched the first commercially successful spreadsheet applications (Visicalc, released in 1979, and Lotus 1-2-3, released in 1984), which are recognized as key factors in the widespread adoption of the Mac and PC, respectively. 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 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. 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 spinoffs, talented engineers often

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175 See Todtling, supra note 159, at 332.


177 See James A. Sena, The PC Evolution and Diaspora, CROSSTalk, March/April 2012; Langlois, supra note 165, at 152.

178 See D.A. Garvin, Spin-Offs and the New Firm Formation Process, 25 CALIF. MGMT. REV. 30, 30 (1983) (observing (as of the early 1980s) that, in both Silicon
their employees to form start-ups, and large incumbents were typically parents of multiple spinoff firms.\textsuperscript{179} One observer records that Route 128 firms tolerated or even welcomed the movement of technical personnel “because they value the knowledge they obtain by hiring employees from other firms more than they fear the loss of proprietary information,”\textsuperscript{180} and that entrepreneurs often conceive of ideas “in the lab of an employer.”\textsuperscript{181} That same observer noted that “[n]ew and expanding firms hire their ‘know how’ by bidding experienced employees away from competing firms.”\textsuperscript{182}

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 work—something that would have been unnecessary if noncompetes were legally potent. The lesson seems clear: when technical 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.\textsuperscript{184}

\textsuperscript{179} See Rosegrant & Lampe, supra note 156, at 29, 154-57; Kuhn, supra note 154; Dorfman 1983, supra note 156; Dorfman 1982, supra note 155, at 69. Kuhn observes as follows: (i) “some firms prefer to hire away employees of other computer manufacturing firms,” Kuhn, supra note 154, at 72; (ii) Route 128 has an unusually high turnover rate among its technical employees, see id., at 124-125, and (iii) Route 128 firms provided survey responses indicating heavy reliance on hiring employees from competitors, see id., at 125. Similarly, 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 1983, supra note 75, at 310. 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.

\textsuperscript{180} See Dorfman 1982, supra note 155, at 9.

\textsuperscript{181} See id. at 69.

\textsuperscript{182} See Dorfman 1983, supra note 75, at 308.

\textsuperscript{183} See Kuhn, supra note 154, at 125.

\textsuperscript{184} 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),
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. 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 “prudent man rule” to permit pension fund trustees to invest in venture capital. 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. This change triggered a dramatic inflow of capital into VC investments and, by the late 1980s, the emergence of pension funds as the single largest investor class in VC funds. 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 employers can credibly impose and enforce noncompetes. For discussion, see *Todd v. Exxon Corp. et al.*, 275 F.3d 191, 207-213 (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 spinoffs during this period. See *supra* notes 156-160 and accompanying text.

185 Starr et al. 2018, *supra* note 10, at Fig. 8.


187 See PAUL A. GOMPERS & JOSH LERNER, WHAT DRIVES VENTURE CAPITAL FUNDRAISING? BROOKINGS INSTITUTION 155-56, 163-66 (1998) (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).
venture capital funds, formally establishing an Alternative Investment Management program for this purpose in 1990. 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. VC funds in turn exhibit an in-state bias in the selection of portfolio firms. 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.

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188 See CalPERS Private Equity Investments Infuse Billions into California Businesses, BUSINESS WIRE, October 17, 2003 (noting establishment by CalPERS of Alternative Investment Management Program in 1990 as vehicle for investing in private equity).


191 Although data is not available from the time period in question, to get a sense of the sums involved, consider that, during 2008-14, CalPERS has held between 8.5% and 13.5% of its “private equity” investments in California-based firms. In 2014, it held $31.5 billion of “private equity” investments, of which 11.5% was invested in California-based firms. Sources: CALPERS FOR CALIFORNIA ANNUAL REPORTS (2010-14); CALPERS ANNUAL REPORT (2009); CALPERS ANNUAL REPORT (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 PENSION RESERVES TRUST INVESTMENT 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% of its private equity investments were made outside the U.S. Hence, it is extremely unlikely that Massachusetts pension fund managers invested more capital in Massachusetts-based VC firms, as compared to CalPERS’ investments in California-based VC firms.
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 as uniquely preeminent position, this narrative overstates both Massachusetts’ 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.\textsuperscript{192} 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.\textsuperscript{193} 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.\textsuperscript{194} 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% to 4%, outperforming California in all years but one.\textsuperscript{195} From 1997 through 2016, California and

\textsuperscript{192} See Best, supra note 156, at 121.
\textsuperscript{193} See id. at 117-162.
\textsuperscript{194} National Venture Capital Association, Yearbook (2015), Fig. 3.08-09.
\textsuperscript{195} Authors’ calculations, based on (i) data on state-level R&D expenditures extracted on an alternating year basis from the National Science Foundation, Industrial Research and Development Information System (https://wayback.archive-it.org/5902/20181004145038/https://www.nsf.gov/statistics/iris/search_hist.cfm?id=x6), and (ii) data on “gross state product” available through the Bureau of Economic Analysis (https://apps.bea.gov/regional/histdata/releases/1204gsp/index.cfm). With respect
Massachusetts 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”).\textsuperscript{196} After the San Francisco area, the Boston area is the second-most popular location in the U.S. that companies select for their primary R&D center (selected by 230 firms as of 2011, compared to 380 firms for San Francisco).\textsuperscript{197}

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.\textsuperscript{198} 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.\textsuperscript{199} Notwithstanding Massachusetts’ formal tolerance of noncompetes, multiple leading firms in various information technology sectors have spawned a steady flow of new firms providing complementary


\textsuperscript{198} See BEST, supra note 156, at 156 (describing “resurgence” of Route 128 area as the local technology industry transitioned from vertically integrated to an “open system . . . model of industrial organization”); Michael H. Best, Albert Paquin and Hao Xie, Discovering Regional Competitive Advantage: Massachusetts High-Tech, BUSINESS AND ECONOMIC HISTORY ON-LINE, VOL. 2 (2004), available at http://www.thebhc.org/sites/default/files/BestPaquinXie_0.pdf (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”).

\textsuperscript{199} See BEST, supra note 154, at 121.
products and services. 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 California raised approximately $6 billion). Trade and scholarly commentary typically situates the Boston area among a triplet of leading biotechnology clusters along with the Bay Area and San Diego, in some cases ranking it as the leader among those three locations. 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 (NIH) than California ($88 per capita). During 2012-14, San Francisco firms received each quarter approximately 30-50% of funding in the national life sciences industry while Boston firms received each quarter approximately 20-40% of funding.

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 though its latest

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200 See id., at 129-30.
204 See id.
205 See PriceWaterhouseCoopers, Biotech Funding Surges, Fig. 13 (Feb. 2015), available at http://docplayer.net/20181141-Biotech-funding-surges.html.
In 2018, California ranked fourth, after having held fourth, third and third places in 2016, 2014 and 2012, respectively. 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% (ranked #3); MA: 2.1% (ranked #4)); (ii) patents awarded to companies per 1,000 private-sector workers (CA: 14.5 (ranked #13); MA: 15.7 (ranked #9)); (iii) venture capital invested as a percentage of state GDP (CA: 1.28% (ranked #1); MA: 1.27% (ranked #2)); and (iv) employment in high-technology industries as a percentage of total private-sector employment (CA: 6.8% (ranked #5); MA: 7.9% (ranked #1)).

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. 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

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206 Kevin Klowden, Joe Lee and Minoli Ratnatunga, State Technology and Science Index 2-3 (Milken Institute: Center for Jobs and Human Capital 2018).

207 See Milken Institute, 2018 State Technology and Science Index, State Overall Ranking, http://www.statetechandscience.org/statetech.taf?page=overall-ranking

208 The 2017 State New Economy Index 10, 44, 47, 50 (Information Technology & Innovation Foundation), http://www2.itif.org/2017-state-new-economy-index.pdf?_ga=2.253970945.800548501.1570201113-10410591.1570201113

209 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, Trade Policy Analysis No. 3, Cato Institute (July 31, 1998).
sample of state jurisdictions, seeking to exploit inter-state differences, or intra-state 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. In that review, we describe significant methodological limitations and identify factual errors 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 of whether the enforceability of noncompetes has a detrimental effect on innovation.

1. Non-Experimental 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

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2003 study by Stuart and Sorenson (the “Stuart and Sorenson” study) examined biotechnology startups founded in the wake of an 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 noncompete regimes realize 217 percent higher founding rates than those that enforce noncompete covenants.” Additionally, taking account for state-fixed effects, Stuart and Sorenson find that the median initial public offering (IPO) “occurring in . . . a weak enforcement state increases the founding rate [of new biotech firms] by 26 percent.” Second, a 2011 study by 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 employee. Third, a 2011 study by Samila and 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. Based on these findings, Samila and Sorenson conclude that the enforceability of noncompetes “significantly impedes entrepreneurship and employment growth.” Fourth, a 2015 study by Marx, Singh, and 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. Moreover, the Marx et al. study found that this effect was strongest for more highly skilled inventors. 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

211 See Toby Stuart & Olav Sorenson, Liquidity Events and the Geographic Distribution of Entrepreneurial Activity, 48 ADMIN. SCI. Q. 175, 193 (2003).
212 Id. at 194-195.
213 See Garmaise, supra note 60.
214 See Samila and Sorenson, supra note 9.
215 See id., at 425.
216 See Marx et al. 2015, supra note 210.
217 See id., at 402. Inventive skill is measured by the number of citations to an inventor's patents.
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 12-factor scale developed by Garmaise.218

Specifically, Stuart and Sorenson classify each state as “non-enforcing” or “enforcing.”219 They identify six states that, during the period 1985-1996, purportedly “preclude[d] the enforcement of all noncompete agreements” (emphasis added) and five states that “only enforce[d] non-compete covenants under very specific circumstances.”220 These eleven states are considered “non-enforcing.”221 In contrast, they identify twenty-six “enforcing” states that purportedly placed “no restrictions” on the enforcement of noncompetes (emphasis added), as well as thirteen other “non-enforcing” states that followed a “reasonableness” approach or enforced noncompetes limited in time or space.222 The Samila and Sorenson study as well as the Marx et al. study both rely on Stuart and Sorenson’s classification system for their analysis.223

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

218 See Garmaise, supra note 60; Stuart & Sorenson, Liquidity Events, supra note 210.
219 See Stuart & Sorenson, Liquidity Events, supra note 211, at 55.
220 See id.
221 See id.
222 See id.
223 Samila & Sorenson, supra note 211, at 430; Marx et al. 2015, supra note 210, at 396 n.2.
enforcement of noncompetes, subject to variation in application.224 Even if one were to draw an arbitrary line between states, it would result during this time period in at most two “non-enforcing” states. Consistent with both Norman Bishara’s comprehensive state-by-state review225 and our own independent review, we find that during the relevant time periods, other than California and North Dakota, none of the purported “non-enforcing” 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,226 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 of trade,” which has common origins with California’s statute, Stuart and Sorenson classify it as a state that “precludes the enforcement of all noncompete agreements.”228 Yet, the Malsberger treatise expressly states that “[d]espite subsection 703, Montana courts have upheld restrictive covenants in employment contracts” under a general reasonableness

224 See BRIAN MALSBERGER, COVENANTS NOT TO COMPETE: A STATE-BY-STATE SURVEY (2004) [hereinafter MALSBERGER 2004]; BRIAN MALSBERGER, COVENANTS NOT TO COMPETE: A STATE-BY-STATE SURVEY (1996) [hereinafter 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) [hereinafter Bishara, Fifty Ways] (“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.”).
225 See Bishara, Fifty Ways, supra note 224, at 771-781.
226 See Stuart & Sorenson, Liquidity Events, supra note 211, at 55.
228 See Stuart & Sorenson, Liquidity Events, supra note Error! Bookmark not defined., at 55.
standard.229

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 non-enforcing states lacking statutes—Alaska, Connecticut, Minnesota, and Washington—are misclassified.230 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, respectively.231

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 “non-enforcing” states.232 In these revised models, the results are substantially similar, in some cases, stronger to Stuart and Sorenson’s initial results.233

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 abstracts away from state fixed effects is not determinative because other regional factors may correlate between the weak regime and level of new firm foundings in the region.234 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

229 See Malsberger 1996, supra note 224, at 674-75; see also Dobbins, DeGuire & Tucker, P.C. v. Rutherford, 218 Mont. 392 (1985) (adopting a three-part reasonableness test to determine whether to enforce a noncompete).
230 Specifically, we reviewed Malsberger 1996, supra note 224, at 98-99, 192-94, 604-05, 1136.
231 See Bishara, Fifty Ways, supra note 224, at 771-81 (reviewing Richey and Malsberger’s 1991 treatise on non-compete covenants).
232 E-mail from Olav Sorenson to Ted Sichelman, Oct. 19, 2016 (on file with authors).
233 See id.
234 See Stuart & Sorenson, supra note 211, at 193-94.
California.\textsuperscript{235} This may reflect the fact that the 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 inter-industry acquisitions, this does not account for the quality of the new firms.\textsuperscript{236} 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.\textsuperscript{237} Fourth, even the Bishara scale faces significant methodological limitations and has not been independently verified.\textsuperscript{238}

The Garmaise study replaces the over-simplified binary approach of Stuart and Sorenson with a graduated 12-point scale that assigns equal weight (1 or 0) to the answers (yes/no) to twelve questions based on those in a later version of the Malsberger treatise\textsuperscript{239} regarding the strength and scope of noncompete law in various states.\textsuperscript{240} 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 post-employment consideration in considering the strength of a state’s noncompete regime.

There are other problems with the Garmaise scale.\textsuperscript{241} 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.\textsuperscript{242} Although some very strict states (e.g., California and North Dakota) have adopted statutes, so have some states following the

\textsuperscript{235} E-mail from Olav Sorenson to Ted Sichelman, Oct. 19, 2016 (on file with authors).
\textsuperscript{236} See infra note 300 and accompanying text.
\textsuperscript{237} See id.
\textsuperscript{238} See infra note 285 and accompanying text.
\textsuperscript{239} See MALSBERGER 2004, supra note 224.
\textsuperscript{240} See Garmaise, supra note 60, at 421-22.
\textsuperscript{241} See id.
\textsuperscript{242} See id.
flexible, common law reasonableness standard (e.g., 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.246 For instance, the applicable Malsberger treatise lists no cases in Wisconsin in which a three-year statewide noncompete was upheld;244 rather, the treatise only cites a case in Wisconsin for which a three-year noncompete was found unreasonable.245 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.246

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 of the firm’s customers, not merely customers with whom the employee had direct contact.”247 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

243 See Malsberger 2004, supra note 224; Garmaise, supra note 60, at 422.
244 See Malsberger 2004, supra note 224, at 3332-37.
245 See id. at 3336 (citing Mutual Serv. Cas. Ins. Co. v. Brass, 242 Wis.2d 733 (2001)).
246 See Reiman Assocs., Inc. v. R/A Advertising, Inc., 102 Wis.2d 305 (Wis. Ct. App. 1981) (upholding six-year noncompete as reasonable); Fullerton Lumber Co. v. Torborg, 70 N.W.2d 585, 589-92 (Wis. 1955) (remanded for determination of the extent of time as to which noncompete covenant is reasonable and suggesting that a minimum period of three years would be supported by the evidence).
247 See Garmaise, supra note 60, at 421.
Garmanise. Variation 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 non-enforcing state would not be allowed in any given state. Although it is clearly impossible to achieve such accuracy, neither Stuart and Sorenson nor Garmanise 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. This concern is confirmed by examining the correlations between the available enforcement scales. The correlation between the Stuart and Sorenson binary scale and the Garmanise 12-point scale is only 0.43. Bishara constructs an alternate scale—using seven of the twelve questions in the 1991 Richey and Malsberger treatise and the 2009 Malsberger treatise—which, although it raises similar issues as the Garmanise 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 Garmanise). The correlation between the Bishara and Garmanise scales is 0.66 and the Bishara and Stuart and Sorenson scale is 0.42.

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

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248 Garmanise additionally examines individual changes in law in three states by using time series estimations, see Garmanise, supra note 60, at 390-93, the limitations of which we address in Barnett & Sichelman, supra note 210, Part 3.2.7.

249 See Bishara, Fifty Ways, supra note 98, at 786-87. For an alternate scale modeled on the Bishara scale, see Evan Starr, Natarajan Balasubramanian & Mariko Sakakibara, Screening Spinouts? How Noncompete Enforceability Affects the Creation, Growth, and Survival of New Firms (working paper, 2015) (on file with authors). The Starr et al. and Bishara scales are correlated at 0.94; hence, we ignore the Starr et al. scale.

250 See Brian Malsberger, Covenants Not To Compete: A State-By-State Survey (2009) [hereinafter Malsberger 2009]; Richey & Malsberger, supra note 1 ERROR! BOOKMARK NOT DEFINED.

251 We thank Norman Bishara for providing the data underlying his scale.
different scales, we are doubtful that the results of studies using the Stuart and Sorenson\textsuperscript{252} or Garmaise\textsuperscript{253} scales to measure the effects of noncompetes on labor mobility can be properly relied upon for empirical study.\textsuperscript{254}

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/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.


\textsuperscript{254} Even Sorenson’s revised results are subject to substantial qualifications. See \textit{supra} notes 232-238 and accompanying text. Nor, as far we know, have these revised results been published in any form.
b. Failure to Properly Reflect Cross-Border Enforcement of Noncompetes

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

Marx et al., however, overlook this complexity and erroneously assume that non-enforcing states always apply their own law so as to void a noncompete agreement that falls under the law of another state. Even assuming that Marx et al.’s list of ten “non-enforcing” states is correct—which it is not, as we discussed above—the only non-enforcing states that generally refuse to enforce out-of-state noncompetes on public policy grounds are California and North Dakota. 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.

255 See Marx et al. 2009, supra note 210, at 879-80; Garmaise, supra note 60, at 390 n.9.
256 See Marx et al. 2015, supra note 210, at 396-97.
257 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 (e.g., its state of incorporation or headquarters). See Garmaise, supra note 60, at 390 n.9; Gillian L. Lester & Elizabeth Ryan, Choice of Law and Employee Restrictive Covenants: An American Perspective, 31 COMP. LAB. L. & POL’Y J. 389, 397 (2009) (discussing the situation in which the choice of law clauses selects the place of the employer’s incorporation).
258 We use the 1996 Malsberger treatise to make this determination, see MALSBERGER 1996, supra note 224, at 102, 136-37, 156-57, 201-02, 618, 684, 719, 857-58, 907, 1147, 1160 (citing various cases), as the 2015 Marx et al. study relies on the same treatise to classify state enforcement regimes. See Marx et al. 2009, supra note 210, at 880.
259 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

Electronic copy available at: https://ssrn.com/abstract=3516397
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 the state of the new employer. Although there are important nuances, essentially, whichever court enforces judgment first will typically bind the employee.\textsuperscript{260}

The simplification of these doctrinal complexities in the Marx et al. study renders that study's key assumption—namely, that non-enforcing 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 “non-enforcing” 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. Because Garmaise’s dataset contains only a little over 600 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.

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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, and while there is new evidence regarding noncompete usage (which we discuss below), 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. If firms in different states substantially vary in their propensity to use and enforce noncompetes and noncompete substitutes, and

261 Based on a sample of top-level executives, Garmaise finds a roughly 70% usage rate, see Garmaise, supra note 60, at 396. Based on a sample of CEOs at S&P 1500 companies, Bishara et al., supra note Error! Bookmark not defined., at 2, find an 80% rate. Based on a sample of founders of VC-backed firms Kaplan and Stromberg find a roughly 70% rate. See Steven Kaplan & Per Stromberg, Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts, 70 REV. FIN. STUD. 281, 289 (2003). An IEEE study of engineers reports a 47% rate. See Matt Marx, The Firm Strikes Back: Noncompete Agreements and the Mobility of Technical Professionals, 76 AM. SOC. REV. 695, 702 (2011) [hereinafter Marx, Strikes Back]. A 2015 study finds lower usage rates, reporting about 23% for managers and about 30% in the engineering, computer, and mathematical fields, see Evan Starr, J.J. Prescott & Norman Bishara, Do Noncompetes Chill Employee Mobility? (working paper, 2015) (on file with authors) [hereinafter, Starr et al., Noncompetes Chill]. These differences are arguably explained by the different datasets—the studies by Kaplan and Stromberg, Garmaise, and Bishara et al. focus on the most sophisticated companies, while Starr et al.’s findings are likely more reflective of firms as a whole. Additionally, Garmaise and Bishara et al. focus on top-level executives.  

262 See infra Part III.C.

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. This omission alone can substantially confound any possible causal link between results and noncompete enforceability, usage, and enforcement.

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 over the period 1963-2006. Labor mobility actually increased post-MARA over the full time period from 7.18% to 8.98%, whereas in other “non-enforcing” states there was a larger increase, from 7.95% to 10.80%.

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 non-enforcing states in absolute terms was roughly 1%, 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—

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264 See supra 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, e.g., Mark A. Lemley, Where to File Your Patent Case, 38 AIPLA Q.J. 1 (2010).

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


267 See Marx et al. 2009, supra note 210, at 884.
the purported difference of inventors moving out of Michigan to non-enforcing states pre- and post-MARA is in the range of merely 20-25 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.  

e. Unique Problems of the Michigan Studies

The 2009 and 2015 Marx et al. studies 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 the Michigan Antitrust Reform Act (“MARA”), which restored the enforceability of noncompetes under Michigan law.

The striking results of the Marx et al. 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) to support the view that noncompetes are unwise public policy for

268 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.

269 Marx et al. 2015, supra note 210; see also Marx et al. 2009, supra note 209.

270 Michigan Antitrust Reform Act § 18, MCL § 445.788

271 See, e.g., TREASURY, supra note 34, at 18; WHITE HOUSE, supra note 34, at 6. 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.” See id. This is most likely a somewhat oblique reference to our companion paper on noncompetes. See Barnett & Sichelman, supra note 209.
jurisdictions that seek to cultivate the next Silicon Valley.

However, beyond the serious shortcomings we have already described in these studies, they 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, pre-existing noncompete provisions automatically became enforceable. This is not the case. The study authors appear to overlook that MARA included a “savings clause” that provided that the statute repealed by MARA would “remain in force for the purpose” of enforcing any liability under the repealed act. Consistent with the saving clause, Michigan courts declined to enforce noncompetes that were entered into prior to MARA.

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 was 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 noncompetes—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

272 For instance, the Marx et al. 2015 study states: “Given that the repeal of Public Act No. 305 merely removed the ban and did not stipulate any governing timeframe, all such contracts [i.e., pre-existing noncompetes] would have become immediately enforceable.” Marx et al. 2015, supra note 210, at 386.


274 See, e.g., Compton v. Joseph Lepak, D.D.S., P.C., 397 N.W.2d 311, 316 (Mich. Ct. 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.”).
affected by MARA was small (which impacts the statistical force of the studies’ results)\textsuperscript{275} 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.”\textsuperscript{276} 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 non-retroactive 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.

\textbf{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 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 noncompete enforcement dummy and the level of entrepreneurial activity in the region.”\textsuperscript{277} Stuart and Sorenson’s models that take account of state-level fixed effects do not account for unique within-state, regional omitted variables that may explain the observed patterns, plus are subject to a number of additional limitations.\textsuperscript{278} The Samila and Sorenson study is subject to similar limitations, as well as another endogeneity concern.

\textsuperscript{275} For further discussion, see Barnett & Sichelman, supra note 210, at 22.
\textsuperscript{276} See Marx et al. 2009, supra note 210, at 883.
\textsuperscript{277} See Stuart & Sorenson, supra note 211, at 194.
\textsuperscript{278} See supra notes 232-238 and accompanying text.
Specifically, this study uses the number of patents to measure innovative output, but patenting is in part a substitute for noncompete enforcement.\(^{279}\) Thus, finding increased patenting in states with weak non-enforcement, 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 sub-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 spinoffs 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.\(^{280}\) Thus, it is not surprising that a more recent study finds that, while noncompetes may depress the absolute number of spinoffs, 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.\(^ {281}\) 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,\(^ {282}\) suggesting that noncompetes

\(^{279}\) As noted previously, Agarwal and co-authors found that aggressive patent litigation by U.S. semiconductor firms discourage labor mobility (presumably, because potential new employers fear litigation and elect not to hire from those firms). See supra note 104 and accompanying text.


\(^{281}\) See Evan Starr, Natarajan Balasubramanian & Mariko Sakakibara, Screening Spinouts? How Non-compete Enforceability Affects the Creation, Growth, and Survival of New Firms, 64 MGMT. SCI. 552 (2018) [hereinafter “Starr 2018 et al.”]. Although the Starr study does not compare the total innovative activity of the startups in non-enforcing 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 non-enforcing states.

sometimes support investment incentives consistent with theoretical expectations.

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 “non-enforcing” but does not misclassify any of the “enforcing” states.283 Such misclassification is not random, but rather is a one-way systemic error. Stuart and Sorenson’s misclassification of “enforcing” and “non-enforcing” 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.284

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,285 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 non-retroactivity of Michigan’s change in law via MARA also casts

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283 See Stuart & Sorenson, supra note 211, at 190.
284 See Marx et al. 2015, supra note 210, at 396-97; Marx et al. 2009, supra note Error! Bookmark not defined., at 879-880.
285 See Bishara, Fifty Ways, supra note 224, at 786-87.
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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,” i.e., the signing of a noncompete provision. Such selection would not be random, but instead would turn on factors such as whether the employee was 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—e.g., that noncompetes govern moves outside of an industry, that firm-level usage and enforcement of noncompetes is constant across states, ignoring state-level fixed effects, that executives’ mobility would be prone to court decisions regarding the role of customer lists, and that changes in certain laws were “shocks”—one cannot causally attribute decreases in labor mobility wholly to noncompete enforcement trends.

In sum, of the four major non-experimental 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.\textsuperscript{286} As such, none of these studies can be relied upon for a general assessment of the role noncompetes play in the innovative process.

\textsuperscript{286} See supra notes 232-238 and accompanying text.
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.\textsuperscript{287} 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. Rather, as explain later in the Article, noncompetes will sometimes hinder and sometimes foster innovative activity depending on a variety of contextual circumstances.\textsuperscript{288}

2. Experimental Studies

Amir and 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.\textsuperscript{289} 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% 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 only performs the first round. 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

\textsuperscript{287} See supra notes 252-253 (listing studies relying on flawed scales).
\textsuperscript{288} See Barnett & Sichelman, supra note 210, at 29.
\textsuperscript{289} See Amir & Lobel, supra note 71, at 834-35.
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postemployment contractual restrictions may negatively impact motivation and performance, as evidenced by the greater rates at which individuals abandon tasks."\textsuperscript{290} 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.\textsuperscript{291} Consistent with that theoretical expectation, a study by Starr finds that stronger noncompete enforcement regimes lead to increased employee training.\textsuperscript{292} 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.\textsuperscript{293}

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 non-competitors at any time. Even during the term of a noncompete, an employee can

\textsuperscript{290} See id. at 863.
\textsuperscript{291} See supra Part I.B.2.
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. 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.

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. Even assuming without further examination that noncompetes have some appreciable marginal effect on inventor mobility (a proposition as to which there is considerable doubt), 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

294 See Guido Bünstorf, Christoph Engel, Sven Fischer & Werner Guth, Win Shift Lose Stay – An Experimental Test of Non-Compete Clauses, MPI COLLECTIVE GOODS PREPRINT, No. 2013/17 (2013).

295 For a similar view, see Bishara & Starr, supra note 293, at 498-02 (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).

296 See Barnett & Sichelman, supra note 210, at 29 (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”).
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’ incentive to invest in cultivating employee capital.297 In particular, these recent studies have found that the ability to enforce noncompetes can increase incentives to invest in client retention (and thereby increase overall returns) at medical practices,298 increase capital investment at knowledge-intensive firms while reducing the entry of new firms,299 and result in the establishment of fewer but higher-quality spinoffs from parent firms.300 Another study finds that legal limitations on worker mobility can increase investment at firms that rely on higher-skill workers.301 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

297 See supra Part I.B.
298 See Kurt Lavetti, Carol Simon & William D. White, The Impacts of Restricting Mobility of Skilled Service Workers: Evidence from Physicians (Working Paper 2018), available at http://kurtlavetti.com/UIPNC_vf.pdf. Specifically, the authors find that practices that used noncompetes for physicians enjoyed greater overall returns, even controlling for physician quality and other potentially relevant factor, which the authors attribute to stronger incentives to invest in advertising, and retaining, clients (given the reduced risk of losing clients in the event of a physician departure).
299 See Jeffers, supra note 282.
300 See Starr 2018 et al., supra note 281.
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.  

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, as well as the material uncertainties that we identified in the empirical studies that are routinely cited in support of precluding noncompetes more broadly (and, by implication, other constraints on employee mobility), 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,

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302 For the leading statements of this approach in the antitrust literature, see supra note 36.

303 See supra Part II.B and C.
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 tradeoff 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 only enforced provided the plaintiff shows that the noncompete promoted either the protection of trade secrets or the recovery of a training investment. 304 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.” 305 Such an approach would tend to push the law closer toward full-enforcement.

Figure I: 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

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304 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 an undue hardship on the employee; and (3) is not injurious to the public.” BDO Seidman v. Hirshberg, 93 N.Y.2d 382, 387 (N.Y. 1999).

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. While there are limited exceptions to this principle (for example, the unconscionability doctrine, although courts rarely accept it as a defense), it holds true across contract law as a general matter.

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 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 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

306 See Alan Schwartz & Robert E. Scott, Contract Theory and the Limits of Contract Law, 113 YALE L. J. 541, 546 (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”).
308 See Schwartz & Scott, supra note 306, at 555 (noting that contract law rarely creates “systematic distributional benefits for particular classes of parties”).

Electronic copy available at: https://ssrn.com/abstract=3516397
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 by which 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, non-economic 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 reflective application of the California model to all states and industries.309 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

309 See Gilson, supra note 8, at 629.
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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 finds 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 70-80%. Another study finds comparable usage rates among venture capital-backed firms: using a sample of 213 venture capital investments in 119 firms during 1987-1999, founders were subject to noncompetes in 70.4% (or 73.5% excluding California firms) of total investments. 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%. A recent and much larger study by Evan Starr and colleagues that surveys 11,505 workers across a broader range of industries finds even lower usage rates,

310 See supra note 81 and accompanying text.
312 See Matt Marx, The Firm Strikes Back: Non-compete Agreements and the Mobility of Technical Professionals, 76 AMER. SOC. REV. 695, 702 Tbl. 1 (2011). The sample consisted of 1,029 technical personnel (all members of the Institute of Electrical and Electronics Engineers) from a variety of industries.
reporting usage rates ranging from 26-32% in engineering positions, computer and mathematical positions, information industries, and professional and scientific industries.\textsuperscript{313} 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% of employees who only “work with clients or have client specific information.”\textsuperscript{314}

These data have been cited by scholars and policymakers who argue that significant numbers of employees are “encumbered” by these provisions.\textsuperscript{315} One scholar claims that employees are now stuck in a “thicket” and that “non-compete agreements are now required in almost every industry and position.”\textsuperscript{316} 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 non-enforcement—meaning, that the “real” use of noncompetes is far less 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 spinoffs during the economic

\textsuperscript{314} See id.
\textsuperscript{315} See, e.g., Lobel 2017, supra note 17; White House, supra note 34, at 5-7; Treasury, supra note 34, at 11-13.
\textsuperscript{316} See, e.g., Lobel 2015, supra note 9, at 3.
\textsuperscript{317} See Robert W. Gomulkiewicz, Leaky Covenants-Not-to-Compete as the Legal Infrastructure for Innovation, 49 U.C. Davis L. Rev. 251, 256-57, 277-80 (2015).
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.\textsuperscript{318} 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 \textit{decline} to use or enforce noncompetes.

\textbf{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 non-price 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 post-employment 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.\textsuperscript{319} Based on these expectations, the prospective employee will demand either compensation up-

\textsuperscript{318} \textit{See supra} notes 178-183 and accompanying text.

\textsuperscript{319} \textit{See} Margaret M. Blair, \textit{Firm-Specific Human Capital and Theories of the Firm}, in \textit{Employees and Corporate Governance} 66-67, 72 (Margaret M. Blair & Mark J. Roe, eds., 1999). Oliver Williamson, the originator of the hold-up context in the institutional economics literature, makes the same observation but argues that repeat-play forces would typically dissuade employers from engaging in this behavior. \textit{See} Oliver E. Williamson, \textit{Economic Institutions of Capitalism} 248-49, 259-60 (1985).
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 labor market. 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 most likely given the widespread observations that, in many technology market segments, skilled technical labor is scarce and employers bid aggressively to recruit them. Absent market power, we should therefore expect to observe variation in the mix of post-employment 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 post-employment opportunities at competitors within the

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320 See Blair, supra note 319, at 66. 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 73. Note that assurance of an internal compensation system would only be credible 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.

321 For a review of the evidence, see NATIONAL SCIENCE BOARD, REVISITING THE STEM WORKFORCE 11 (2014).
typical duration of a noncompete.\textsuperscript{322}

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 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. Where 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.\textsuperscript{323} 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.\textsuperscript{324}

While some evidence supports the view that, in certain market segments, noncompete clauses are not typically negotiated,\textsuperscript{325} it

\textsuperscript{322} 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 post-employment opportunities. See Rubin & Shedd, supra note 53, at 86-87. Indeed, a recent study finds that noncompetes are associated with a 5% increase in the likelihood of receiving training on the job. Starr et al. 2018, supra note 10, at 3. 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.

\textsuperscript{323} See White House, supra note 34, at 9-10, Treasury, supra note 315, at 34; Marx, supra note 312, at 696.

\textsuperscript{324} See Bishara & Starr, supra note 293, at 506.

\textsuperscript{325} See Starr et al. 2018, supra note 10, at 3 (finding that “less than 10% of noncompete signers negotiate over contract); Marx, supra note 312, at 706 Tbl. 4 (finding that 31% of surveyed employees received noncompete request prior to job offer, 22% received the request after the offer was accepted but prior to the start
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 agreements are typically entered into with the advice of highly sophisticated counsel specialized in executive compensation matters.\textsuperscript{326} 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.\textsuperscript{327}

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.

\footnote{Statement made based on one of the authors’ personal experience as a practicing transactional attorney.}

\footnote{For the original version of this argument, made in the debate over the efficiency of contracts of adhesion, see Alan Schwartz & Louis A. Wilde, \textit{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 Easterbrook, \textit{Contract and Copyright}, 42 Houston L. Rev. 953, 969-70 (2005). As 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.}
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% of employees earning over $100,000 a year are subject to a noncompete, this is only true of 14% of employees earning up to $40,000. 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;

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(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.329

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 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 a FDA-approved drug,330 product

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329 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 post-employment 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.

development is long (about 10 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 is 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—tends 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.\textsuperscript{331} This observed 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,\textsuperscript{332} 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.

\textbf{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.\textsuperscript{333} 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 (principal, 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 (e.g., below-cost “predatory” pricing).\textsuperscript{334} 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 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 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

\textsuperscript{333} See supra note 36 (listing the leading sources).

\textsuperscript{334} See Easterbook, Limits of Antitrust, supra note 36, at 3.
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. See supra Part I.B.5. 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
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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*.336 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 exhibit a close fit with our best theoretical and empirical understanding—which is to say, our self-acknowledged limited understanding—of the complex efficiency tradeoffs 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.337 Relatedly, we note that the administrative costs under Option III (per se illegality) may in practice be appreciably greater than zero insofar as an especially absolutist ban on non-competes 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.338

In sum, the reasonableness limitations that the common law places on the duration, geographic, and industry scope of noncompete obligations may be interpreted as an indirect instrument 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 the duration, geographic reach, and industry scope, courts may effectively minimize the expected error costs inherent to the enforcement or non-enforcement 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

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337 See supra note 144 and accompanying discussion.
338 See supra notes 27-28 and accompanying text.
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 enforcement [noncompete] . . . agreements.” Based on these types of unqualified statements in the scholarly literature, U.S. Senators have proposed—and multiple state legislatures have already taken or are actively considering—actions to substantially limit or even prohibit noncompetes.

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 both cases. 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. Moreover, more recent empirical work has

339 See Moffat 2010, supra note 9, at 879.
340 See supra notes 17-26 and accompanying text.
341 See supra Part II.A.
342 See supra Part II.B.
uncovered evidence supporting theoretical claims that noncompetes sometimes induce firms to invest in cultivating employees’ human capital.\textsuperscript{343}

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.\textsuperscript{344} 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 tradeoffs raised by noncompetes and other constraints on the mobility of human capital in innovation markets.

\footnote{\textit{See supra} notes 298-301 and accompanying text.}
\footnote{\textit{See supra} Part IV.D.}
### Changes to State Laws Affecting Noncompetes (2014-Present)

<table>
<thead>
<tr>
<th>State (Year)</th>
<th>Change</th>
<th>Reduces Enforceability?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware (2014)</td>
<td>Bars noncompetes for home inspector trainees.</td>
<td>Y</td>
</tr>
<tr>
<td>New Hampshire (2014)</td>
<td>Employee must agree to noncompete prior to start of employment.</td>
<td>Y</td>
</tr>
<tr>
<td>Hawaii (2015)</td>
<td>Prohibits enforcement of noncompetes by “technology businesses”</td>
<td>Y</td>
</tr>
<tr>
<td>Alabama (2016)</td>
<td>Specifically authorizes noncompetes in certain circumstances</td>
<td>N</td>
</tr>
<tr>
<td>Connecticut (2016)</td>
<td>Limits enforceable geographic scope and duration of noncompetes involving physicians.</td>
<td>Y</td>
</tr>
<tr>
<td>Idaho (2016)</td>
<td>Specifically authorizes</td>
<td>N</td>
</tr>
</tbody>
</table>

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): DEL. CODE, TIT. 24 §4109; N.H. REV. STAT. ANN. § 275:70; ARK. CODE. ANN. §4-75-101 (2015); HAW. REV. STAT. ANN. § 480-4; ALA. CODE § 8-1-190; CONN. GEN. STAT. §§ 20-14P; IDAHO CODE ANN. § 44-2704(6); 820 ILL. COMP. STAT. ANN. 90/10; OR. REV. STAT. § 653.295; UTAH CODE ANN. § 34-51-201; CAL. LAB. CODE § 925; NEV. REV. STAT. §613,195; C.R.S. § 8-2-113; NEB. REV. STAT. § 87-404(2); MGL c.149, §24L; Substitute H.B. 1450, 66th Leg., Reg. Sess. (Wash. 2019); CT. GEN. ASSEMBLY, BILL NO. 7424 (JAN. SESS. 2019); ME.STAT. TIT. 26 §599-A(1); ANN. CODE. MD. §3-716 (AS AMENDED); N.H. REV. STAT. ANN. § 275-70-a (AS AMENDED); N.D. LEGISLATIVE BRANCH, H.B. 1351; R.I. GEN. LAWS 28-58-1, et seq.

Electronic copy available at: https://ssrn.com/abstract=3516397
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<thead>
<tr>
<th>State</th>
<th>Reform Characteristics</th>
<th>Enforceable(Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois (2016)</td>
<td>Bars noncompetes for “low-wage” employees</td>
<td>Y</td>
</tr>
<tr>
<td>Oregon (2016)</td>
<td>Maximum term of noncompete limited to 18 months</td>
<td>Y</td>
</tr>
<tr>
<td>Utah (2016)</td>
<td>Maximum term of noncompete limited to 12 months</td>
<td>Y</td>
</tr>
<tr>
<td>California (2017)</td>
<td>Limits ability of employers to require employees to litigate disputes outside of California or under the laws of another state.</td>
<td>Y</td>
</tr>
<tr>
<td>Nevada (2017)</td>
<td>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.</td>
<td>Y, N³⁴⁶</td>
</tr>
<tr>
<td>Colorado (2018)</td>
<td>Bars noncompetes for physicians</td>
<td>Y</td>
</tr>
<tr>
<td>Idaho (2018)</td>
<td>Repeals Idaho 2016 statute relating to noncompetes</td>
<td>Y</td>
</tr>
<tr>
<td>Nebraska (2018)</td>
<td>Provides that arbitrator or court may “reform” noncompete provisions in a franchise agreement</td>
<td>N³⁴⁷</td>
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</tbody>
</table>

³⁴⁶ 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.

³⁴⁷ 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.
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<table>
<thead>
<tr>
<th>State (Year)</th>
<th>Change in Noncompete Law</th>
<th>Enforcement Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utah (2018)</td>
<td>Curtails enforcement of noncompetes in the broadcasting industry.</td>
<td>Y</td>
</tr>
<tr>
<td>Massachusetts (2018)</td>
<td>Prohibits noncompetes for employees subject to the Fair Labor Standards Act and all other employees terminated without cause.</td>
<td>Y^348</td>
</tr>
<tr>
<td>Washington (2019)</td>
<td>Imposes high salary and compensation minimums on employees and contractors who may be subject to noncompetes; sets presumptive 18 month limit on term; requires agreement at time of acceptance of employment or additional compensation; requires additional payment to employees terminated without cause.</td>
<td>Y</td>
</tr>
<tr>
<td>Connecticut (2019)</td>
<td>Bars noncompetes in home health services industry.</td>
<td>Y</td>
</tr>
<tr>
<td>Maine (2019)</td>
<td>Bars noncompetes for certain lower-wage workers and, in all cases, requires that employers disclose noncompete prior to offer of employment.</td>
<td>Y</td>
</tr>
<tr>
<td>Maryland (2019)</td>
<td>Bars noncompetes for certain lower-wage workers.</td>
<td>Y</td>
</tr>
</tbody>
</table>

North Dakota Clarifies that “goodwill sale” N

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^348 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 supra note 143 and accompanying text.
(2019) exception to ban on noncompetes can extend to firm's partners, members or shareholders.

Rhode Island (2019) Bars noncompetes for certain lower-wage workers, employees subject to the Fair Labor Standards Act, students and workers age 18 or younger. Y