

## Does Enforcement of Employee Noncompete Agreements Impede the Development of Industry Clusters?

By David A. Price

Employee noncompete agreements are widespread among technical workers and managers in technology companies. Policies regarding the enforcement of these agreements vary among states, however. The rise of the technology industry cluster in Silicon Valley and the car industry cluster in the Detroit region occurred during periods when California and Michigan courts did not enforce noncompete agreements. Research has sought to determine the extent to which enforcement of noncompetes may suppress the formation of industry clusters by restricting labor mobility and entrepreneurship.

Policymakers have long been interested in fostering the formation and growth of industry clusters—what Alfred Marshall in 1890 called “the concentration of specialized industries in particular localities.”<sup>1</sup> An array of federal, state, and local programs is aimed at doing so.<sup>2</sup> This interest is perhaps unsurprising since the iconic example of clustering, California’s Silicon Valley, has long been synonymous with economic growth and technological innovation. Located in an area that was largely agricultural in the 1940s, Silicon Valley now has the second-highest concentration of high-income households in the United States.<sup>3</sup> There is evidence that industry clusters in general are associated with higher employment growth, wage growth, startup activity, and patenting within the clustered industry.<sup>4</sup> Moreover, local service and retail firms benefit from the economic activity generated by the industry’s highly paid employees.

This *Economic Brief* discusses research suggesting that state policies on postemployment

noncompete agreements, commonly known as “noncompetes,” may affect the development of industry clusters. These agreements prohibit a worker whose employment has ended from going to work for a competitor of his or her former employer, usually within a specified geographic area and for a period of one to two years. Surveys indicate that between 50 percent and 90 percent of technical and managerial employees in technology companies are subject to one.<sup>5</sup>

### Theoretical Effects of Noncompetes

In terms of economic theory, the net effect of the enforcement of noncompetes is ambiguous. On the positive side, enforcement may encourage employers to make more investments in the human capital of their workers, such as training programs. This is because employers are more likely to make such investments if they believe workers are less likely to move to competitors. In addition, violation of a noncompete is generally easier to detect than the use of a past employer’s intellectual property; to the extent that

noncompete enforcement protects the intellectual property of firms more effectively than other methods, such as patent and trade secret protection, enforcement may encourage firm entry and creation of intellectual property. (Conversely, it is possible that strong trade secret protection could partly offset the effect of nonenforcement of noncompetes, although such protection likely would be a weak substitute given the greater difficulty of learning about trade secret violations.)

On the negative side, just as enforcement may encourage greater human capital investment by firms, it may discourage self-investment in human capital by workers because enforcement reduces their ability to capture gains from that investment.<sup>6</sup> More importantly, enforcement may directly suppress cluster development through several mechanisms. First, by restricting the movement of workers, it limits diffusion of knowledge among an area's firms (known in the literature as "knowledge spillovers").<sup>7</sup> Second, it may limit pooling of skilled workers, possibly suppressing wages of those workers and discouraging their entry into the region. Finally, for the duration of their noncompetes, enforcement may deter workers from founding spinoffs.

Although the magnitude of the effect of noncompetes on startups and on cluster development is not known, it is a concern because spinoffs have been found to perform better than other startups, on average, in a range of industries, from disk drive manufacturing to hedge fund management to fashion design.<sup>8</sup> Research on agglomeration in the Silicon Valley computer and information technology cluster and the Detroit region's automotive cluster indicates that spinoffs—and, by implication, the noncompete enforcement policies of California and Michigan at the relevant times—had an important role in the economic rise of those regions.

### **Noncompete Policy and Practice**

The enforcement of noncompetes is determined by the laws of each state rather than by federal law. The courts of nearly all states enforce noncompetes. A somewhat simplified description of typical state law in this area is that courts will enforce a noncompete

if they find the restriction "reasonable" as to geographic area and duration.<sup>9</sup> In such a case, the employer can obtain an injunction barring its former employee from working for the competitor and, if appropriate, obtain an award of damages from the employee. Within these general rules, there is variation among enforcing states with regard to such questions as the determination of reasonableness, the burden of proof regarding reasonableness, and the availability of punitive damages.

In practice, however, employers rarely need to bring legal action; research indicates that the fear of a noncompete being invoked may be enough to ensure compliance. Based on a survey of 1,029 technology professionals and on interviews with a separate group of 52 such professionals, Matt Marx of the Massachusetts Institute of Technology found that even without actual legal action, many workers under a noncompete who changed jobs went so far as to take career detours by switching industries in response to the noncompete; one-quarter of the survey respondents who were bound by a noncompete and changed jobs reported taking such a detour, as did one-third of the interviewees.<sup>10</sup>

The reported experiences of Marx's survey respondents help illuminate the circumstances in which employees enter into noncompetes. Only 30.5 percent of the respondents who were presented with noncompetes received them at the time of their job offers. Some 22.2 percent received them after accepting offers, but before starting work (and thus possibly after giving notice to their current firms). A little under half (45.3 percent) entered into noncompetes on or after their first day with their new employers. One possible interpretation of these results is that workers do not view noncompetes as burdensome: having knowledge of the prevalence of noncompetes in their industries, they nonetheless often accept job offers without demanding to see the terms of their noncompetes. Another interpretation is that employers present new hires with noncompetes after acceptance of job offers to take advantage of various frictions, such as the hires' eagerness to join the firms and their limited ability to bargain after giving notice to their current employers.

Three states are outliers in their noncompete policies: California, North Dakota, and Oklahoma have blanket bans on enforcement of noncompetes.<sup>11</sup> Also, Michigan banned enforcement from 1905 until 1985.<sup>12</sup> California's ban has been on its statute books since it attained statehood in 1872.<sup>13</sup> Thus, the growth periods of both the Silicon Valley and Detroit clusters took place under unusual legal regimes in which employers could not use noncompetes to prevent employees from moving to competitive firms or starting competitive firms.

### **Spinoffs in the Development of Silicon Valley**

Silicon Valley, a region centered in the northern Santa Clara Valley near San Francisco, takes its name from the semiconductor cluster that transformed it into a major industrial and commercial hub in the 1960s and 1970s. This cluster was preceded by local manufacturing of vacuum tubes, microwave electronics, and test equipment, activities that were encouraged by Stanford University's electrical engineering department. But Silicon Valley's turning point occurred in large measure through serendipity—namely, the decision of William Shockley, former leader of the Bell Labs team that had invented the transistor, to locate his new semiconductor company in a place where he could live near his mother and his childhood environs of Palo Alto.<sup>14</sup> At the time, in 1955 and 1956, there were no other semiconductor manufacturers in the region; the industry was concentrated in New York, Los Angeles, and Boston.<sup>15</sup>

Many of Shockley's technical staff, recruited from across the country, became displeased with his management. Eight of them, including five with science Ph.D. degrees, left in 1957 to start a competing semiconductor operation, Fairchild Semiconductor, which was funded by Fairchild Camera and Instrument. The Fairchild team patented what would become the preferred form of integrated circuit—the planar integrated circuit—in 1959 and brought the first integrated circuit product to market in 1961.

Later in the 1960s, waves of Fairchild executives, engineers, and production managers defected to various startup competitors in Silicon Valley. Among these so-called "Fairchildren" was Intel, the company

that would later invent the microprocessor. By 1976, according to one count, at least 29 Silicon Valley semiconductor startups had one or more founders who had previously worked for Fairchild.<sup>16</sup>

The employees joining these competitors commonly received significant grants of stock options from their new employers, a practice that Fairchild and other established companies had extended only to senior management. Such grants, which typically vest over a period of three to five years, have become a common means for high-technology firms to recruit and retain workers. Christophe Lécuyer of Université Pierre et Marie Curie, a historian of the industry, has written that the broad distribution of stock options—a development brought about indirectly by Silicon Valley's fluid labor market—was an important innovation in itself; it reduced the division between managerial and technical employees, gave technical employees a more entrepreneurial point of view, and helped Silicon Valley attract top talent from around the country.<sup>17</sup>

Silicon Valley had started as a laggard in semiconductors relative to several other regions in 1955, but two decades later, it represented some 43 percent of the industry's output. At that point, the top five Silicon Valley semiconductor companies were Fairchild and spinoffs of Fairchild (in one case, a spinoff of a spinoff).<sup>18</sup>

The continued success of Silicon Valley's high-mobility model after 1975 is highlighted by comparison with the computer technology cluster around Boston's Route 128. Companies in the Route 128 corridor, as in the rest of Massachusetts, could obtain enforcement of noncompetes. Unlike in Silicon Valley, computer technology executives there tended to prefer long-term corporate career paths and to regard job-hopping as disreputable.<sup>19</sup> It is not clear how much this attitude was fostered by the fact that noncompetes, or at least the fear of them, rendered the job-hopping path and the spinoff path more difficult. Still, the economic benefits of the high-mobility model are suggested by the contrasting courses of development of the two regions, as described by April Franco and Matthew Mitchell of the University

of Toronto: "In 1965, Route 128 had approximately three times more technology employment compared to Silicon Valley. But by 1975, Silicon Valley's employment had quintupled, while Route 128 had only tripled, resulting in 15 percent higher total employment in Silicon Valley. From 1975 to 1990, Silicon Valley had tripled Route 128's new job creation."<sup>20</sup>

Franco and Mitchell characterize the overtaking of Route 128 by Silicon Valley as "remarkable" and suggest, on the basis of a model of employee mobility and spinoff formation, that it can be explained by the difference in noncompete policy.

### **Spinoffs in the Development of Detroit**

Like Silicon Valley, the Detroit region was not initially a leader in its industry. At the outset of the U.S. auto industry in the late 1890s, New York and Chicago accounted for a larger share of auto manufacturers than Detroit.<sup>21</sup> Yet by 1920, Detroit was clearly dominant, with the highest share of manufacturers by far and 70 percent of total output. This record reflects the success of the Detroit cluster in surviving industry-wide shakeouts that reduced the number of automakers from its peak of 200 in 1910 to eight in the 1940s.

The evolution of the Detroit cluster resembles that of the Silicon Valley cluster in that many of its entrants were spinoffs—with the departing employees unconstrained by noncompetes. For example, employees of General Motors (GM) spun off 10 auto manufacturers between 1909 and 1924, including Chevrolet (later absorbed back into GM), Chrysler, and Lincoln.<sup>22</sup> Four of these spinoffs yielded second-generation spinoffs.

According to research by the late Steven Klepper of Carnegie Mellon University, Michigan's car industry had a total of 59 spinoffs, which made up 44 percent of all entrants. No other state's car industry had nearly as many spinoffs; the closest states in terms of share of entrants, Indiana and Pennsylvania, had 16 spinoffs and 11 spinoffs, respectively, amounting to 23 percent and 21 percent of their entrants. Klepper found that in Detroit, as in Silicon Valley, the superior performance of its cluster was the result of superior

performance by its spinoffs, specifically the spinoffs "that were descended from the leading firms."<sup>23</sup>

Research by Zhu Wang of the Richmond Fed, Luís Cabral of New York University, and Daniel Xu of Duke University has sought to break down the relative extent to which various factors contributed to the formation of clusters in the early U.S. car industry. As detailed in an earlier *Economic Brief*, "Explaining an Industry Cluster: The Case of U.S. Car Makers from 1895–1969" (October 2012), they found that the presence of other car makers, by itself, did not appear to increase firm entry rates or decrease exit rates. They did find evidence that the presence of a related industry—the older carriage and wagon industry, which was present to varying degrees in most states with a significant car cluster—seemed to bring spillovers that were beneficial to the clusters. As one would expect, access to input materials was also important. With respect to spinoffs, the researchers concluded that spinoffs accounted for around one-third of the clustering in the car industry and that spinoffs were more likely to survive than other firms.<sup>24</sup>

### **How General Are the Silicon Valley and Detroit Experiences?**

To what extent can economists and policymakers extrapolate from the formation of Silicon Valley and the Detroit region's auto cluster? As an empirical matter, the question is fraught with issues of multiple causation. In recent years, researchers have studied the effects of noncompete agreements using models that incorporate national data on states' enforcement policies; the findings of this research point in more than one direction.

With regard to human capital investment by firms, research has borne out the prediction of economic theory—that is, enforcement does, in fact, encourage firm-sponsored training and similar investments. Evan Starr of the University of Michigan found that a one-standard-deviation increase in the level of enforceability leads to a 3 percent increase in firm-sponsored training for occupations in which noncompete litigation is most prevalent.<sup>25</sup> These findings are consistent with evidence from European countries indicating that employers tend to fund more general

training (in other words, training in transferable skills) if they have less cause to fear that employees will be poached by competitors.<sup>26</sup>

Other research implies that enforcement may reduce human capital self-investment by high-level employees. Mark Garmaise of the University of California, Los Angeles considered the effects of noncompete enforcement on the pay and mobility of executives at large public corporations; he found that the more stringently a state allows enforcement of noncompetes, the longer executives' tenures at their companies tend to be, the less their compensation, and the greater the use of salary compensation over alternatives such as stock options. Garmaise suggested that these results may have stemmed from executives in higher-enforcement states investing less in their own human capital and that their self-investments were more important than the firms' investments in them.<sup>27</sup>

Looking at the effect of noncompetes on the incentives of established firms to innovate, a study by Raffaele Conti of Bocconi University in Milan concluded that enforcement, by enabling firms to capture more securely the fruits of their innovations, may encourage those firms to pursue higher-risk research and development projects.<sup>28</sup>

With regard to the effects of enforcement on start-up entry, research by Sampsa Samila of the National University of Singapore and Olav Sorenson of Yale University found that in states where enforcement of noncompetes is barred or relatively more restricted, an increase in the local supply of venture capital has greater positive effects on the number of patents, on the number of firm starts, and on employment.<sup>29</sup>

Another such effort, by Starr, Natarajan Balasubramanian of Syracuse University, and Mariko Sakakibara of the University of California, Los Angeles found that stricter noncompete enforcement reduces the number of spinoffs. They also found, however, that the prospective spinoffs that do overcome the barriers posed by noncompetes tend to have a higher survival rate and tend to grow faster. They posited that the entry barriers from noncompetes, such as litigation and the fear of litigation as well as higher

recruiting costs, create a screen that favors spinoffs with higher-quality ideas and more resources.<sup>30</sup> They also found that spinoffs in states with enforcement were more likely to come from small parent firms, perhaps because those parent firms are less likely to pursue enforcement litigation.

Finally, MIT's Marx, Jasjit Singh of INSEAD, and Lee Fleming of Harvard University analyzed patent data from 1975 to 2005 and found a "brain drain" of employees who were inventors (patent holders) from states that enforce noncompetes to those that do not enforce them; the brain drain was greatest among the highest-performing inventors.<sup>31</sup> The researchers took advantage of the natural experiment presented by Michigan's 1985 policy change—from nonenforcement to enforcement—to attempt to tie the causation of the moves to noncompete policy. To control for the influence of separate factors specific to changes in the auto industry during the period, they also conducted their analysis without auto-related patents and reached similar results. They also repeated their analysis with four other states with industrial centers (Illinois, New York, Ohio, and Pennsylvania), two of them in the Midwest near Michigan, using their model and found no evidence of a brain drain in those states during the period following Michigan's policy change.

The role of spinoffs in the Silicon Valley and Detroit clusters is an area of continuing study, as are the economic effects of noncompetes more generally. While the experiences of these clusters are suggestive, the influence of noncompetes may be sensitive to characteristics of the industry in question and the stage of the cluster's development. Further research could shed light, as well, on the role of labor mobility and other mechanisms in enabling clusters to reinvent themselves, as in the case of Silicon Valley's successful diversification from reliance on semiconductor production to computer systems and software production and, more recently, Internet services. ■

**David A. Price is a senior editor in the Research Department at the Federal Reserve Bank of Richmond.**



## Endnotes

- <sup>1</sup> Marshall, Alfred, *Principles of Economics*, London: Macmillan and Co., 1890.
- <sup>2</sup> At the federal level, such programs include Economic Development Agency grants to regional cluster efforts, the Small Business Administration's Regional Clusters Initiative, and the Department of Energy's Energy Innovation Hubs. See Chatterji, Aaron, Edward L. Glaeser, and William R. Kerr, "Clusters of Entrepreneurship and Innovation," National Bureau of Economic Research Working Paper No. 19013, May 2013, pp. 23–25. The America COMPETES Reauthorization Act of 2010, Section 603, established a regional innovation program within the Department of Commerce to make grants and loan guarantees to "support the development of regional innovation strategies, including regional innovation clusters and science and research parks."
- <sup>3</sup> See Bee, Charles Adam, "The Geographic Concentration of High-Income Households: 2007–2011," U.S. Census Bureau American Community Survey Brief, February 2013, p. 7.
- <sup>4</sup> Delgado, Mercedes, Michael E. Porter, and Scott Stern, "Clusters, Convergence, and Economic Performance," National Bureau of Economic Research Working Paper No. 18250, July 2012.
- <sup>5</sup> See Marx, Matt, "The Firm Strikes Back: Non-Compete Agreements and the Mobility of Technical Professionals," *American Sociological Review*, October 2011, vol. 76, no. 5, pp. 695–712; also see Samila, Sampsa, and Olav Sorenson, "Non-Compete Covenants: Incentives to Innovate or Impediments to Growth," *Management Science*, March 2011, vol. 57, no. 3, pp. 425–438.
- <sup>6</sup> See Franco, April M., and Matthew F. Mitchell, "Covenants not to Compete, Labor Mobility, and Industry Dynamics," *Journal of Economics & Management Strategy*, Fall 2008, vol. 17, no. 3, pp. 581–606; also see Garmaise, Mark J., "Ties that Truly Bind: Noncompetition Agreements, Executive Compensation, and Firm Investment," *Journal of Law, Economics and Organization*, 2011, vol. 27, no. 2, pp. 376–425.
- <sup>7</sup> On the role of job-hopping in diffusion of innovations in the information technology industry, see Tambe, Prasanna, and Lorin M. Hitt, "Job Hopping, Information Technology Spillovers, and Productivity Growth," *Management Science*, February 2014, vol. 60, no. 2, pp. 338–355.
- <sup>8</sup> Regarding the disk drive industry, see Christensen, Clayton M., "The Rigid Disk Drive Industry, 1956–90: A History of Commercial and Technological Turbulence," *Business History Review*, Winter 1993, vol. 67, no. 4, pp. 531–588. Regarding the hedge fund industry, see de Figueiredo Jr., Rui J.P., Philipp Meyer-Doyle, and Evan Rawley, "Inherited Agglomeration Effects in Hedge Fund Spawns," *Strategic Management Journal*, July 2013, vol. 34, no. 7, pp. 843–862. Regarding the fashion industry, see Wenting, Rik, "Spinoff Dynamics and the Spatial Formation of the Fashion Design Industry, 1858–2005," *Journal of Economic Geography*, September 2008, vol. 8, no. 5, pp. 593–614.
- <sup>9</sup> For recent tables of noncompete enforcement rules across all 50 states, see Kesan, Jay P., and Carol M. Hayes, "The Law and Policy of Non-Compete Clauses in the United States and Their Implications," In Marilyn Pittard et al. (eds.), *Business Innovation and the Law*, Cheltenham, U.K.: Edward Elgar Publishing, 2013, pp. 400–404; and Beck, Russell, "Employee Noncompetes: A State by State Survey," Beckreedriden.com/50-state-noncompete-survey, updated August 14, 2013.
- <sup>10</sup> Marx (2011)
- <sup>11</sup> Kesan and Hayes (2013); Beck (2013)
- <sup>12</sup> See Marx, Matt, Jasjit Singh, and Lee Fleming, "Regional Disadvantage? Non-Compete Agreements and Brain Drain," Manuscript, July 7, 2011, pp. 5–6.
- <sup>13</sup> See Gilson, Ronald J., "The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants not to Compete," *New York University Law Review*, June 1999, vol. 74, no. 3, pp. 575–629. The background to the adoption of the ban is set out by Gilson at pp. 613–619.
- <sup>14</sup> Berlin, Leslie, *The Man Behind the Microchip: Robert Noyce and the Invention of Silicon Valley*, Oxford, U.K.: Oxford University Press, 2005, p. 56.
- <sup>15</sup> See Klepper, Steven, "The Origin and Growth of Industry Clusters: The Making of Silicon Valley and Detroit," *Journal of Urban Economics*, January 2010, vol. 67, no. 1, pp. 15–32.
- <sup>16</sup> Franco and Mitchell (2008), pp. 582–583
- <sup>17</sup> See Lécuyer, Christophe, *Making Silicon Valley: Innovation and the Growth of High Tech, 1930–1970*, Cambridge, Mass.: MIT Press, 2006, pp. 265, 300.
- <sup>18</sup> Klepper (2010), p. 20
- <sup>19</sup> See Saxenian, AnnaLee, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, Mass.: Harvard University Press, 1994, pp. 62–63.
- <sup>20</sup> See Franco and Mitchell (2008), p. 582; also see Gilson (1999).
- <sup>21</sup> See Cabral, Luís, Zhu Wang, and Daniel Yi Xu, "Competitors, Complementors, Parents and Places: Explaining Regional Agglomeration in the U.S. Auto Industry," Manuscript, August 2014, p. 5.
- <sup>22</sup> Cabral, Wang, and Xu (2014), p. 7
- <sup>23</sup> Klepper (2010), p. 29
- <sup>24</sup> Cabral, Wang, and Xu (2014)
- <sup>25</sup> See Starr, Evan, "Training the Enemy? Firm-Sponsored Training and the Enforcement of Covenants Not to Compete," Manuscript, April 23, 2014. For evidence that noncompete enforcement improves the position of physicians working in institutions, particularly in jobs where patient relationships are somewhat transferable, see Lavetti, Kurt, Carol Simon, and William D. White, "Buying Loyalty: Theory and Evidence from Physicians," Manuscript, October 10, 2014.
- <sup>26</sup> See Muehlemann, Samuel, and Stefan C. Wolter, "Firm-Sponsored Training and Poaching Externalities in Regional Labor Markets," *Regional Science and Urban Economics*, November 2011, vol. 41, no. 6, pp. 560–570; also see Brunello, Giorgio, and Francesca Gambarotto, "Do Spatial Agglomeration and Local Labor Market Competition Affect Employer-Provided Training? Evidence from the UK," *Regional Science and Urban Economics*, January 2007, vol. 37, no. 1, pp. 1–21.
- <sup>27</sup> Garmaise (2011)
- <sup>28</sup> Conti, Raffaele, "Do Non-Competition Agreements Lead Firms to Pursue Path-Breaking Inventions?" Presentation at the DRUID 2011 Conference, Copenhagen Business School, Denmark, June 15–17, 2011.

<sup>29</sup> Samila and Sorenson (2011)

<sup>30</sup> Starr, Evan, Natarajan Balasubramanian, and Mariko Sakakibara, "Enforcing Covenants Not to Compete: The Life-Cycle Impact on New Firms," Manuscript, June 15, 2014.

<sup>31</sup> Marx, Singh, and Fleming (2011)

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