



Utrecht University

School of Economics

The Case against Non-Compete Agreements

Erik Stam



Utrecht University School of Economics (U.S.E.) is part of the faculty of Law, Economics and Governance at Utrecht University. The U.S.E. Research Institute focuses on high quality research in economics and business, with special attention to a multidisciplinary approach. In the working papers series the U.S.E. Research Institute publishes preliminary results of ongoing research for early dissemination, to enhance discussion with the academic community and with society at large.

The research findings reported in this paper are the result of the independent research of the author(s) and do not necessarily reflect the position of U.S.E. or Utrecht University in general.

U.S.E. Research Institute

Kriekenpitplein 21-22, 3584 EC Utrecht, The
Netherlands Tel: +31 30 253 9800, e-mail:
use.ri@uu.nl www.uu.nl/use/research



U.S.E. Research Institute
Working Paper Series 19-20

The Case against Non-Compete Agreements

Erik Stam
Utrecht School of Economics
Utrecht University

December 2019

Abstract

This paper reviews the empirical evidence on the economic effects of non-compete agreements. Non-compete agreements are supposed to be an incentive compatible mechanism to enhance employer investments in employee human capital. This micro mechanism is thought to stimulate macroeconomic performance. The review shows that noncompetes are a significant constraint on labour mobility. This serves the interest of incumbent firms, but constrains the founding and growth of new innovative firms. These new innovative firms develop and diffuse new knowledge that challenge the position of incumbents. The net macroeconomic effect is likely to be negative when dynamic efficiency is severely harmed due to the microeconomic constraints on labour market mobility. Labour market policy for a dynamic knowledge based economy should more explicitly balance the 'traditional' legal protection for human capital investments on the one hand against innovation resulting from employee mobility on the other hand. In this way positive spillovers can be enhanced and negative spillovers can be constrained more effectively.

Keywords: Non-compete agreement, noncompetition agreements, non-compete covenants, noncompete covenants, noncompetes, covenants not to compete

JEL classification: D86, G31, J33, J62, K12

Comments welcomed to: f.c.stam@uu.nl

The Case against Non-Compete Agreements

1. Introduction

Non-compete agreements are supposed to be an incentive compatible mechanism to enhance employer investments in employee human capital. This micro mechanism is thought to stimulate macroeconomic performance. Do these claims still hold in knowledge based economies? In knowledge based economies the development and diffusion of new knowledge has become more important, which may be severely constrained by labour market institutions like non-compete agreements. The net macroeconomic effect of the use of non-compete agreements may be negative when dynamic efficiency is severely harmed due to the microeconomic constraints on labour market mobility.

Non-compete agreements are contracts between an employer and employee prohibiting the practice of a trade or profession for a specified time in a specified region after termination of employment. It is used to preclude that employees will go to competitors, or become competitors (with a newly founded organization), to prevent the leakage of sensitive information, and to maintain continuity in the organization of work and the relation with customers. Even though there can be substantial overlap in practice, non-competes should be distinguished from “non-disclosure agreements” which prohibit former employees from using or disclosing the employer’s confidential or proprietary information, intellectual property rights, “non-solicitation covenants” which prohibit former employees from soliciting the employer’s prospects and customers, and “non-raiding clauses” which prohibit former employees from hiring the employer’s other employees. This means that investments in knowledge, human capital and customer relations can be safeguarded with other legal instruments than non-compete agreements.

To what extent are these noncompetes prevalent in society, and how strong is their enforcement? A recent study by Starr et al. (2015) (based on a large online survey) reveals that one in four workers in the US have ever signed a noncompete, and 12.3% are currently working under one. Of those with college education or above, one in five are currently subject to a noncompete agreement. The occupations in which noncompetes appear most frequently are engineering (30%) and computer and mathematical occupations (28%), though they are prevalent in typically lower-skilled occupations as well: office support (9%), installation and repair (11%), production occupations (11%), and personal services (12%). About 80% of newly hired IT professionals in the US are asked to sign non-compete agreements (Holley 1998), and almost 70% of entrepreneurs receiving venture capital finance are required to sign non-compete agreements by the venture capital firms (Kaplan and Stromberg 2003). According to Simon and Loten (2014), noncompetes are a very frequently used type of contract for CEOs and even on the rise: 72% of the CEO level contracts in the US were accompanied by non-compete agreements in 2000 (cf. Garmaise 2011), increasing to almost 90% in 2008. A recent study by Bishara et al. (2015) amongst CEOs of large firms in the US, shows that 80% of the CEO employment contracts contain noncompetes, often with a broad geographic scope, and that these generally last one to two years. In the period 2000-2008 the published court decisions for non-compete

agreement cases has increased from about 400 per year in 2000, to about 700 in 2008. However, popular wisdom states that only half of the agreements being signed would survive a courtroom showdown (Seligman 2004). Some say this is even a public problem, because it is rather unpredictable which noncompete clauses will be enforced (O'Malley 1999; Hyde 2010).¹

In 2009, 23% of the employees in the Netherlands have a labour contract that includes a noncompete clause, which has increased from about 15-20% in 1997 (Ecorys 2009). A noncompetes clause is relatively more prevalent amongst advisors (70%), employees in business services in general, and amongst employees with high incomes. Self-employed are more likely to have had a noncompetes clause than employees. For most (90%) employees that leave their job, the noncompete clause is not made relevant. However, for the 10% of the employees that are faced with their noncompetes clause, about 80% is sanctioned by their employer (8% of the total population). About 1.5% of all employees that leave their job go to court to dispute their noncompetes, which might add up to about 10,000 court cases on noncompetes per year in the Netherlands only (Ecorys 2009).

Noncompete clauses have a long history. For example, in the profession of physicians courts have been asked to evaluate the validity of covenants not to compete already since the early fifteenth century (Lowry 2003: 215):

Physicians with established practices use these covenants to prevent their physician employees from competing with them after employment has terminated. Typically, a relatively inexperienced physician will work for an experienced physician for a few years and then open his or her own practice, which will compete directly with the former employer. To combat this practice, mentor physicians include covenants not to compete in their employment contracts. After the protégé leaves the mentor's practice, the covenant usually places limitations on practice options, with particular emphasis on the scope of the employee physician's activities, the locations where the former employee may not open a practice, and the duration of these restrictions.

There is still substantial debate in the profession of physicians about the pros and cons of noncompete agreements (see e.g. Di Dio 1999; Beauchamp et al. 2014). The benign rationale behind noncompetes is that they enable investments in human capital of employees by their employers, making sure that the returns can be appropriated by the employer: an incentive compatible mechanism. The less benign, short term rationale for the employer is to make sure that he does not create his own competitors from within.²

¹ Only about 10% of workers who have signed a non-compete in the US ever try to argue over it, with most assuming that it is either not negotiable or that doing so would cause tension with an employer (Starr et al. 2015). In the Netherlands, only 10% of workers who have signed a non-compete agreement are confronted with this when they leave their employer, with 8% of workers being confronted with a strict enforcement.

² One might wonder why noncompetes are signed by employees if they are not advantageous for them. However, Marx (2011) found that in nearly 70% of cases, the worker was asked to sign the non-compete after accepting the job offer, and, consequently after having turned down (all) other offers, putting the worker in a weak bargaining position. Ex-post bargaining might also be in the disadvantage of the employee, as it is likely that the employee is facing more liquidity constraints than the employer (cf. Rauch and Watson 2015).

From a legal perspective, for a covenant not to compete to be valid, the covenant must first pass the hurdle of protecting a valid protectable interest. If there is a valid protectable interest, then the court will look to the reasonableness of the covenant. The common-law test to determine the reasonableness of restraint is that the restraint cannot be greater than is needed to protect (1) the employer's legitimate interest, (2) the employer's need is not outweighed by the hardship to the employee, and (3) the covenant is not likely to harm the public (Lowry 2003). The reasonableness of a restrictive covenant is a question of law to be decided by a court. This judgement takes into account the interests of the employer, the employee, and the public. Subsequently, courts look to the reasonableness of the three elements of time, space, and scope (Lowry 2003). Of the three types of interests involved, the public interest is probably most difficult to delineate (WRR 2012). In the context of noncompetes, this public interest comprises broad concepts like externalities, social welfare, but also more limited issues like (the unethical effect of) harm done to doctor-patient relations (Beauchamp et al. 2014).³

From an economic perspective the question is what the micro and macroeconomic effects are of the design and enforcement of noncompetes. The microeconomic effects include consequences for individual (labour) careers and firm performance, while macroeconomic effects include regional and national performance.

Noncompetes are obviously expected to constrain labour mobility, in order to ensure that the returns of human capital investments by the employer can also be appropriated by the employing organization, or at least not by competing organizations. One interpretation stemming from incentive theory is that these clauses might be in place to mitigate holdup problems in general human capital investment. For example, if a law firm makes a large investment to train an associate, this investment could be lost if the associate leaves and a noncompete clause might be useful to alleviate this holdup. This effect may be especially relevant for professions in which partnerships are an important organizational form, as noncompetes provide stability to these professional partnerships (Levin and Tadelis 2005). Den Hertog (2003) argues that noncompetes can be used as a device to self-select employees who desire a long-term contract with the firm, and that the legal restrictions on noncompetes have the danger of decreasing the ex-ante value of the employment relationship, resulting in lower investments and lower wages. However, no empirical evidence is provided for this argument.

These arguments on noncompetes providing an incentive compatible mechanism (i.e. both employees and employers gain through this mechanism) focus on the bilateral, static efficiency of the noncompete agreement. More recent studies suggest that this constraint on labour mobility will thwart the development of new business ideas (if the employee has new business ideas, but they are not allowed to be pursued by her employer), which is likely to lower the dynamic efficiency of the aggregate economy. This effect includes a barrier to innovative entry into product markets, as a consequence of a barrier to exit in labour markets. Subsequently, new innovative entrants in a

³ Fairness considerations also play a role with employers' and employees' interests, for example can be claimed that noncompetes are unethical for early career professionals that are in search for new positions outside their current employers, or for people with short term temporary employment contracts.

product market are also constrained in their hiring of employees, because these are 'locked in' their current employer's organization. This is an element of a broader negative effect of suboptimal job matching (Helsley and Strange 1990; Kerr 2010). Cooper (2001) argues that non-competes are a double-edged sword if all firms use them: each firm gets to keep its own employees but cannot get other firms' employees. The resulting labor allocation is sub-optimal. Given the relative inert nature of incumbents in general (Utterback 1994; Christensen 1997), and their lower inclination to invest in new products that might cannibalize their current markets (Arrow 1962), this means that noncompetes contribute to a status quo bias that is harmful for new challengers in the economy (see Klepper 2009; Nooteboom and Stam 2008; Jacobs and Theeuwes 2005). Last but not least, one might also expect a lower level of individual investments in human capital, due to lower labour market mobility (Diamond and Simon 1990; Rotemberg and Saloner 2000). This latter effect might counteract the increased investments in human capital, for which the noncompetes were allowed to be enforced in the first place.

The aggregate effect is likely to be the outcome of positive and negative effects on the micro level plus systemic effects, making the net aggregate effect an empirical question. Even though a substantial empirical evidence base has emerged on the relations of noncompetes with all kind of economic outcomes, the net aggregate effect of all these hypothesized relations remains a topic of debate. In the next section of this paper we review and discuss the state of the art with respect to the empirical evidence on the economic effects of noncompetes.

2. Empirical evidence on the economic effects of noncompetes

In this section we provide an overview of empirical scientific studies on the economic effects of noncompetes. We emphasize the realisticness of the findings, and thus disregard theoretical studies. However, theoretical studies may provide important inputs to empirical studies: for example Meccheri (2009) shows with a theoretical model that noncompetes increase incentives to provide general training, but reduce those related to specific training, which is largely confirmed by the empirical study of Garmaise (2011). In addition, Franco and Mitchell (2008) theorize that noncompetes may be essential during emergent stages of a new industry to stimulate both (de novo) entry and innovation, because the value that firms can appropriate in regions with strong enforcement of noncompetes is higher than that in regions where noncompetes are not allowed. They argue that greater protection of intellectual property creates a greater reward (both for incumbents and de novo entrants). There is no empirical evidence for this argument; there is only empirical evidence that strong enforcement of noncompetes leads to riskier R&D projects (Conti 2014). However, in a later industry stage, when spin-off firms become more important (see Klepper 2011), entry is likely to be constrained by strong enforcement of noncompetes, as is confirmed by the empirical studies of Filson and Gretz (2004) and Samila and Sorenson (2011).

We used the TOPIC search terms "noncompetes", "noncompetition clauses", "noncompetition agreements", "non-compete agreements", "noncompete agreements" and "covenants not to compete" in the Web of Science database (October 2018). This resulted in 96 documents (76 articles, 9 editorial materials, 2 reviews, 1 proceedings

paper, 1 book chapter and 1 letter) over the period 1956-2018. The documents can predominantly be found in the law discipline (41), followed by economics (15), business finance (15), management (13), business (10), veterinary sciences (5), psychology applied (5), ethics (3), engineering mechanical (3), sociology (1), operations research management science (1), environmental studies (1), planning development (1).

The three most cited articles by far are Gilson, RJ (1999) The legal infrastructure of high technology industrial districts: Silicon Valley, Route 128, and covenants not to compete (*New York University Law Review* 74.3: 575-629; cited 225 times), Fallick, B, Fleischman, CA, Rebitzer, JB (2006) Job-hopping in Silicon Valley: Some evidence concerning the microfoundations of a high-technology cluster (*Review of Economics and Statistics* 88.3: 472-481; cited 146 times), and Marx, M, Strumsky, D, Fleming, L (2009) Mobility, Skills, and the Michigan Non-Compete Experiment (*Management Science* 55.6: 875-889). The fourth most cited article received 143 citations. We have analysed these 96 documents for answering our research question ‘What are the effects of noncompetes on micro and macroeconomic performance?’. Only 25 documents discuss micro and macroeconomic empirical effects (see table 1 in the appendix for a detailed overview).

Which of the hypothesized effects of noncompetes are traced by empirical evidence? First of all, there is strong evidence for the direct negative effect of noncompetes on labour mobility within the jurisdiction involved. In addition there is evidence that jurisdictions with strong enforcement of noncompetes push inventors to other jurisdictions, especially jurisdictions that do not enforce noncompetes (Marx et al. 2015). A strict enforcement of noncompetes also limits the geographical diffusion of knowledge from university research (Belenzon and Schankerman 2013). If we take this labour mobility constraining effect as given, the subsequent effects concern investments in human capital and knowledge investments more broadly, and outputs in the form of patents and entry of (innovative) firms. The only positive effect of noncompetes is the increase of employer investments in human capital of employees⁴ (Garmaise 2011). However, this positive effect is counterbalanced by lower employee investments in human capital (Garmaise 2011) and lower motivation of employees (Amir and Lobel 2014). In addition, noncompetes reduce capital expenditures per employee, but has no net effect on state level R&D investments (Garmaise 2011). Even though noncompetes do not seem to effect overall levels of R&D investments, Conti (2014) found out that it does effect the nature of R&D projects: with lower levels of labour mobility, firms are more likely to invest in high-risk R&D projects. Several studies show the negative effect on the number of (innovative) start-ups⁵ (Samila and Sorenson 2011; Filson and Gretz 2004; Gilson 1999), and also on the mobility of employees from incumbents to start-ups, incurring a double negative effect on the development of new ideas beyond the boundaries of incumbents. In addition, Samila and Sorenson (2011) found negative effects on the number of patents and overall employment on the regional level.

⁴ In a recent working paper Starr (2015) shows that increases in noncompete enforcement leads to an increase in firm-sponsored training for occupations that are likely to experience noncompete litigation. Among these occupations, the effect is strongest in the high earning, high skill occupations.

⁵ The findings of a working paper by Starr et al. (2014) suggest that states that permit stronger enforcement of noncompete agreements tend to have fewer – but better (higher-quality ideas and more likely to survive) – startups.

Even though there is a substantial number of empirical studies on the economic effects of noncompetes, all these studies are based on US data. This means that there is a US bias in the empirical evidence base. This calls for more research on noncompetes in other country settings, with their own specific institutional set-up. Noncompetes are allowed in all European countries, which makes it hard to analyse their micro and macroeconomic effects. However, there are research opportunities to uncover how different designs of noncompete regulation and enforcement lead to different economic outcomes.

3. Policy implications

Labour market policy has significant direct and indirect economic effects. An important barrier to the employment growth of new firms is regulation that constrains the flexibility of labour markets, like strict employment protection legislation and non-compete agreements. In this paper we have focused on the economic effects of noncompetes. The question is what the policy implications are of the insights we gained with the review of empirical studies. Depending on the political system in a country, labour market institutions are designed and implemented on the national, regional or municipal level: for example, in the US the state level is likely to be most relevant, while in the EU the country level is likely to be most relevant.

The policy implications of our findings depend on the policy goals that have been prioritized in the political process. It is likely that from a public choice point of view the employers have been best organized to prioritize their goal of limiting competition via public policy. Even though in general employers prefer flexibility of workers in the labour market, they might not prefer the mobility caused by the abolishment of noncompetes. The groups in favour of this abolishment of noncompetes (highly skilled workers) are not well organized, and the most important groups against the abolishment of noncompetes, the employers' organizations, are well organized. Another group in favour of maintaining noncompetes may be the legal profession, since their income is positively affected by the legal services needed to settle disputes around noncompetes.

From a broader social welfare perspective, taking into account both static and dynamic efficiency effects on the aggregate level, there is a good case for rethinking the enforcement of noncompetes. There seems to be sufficient evidence that they do more harm than good overall. These negative effects of noncompetes seem to affect the more collaborative and high impact workers disproportionately, making it even more urgent to rethink the presence of noncompetes.

The practical policy question is what kind of changes should be implemented. There are several options. First, the period of enforcement could be shortened (from two years to one year or six months). Second, the scope of application could be narrowed (to more specific professions or sectors). Third, the consequences should be more balanced between employer and employee, by for example also giving the employer the duty to pay for the opportunity costs caused to the employee, when the noncompete is enforced. Fourth, and most radical (and perhaps with the largest direct reduction of legal costs in society), a wholesale abolishment of noncompetes. A more limited version of this fourth

option has been implemented in the Netherlands in 2014 for employees with temporary labour contracts, for whom non-compete agreements are only allowed in very restrictive cases.

Non-compete agreements make it hard for employees that want to pursue innovative ideas with their own business in the same or a related market of their employer. Empirical research has shown that the abolishment of these non-compete agreements takes away the barriers for innovative high potential start-ups (Fallick et al. 2006; Gilson 1999; Garmaise 2011; Marx et al., 2009; Samila and Sorenson 2011). However, one should be careful in implementing this as a one-size-fits-all policy. The regional or national context is an important contingency in the effectiveness of these labour market policies: Fallick et al. (2006) argued that the regional benefits of labour mobility in Silicon Valley (partly enhanced by California's policy not to enforce non-compete agreements) depended on the benefits from shared tacit knowledge outweighing losses from reduced employer incentives to invest in human capital. The advantage of abolishing non-compete agreements thus might depend on local industry characteristics (i.e., a high density of similar or related industries).

Changes in labour market institutions are likely to be less successful in areas where regional, national, and supra-national policies are potentially conflicting with the proposed policy change. For example, local initiatives for fostering high-growth entrepreneurship may be more difficult where the national regulations protect employment (Henrekson et al. 2010, Bosma and Levie 2010), or put disproportionate burdens on firms beyond a certain firm size (Braguinsky et al. 2011; Garicano et al. 2012). One example in this respect is the underdevelopment of the high-tech industry in Ontario (Canada) in spite of high levels of R&D at local universities and firms, high flows of venture capital, and active support from the local government. According to Samila and Sorenson (2011: 25), 'part of the answer may reside in the way common law in Canada effectively bars management-level employees from leaving to competing firms, even in the absence of actual non-compete clauses.' This observation also calls for more detailed studies on how the design and implementation of non-compete and related laws varies by jurisdiction (either regionally or nationally), especially given the dominance of studies based on data from the US context.

In addition, the nature of knowledge production, capital markets and product markets is likely to be an important context condition enabling or constraining the effects of changing labour market policies with relation to noncompetes. These dynamic efficiency effects are likely to be more positive in a context in which new ideas are produced on a larger scale (by public and private investments in new knowledge), with capital markets that provide finance to innovative projects, and a competition policy that constrains the market power of incumbents.

Finally, one should take into account sector specificities. Low levels of knowledge investments and subsequent spillovers are to be expected in knowledge extensive sectors (like cleaning services and low knowledge complementarity sectors (like temporary staffing). Bishara (2006) makes a related typology of workers, making a distinction between creative and service employees within knowledge intensive sectors: creative workers are characterized by a high level of general (non-firm specific) human

capital, while service workers also have a high level of human capital, but they are likely to use firm specific knowledge to provide valuable services. He argues that the category of service workers is more legitimately constrained by noncompetes than creative workers.

The size and direction of the effect of abolishing noncompetes are likely to be influenced by the dominant investment horizons: long investment horizons in sectors like oil and gas, and short in ICT. In sectors with short investment horizons the mobility of human capital may be welfare enhancing, while mobility in sectors with long investment horizons may frustrate these investments leading to welfare destroying effects.

4. Conclusions: noncompetes in a dynamic knowledge based economy

Advanced capitalist economies have gone through a transition from the managed economy in which large organizations and rather stable employment relations dominated, to a dynamic knowledge based economy in which knowledge development, circulation and application has become central (Audretsch and Thurik 2001; Foray 2004; Thurik et al. 2013). On the one hand, the traditional incentive alignment mechanism of noncompetes (stimulating employers to invest in the human capital of their employees, to the benefit of both parties involved) might be a relic of the past managed economy, with lifelong contracts between employers and employees, which does not apply anymore in highly flexible labour markets, with low employer commitment and low employment protection. On the other hand, investments in intangibles, like knowledge, have become ever more important, and protecting these investments has also gained more importance, for example with constraining the mobility of embodied knowledge via noncompetes. The institutions that served the managed economy might become a constraint in dynamic knowledge based economies. This means that institutions, like labour market institutions should be aligned with the changes occurring in the economy. Protecting investments in intangible assets has remained, or perhaps become more important⁶, but so does the circulation and innovative application of knowledge outside the originating organization.

Labour market policy for a dynamic knowledge based economy may involve a more explicit decoupling of trade secret and intellectual property protection from employee noncompete law (cf. Fisk 2001; Garrison and Wendt 2008). Trade secrets and intellectual property protection are not considered a legitimate interest justifying an employee noncompete agreement. Trade secrets would continue to be protected from actual or threatened misappropriation under confidentiality agreements and trade secret laws. Most importantly, courts would be empowered to prevent employment of a former employee under the inevitable disclosure doctrine. Also intellectual property right protection should be made easy, especially for small and young firms that traditionally do not have the means to safeguard their intellectual property. Such a labour market policy approach would support a climate of employee mobility and knowledge circulation and application while providing firms with an appropriate level of protection

⁶ Labour market policy for a dynamic economy might also involve a more explicit consideration of the ownership of knowledge resources on the level of the individual and the level of the firm, based on the resource-based theory of the firm (Bishara and Orozco 2012).

for their intangible assets. This serves firms on the short run, but especially on the long run as using noncompetes to restrict employee mobility may backfire on the long run and result in a stagnant labour pool and a lack of knowledge circulation and application.

Labour market policy for a dynamic knowledge based economy should more explicitly balance innovation from employee mobility (as is evidenced by a substantial number of empirical studies) against the ‘traditional’ legal protection for human capital investments, and in this way enhance positive spillovers and constrain negative spillovers.

References

- Amir, O. and Lobel, O. (2014) How noncompetes stifle performance. *Harvard Business Review* Jan-Feb: 26.
- Arrow, K. (1962) Economic welfare and the allocation of resources for invention. in: *The Rate and Direction of Inventive Activity: Economic and Social Factors*, Princeton University Press, Princeton, NJ. pp. 609-625.
- Audretsch, D.B. and Thurik, A.R. (2001) What is New about the New Economy: Sources of Growth in the Managed and Entrepreneurial Economies. *Industrial and Corporate Change* 10(1): 267-315.
- Beauchamp, M.B., Benson, S.S. and Daniel, LW (2014) Why the doctor will not see you now: the ethics of enforcing covenants not to compete in physician employment contracts. *Journal of Business Ethics* 119(3): 381-398.
- Belenzon, S. and Schankerman, M. (2013) Spreading the word: geography, policy and knowledge spillovers. *Review of Economics and Statistics* 95(3): 884-903.
- Bishara, N. (2006) Covenants Not to Compete in a Knowledge Economy: Balancing Innovation from Employee Mobility Against Legal Protection for Human Capital Investment. *Berkeley Journal of Employment and Labor Law* 27(2).
- Bishara, N.D. and Orozco, D. (2012) Using the Resource-Based Theory To Determine Covenant Not To Compete Legitimacy. *Indiana Law Journal* 87(3): 979-1031.
- Bishara, N. D., Martin, K. J., and Thomas, R. S. (2015) An Empirical Analysis of Noncompetition Clauses and Other Restrictive Postemployment Covenants. *Vanderbilt Law Review* 68: 1-51.
- Boettke, P.J. and Coyne, C.J. (2003) Entrepreneurship and development: Cause or consequence? In: Koppl, R., Birner, J. and Kurrild-Klitgaard, P. (ed.) *Austrian Economics and Entrepreneurial Studies (Advances in Austrian Economics, Volume 6)* Emerald Group Publishing Limited, pp.67 – 87.
- Bosma, N. and Levie, J. (2010) *Global Entrepreneurship Monitor: 2009 global report*. Global Entrepreneurship Research Association.
- Braguinsky, S., Branstetter, L.G. and Regateiro, A. (2011) The Incredible Shrinking Portuguese Firm. *Nation Bureau of Economic Research Working Paper No. 17265*.
- Christensen, C.M. (1997) *The innovator's dilemma: when new technologies cause great firms to fail*. Boston: Harvard Business School Press
- Conti, R. (2014) Do non-competition agreements lead firms to pursue risky R&D projects? *Strategic Management Journal* 35(8): 1230–1248.
- Cooper, D.P. (2001) Innovation and Reciprocal Externalities: Information Transmission via Job Mobility. *Journal of Economic Behavior & Organization* 45(4):403-425.

- Den Hertog, J. (2003) Noncompetition Clauses: Unreasonable or Efficient? *European Journal of Law and Economics* 15(2):111-127.
- Diamond, C. and Simon, C. (1990) Industrial specialization and the returns to labor. *Journal of Labor Economics* 8: 175–201.
- Di Dio, A.S. (1999) The legal implications of noncompetition agreements in physician contracts, *Journal of Legal Medicine* 20(4): 457-477.
- Doepke, M. and Zilibotti, F. (2014) Culture, Entrepreneurship, and Growth. In: *Handbook of Economic Growth*, edition 1, volume 2, pp. 1-48 Elsevier.
- Ecorys (2009) *Het concurrentiebeding in de praktijk*. Ecorys: Rotterdam.
- Fallick, B., Fleischman, C. A. and Rebitzer, J. B. (2006) Job-hopping in Silicon Valley: Some Evidence Concerning the Microfoundations of a High-Technology Cluster. *Review of Economics and Statistics* 88: 472–481.
- Filson, D. and Gretz, R.T. (2004) Strategic innovation and technology adoption in an evolving industry. *Journal of Monetary Economics* 51(1): 89–121.
- Fisk, CL (2001) Working knowledge: Trade secrets, restrictive covenants in employment, and the rise of corporate intellectual property, 1800-1920. *Hastings Law Journal*
- Foray, D. (2004) *The Economics of Knowledge*. Cambridge, MA: MIT Press.
- Franco, AM; Mitchell, MF (2008) Covenants not to compete, labor mobility, and industry dynamics. *Journal of Economics & Management Strategy*
- Freeman, R. B. (2009) Labor regulations, unions, and social protection in developing countries: market distortions or efficient institutions? (No. w14789). National Bureau of Economic Research.
- Garicano, L., LeLarge, C. and Van Reenen, J. (2012) Firm Size Distortions and the Productivity Distribution: Evidence from France. Centre for Economic Performance Discussion Paper No. 1128.
- Garmaise, M. J. (2011) Ties That Truly Bind: Noncompetition Agreements, Executive Compensation and Firm Investment. *Journal of Law, Economics, and Organization* 27(2): 376–425.
- Garrison, M.J. and Wendt, J.T. (2008) The evolving law of employee noncompete agreements: Recent trends and an alternative policy approach. *American Business Law Journal* 45(1): 107–186.
- Gilson, R. J. (1999) The Legal Infrastructure of High Technology Industrial Districts: Silicon Valley, Route 128, and Covenants Not to Compete. *New York University Law Review* 74: 575–629.
- Helsley, R.W. and Strange, W.C. (1990) Matching and agglomeration economies in a system of cities. *Regional Science and Urban Economics* 20(2): 189-212.
- Henrekson, M. and Johansson, D. (2009) Competencies and Institutions Fostering High-Growth Firms. *Foundations and Trends in Entrepreneurship* 5(1): 1–80.
- Henrekson, M., Johansson, D. and Stenkula, M. (2010) Taxation, Labor Market Policy and High-Impact Entrepreneurship. *Journal of Industry, Competition and Trade* 10(3): 275–296.
- Holley, R. (1998) Looking at the legalities of non-compete agreements. *Computer Reseller News* 800, 139.
- Jacobs, B. and Theeuwes, J. (2005) Innovation in the Netherlands: The Market Falts and the Government Fails. *De Economist* 153(1): 107-124.

- Hyde, A. (2010) Should Noncompetes Be Enforced? New empirical evidence reveals the economic harm of non-compete covenants. *Regulation*, Winter 2010-2011, 6-11.
- Kaplan, S.N. and Strömberg, P. (2003) Characteristics, Contracts and Actions: Evidence from Venture Capitalist Analyses. SIFR Research Report Series 14, Institute for Financial Research, Stockholm.
- Kerr, W.R. (2010) Breakthrough Inventions and Migrating Clusters of Innovation. *Journal of Urban Economics* 67(1): 46–60.
- Klepper, S. (2009) Spinoffs: A Review and Synthesis. *European Management Review* 6: 159–171.
- Klepper, S. (2011) Nano-economics, Spinoffs, and the Wealth of Regions. *Small Business Economics* 37: 141–154.
- Kobeissi, N., Sun, X.A. and Wang, H.Z. (2010) Managerial labor-market discipline and the characteristics of merger and acquisition transactions. *Journal of Business Research* 63(7): 721–728.
- Levin, J. and Tadelis, S. (2005) Profit Sharing and the Role of Professional Partnerships. *The Quarterly Journal of Economics* 120(1): 131-171.
- Lowry, J.W. (2003) Covenants not to compete in physician contracts - Recent trends defining reasonableness at common law. *Journal of Legal Medicine* 24(2): 215-232.
- Marx, M., Strumsky, D. and Fleming, L. (2009) Mobility, Skills, and the Michigan Noncompete Experiment. *Management Science* 55(6): 875–889.
- Marx, M. (2011) The firms strike back: post-employment restraints and the inalienability of expertise. *American Sociological Review* 75(5): 694–712.
- Marx, M., Singh, J. and Fleming, L. (2015). Regional disadvantage? Employee non-compete agreements and brain drain. *Research Policy* 44(2): 394-404.
- Meccheri, N (2009) A note on noncompetes, bargaining and training by firms. *Economics Letters* 102(3): 198–200.
- Mezrich, J.L. and Siegel, E.L. (2014) Noncompete Clauses: A Contract Provision That Has Exhausted Its Usefulness? *Journal of the American College of Radiology* 11(2): 145–152.
- Nooteboom, B. and Stam, E. (2008) *Micro-Foundations for Innovation Policy*. Amsterdam: Amsterdam University Press.
- North, D.C. (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge University Press: Cambridge.
- O'Malley, C.M. (1999) Covenants Not to Compete in the Massachusetts Hi-Tech Industry: Assessing the Need for a Legislative Solution. *Boston University Law Review* 79: 1217-1227
- Rauch J.E. and Watson, J. (2015) Client-Based Entrepreneurship. *Journal of Law, Economics and Organization* 31(1): 30-60.
- Rotemberg, J. and Saloner, G. (2000) Competition and human capital accumulation: A theory of interregional specialization and trade. *Regional Science and Urban Economics* 30: 373–404.
- Samila, S. and Sorenson, O. (2011) Noncompete Covenants: Incentives to Innovate or Impediments to Growth? *Management Science* 57(3): 425–438.
- Seligman, D. (2004) The Case For Servitude. *Forbes* <http://www.forbes.com/forbes/2004/0301/070.html> accessed February 24th, 2015

- Simon and Loten (2014) Litigation Over Noncompete Clauses Is Rising. Wall Street Journal
<http://www.wsj.com/articles/SB10001424127887323446404579011501388418552> accessed February 27th, 2015
- Starr, E. (2015) Training the Enemy? Firm-Sponsored Training and the Enforcement of Covenants Not to Compete. Working paper University of Illinois at Urbana Champaign.
- Starr, E., Bishare, N. and Prescott, J.J. (2015) Noncompetes in the U.S. Labor Force. Working paper University of Michigan.
- Starr, E., Balasubramanian, N. and Sakakibara, M. (2014) Enforcing Covenants Not to Compete: The Life-Cycle Impact on New Firms. Working paper.
- Thurik, A.R., Stam, E. and Audretsch, D.B (2013) The Rise of the Entrepreneurial Economy and the Future of Dynamic Capitalism. *Technovation* 33(8–9): 302–310.
- Utterback, J. (1994) *Mastering the dynamics of innovation*. Boston: Harvard Business School Press.
- WRR (2012) *Publieke zaken in de marktsamenleving*. WRR-rapport nr. 87. Den Haag: Wetenschappelijke Raad voor het Regeringsbeleid.

Appendix

Table 1. Overview of empirical scientific studies on the economic effects of noncompetes

Authors	Research context	Findings	Remarks
Marx, Singh & Fleming 2015	Effect of non-compete agreements on interstate employee mobility by exploiting Michigan's apparently inadvertent 1985 reversal of its non-compete enforcement policy as a natural experiment.	Enforceable employee non-compete agreements not only reduce within-state mobility among firms, but also induce inventors to exit the state. These exiting inventors migrate specifically to states where employee non-compete agreements are unenforceable. More valuable workers (elite inventors) are more substantially affected by non-competes	These results indicate that employee non-compete agreements not only reduce the local circulation crucial to labour pooling and knowledge spillovers, but also that such contracts drive an across-state “brain drain” of talent.
Mezrich & Siegel 2014	Radiologists (survey, N=21); US	Noncompetes are still widely used and are still being enforced in many courts, and thus constrain labour mobility in the same profession in the same region.	Teleradiology is common, and improvements in telecommunications and portable devices allow radiologists to perform their services virtually anywhere. ⁷ In light of these changes, are noncompetes still necessary for radiologists? Contracts should specifically address teleradiology in noncompetes provisions.
Conti 2014	US patent applications from 1990 to 2000, longitudinal variation in the enforcement of non-compete clauses per US state	States with stricter enforcement, companies undertake riskier R&D paths than in states that do not enforce non-compete agreements as strictly.	Non-competition agreements, by reducing outbound mobility and knowledge leakages to competitors, make high-risk R&D projects relatively more valuable than low-risk ones. Thus, they induce companies to choose riskier R&D projects, such that corporate inventions are more likely to lie in the tails of the inventions' value distribution (as breakthroughs or failures) and be in novel technological areas.
Amir & Lobel 2014	Large scale experiment (N=1028) mimicking conditions of	Sixty-one percent of the subjects in the noncompete group gave up on their task (thus forgoing payment), compared with only 41% in the control group. Among the subjects who completed the matrix	

⁷ More in general, it is not clear what the effect is of ICT-enabled expanded market reach (Mezrich and Siegel 2014) and globalization (Pagnattaro 2007) on the enforcement of noncompetes.

	noncompetes in the context of creative behavior	task, people with noncompete conditions were twice as likely to make mistakes as people in the control group. Those who were restricted also skipped more items and spent less time on the task—further indications of low motivation.	
Belenzon & Schankerman 2013	Knowledge spillovers (citations to university patents and scientific publications) in US States.	The geographical constraints on knowledge spillovers from university research are stronger in states with strong noncompete labour laws, which is also confirmed with studying a policy reform in Michigan.	
Marx 2011	In-depth interviews with 52 randomly sampled patent holders in the US automatic speech recognition industry, coupled with a US survey of 1,029 engineers across a variety of industries	Ex-employees subject to non-competes are more likely to take career detours—that is, they involuntarily leave their technical field to avoid a potential lawsuit. Firms strategically manage the process of getting workers to sign such contracts, waiting for workers' bargaining position to weaken.	
Garmaise 2011	Time-series and cross-sectional variation in the enforceability of these contracts across US states	Tougher noncompetition enforcement promotes executive stability. Increased enforceability also results in reduced executive compensation and shifts its form toward greater use of salary. Stricter enforcement reduces capital expenditures per employee. These results are consistent with a model in which enforceable noncompetition contracts encourage firms to invest in their managers' human capital. On the other hand, our findings suggest that these contracts also discourage managers from investing in their own human capital and that this second effect is empirically dominant. The overall effect on R&D investments is null.	
Samila & Sorenson 2011	Panel study of metropolitan areas in the United States from 1993 to 2002.	Enforcement of noncompete clauses significantly impedes entrepreneurship and employment growth: relative to states that enforce noncompete covenants, an increase in the local supply of venture capital in states that restrict the scope of these agreements has significantly stronger positive effects on (i) the number of patents, (ii) the number of firm starts, and (iii) employment.	
Kobeissi, Sun & Wang 2010	Study of how state regulation of noncompetition agreements affects merger and acquisition activity in US states	Stricter enforcement of noncompetition agreements significantly reduces the likelihood of using stock in takeovers and the premiums paid for targets. Stronger enforcement of noncompetition agreements is related with more favourable market reactions for large acquirers.	Underlying reasoning: Noncompetition agreements put restrictions on postemployment activities, thereby reducing management mobility and forcing top managers to bear the long-term

			consequences of their corporate decisions. State regulation of noncompetition agreements functions as a mechanism to align management's interests with those of the shareholders when management makes major corporate decisions.
Marx, Strumsky & Fleming 2009	Effect of non-compete agreements on within-state employee mobility by exploiting Michigan's apparently inadvertent 1985 reversal of its non-compete enforcement policy as a natural experiment. Using a differences-in-differences approach, and controlling for changes in the auto industry central to Michigan's economy.	The enforcement of non-competes attenuates mobility. Non-compete enforcement decreases mobility more sharply for inventors with firm-specific skills and for those who specialize in narrow technical fields.	
Fallick, Fleischman & Rebitzer 2006	Study of labour mobility in computer industries and other industries, in Silicon Valley, California and other US states.	Higher rates of job-hopping for college-educated men in Silicon Valley's computer industry than in computer clusters located out of the state. Mobility rates in other California computer clusters are similar to Silicon Valley's, suggesting some role for features of California law that make noncompete agreements unenforceable.	
Filson & Gretz 2004	Tests of a theoretical "racing model with multiple product generations, product innovation, spin-outs, and licensing" with data from the US rigid disk drive industry (1977–1997)	Our analysis suggests that non-compete agreements are socially harmful because they discourage the emergence of small start-ups that can compete in innovation races and market goods in new product generations.	
Gilson 1999	high technology industries in Silicon Valley (California) and Route 128 (Massachusetts)	Legal rules governing employee mobility influence the dynamics of high technology industrial districts by either encouraging rapid employee movement between employers and to startups, as in Silicon Valley, or discouraging such movement, as in Route 128 Because California does not enforce past-employment covenants not to compete, high technology firms in Silicon Valley gain from knowledge spillovers between firms.	Other regions may not be able to emulate California's success simply by replicating its legal rules. Rather, policymakers in other states should consider the characteristics of local industries, weighing the advantages to those industries of knowledge spillovers against the reduced incentives for initial

			innovation that result from decreased employer intellectual property rights.
Bishara et al. 2015	S&P 1500 companies	In 80% of CEO employment contracts from 1996-2010, we found CNCs. We discover that NDAs are quite common as well: 87.1% of all contracts stop CEOs from disclosing confidential information. In addition, we note that there is a strong “California effect,” whereby firms from that state are less likely to put CNCs in employment contracts.	
He 2018	Studying the effects of state non-competition policy, laws that can promote competition for highly skilled labor, on cash holding policies of U.S. public firms.	Exploiting a series of natural experiments regarding the reform of non-compete laws, I show that a shift to a weaker (stronger) enforceability of non-competes in the state leads to an increase (a decline) in firm cash holdings, particularly among talent-intensive firms and in industries relying more on knowledge-based competitive advantages. I further show that when talent competition intensifies firms maintaining a relatively larger cash balance than local peers gain labour market shares at the expense of rivals, leading to superior product market performance. These results point out that the ability to retain and attract talent maybe one of the channels through which finance affects product market behaviour.	In the knowledge economy where human capital is growing prominence (Zingales, 2000), the survival of modern American corporations rests critically on their ability to retain star performers. When skilled workers are free to move across firms, corporate employers have to improve their financial positions to overcome the frictions stemming from the unrestricted flow of labour and, at the same time, remain competitive in the market for talent.
Anand et al. 2018	We focused on publicly traded U.S. firms only in the manufacturing sector (Standard Industrial Classification [SIC] code 2000–3999) as recorded in the Compustat database. The time span runs from 1991 to 2004.	We assert that an increase in state level CNC enforceability is detrimental to firm productivity, and this relationship becomes stronger as comparable job opportunities become more concentrated in a firm’s home state. On the other hand, this negative relationship is weakened as employee compensation tends to become more long-term oriented.	Findings of this study demonstrate that the strength of this relationship depends on the geographical characteristics of firms’ competitors in the labour market and firms’ compensation design.
Aobdia 2017	The impact on companies’ disclosures of U.S. states’ different propensities to enforce noncompete agreements.	I find a negative association between a state’s enforcement of noncompete agreements and disclosure activities of firms headquartered in that state.	
Azevedo, Pereira & Rodrigues 2018	Tests of a dynamic model which assesses non-compete covenants (NCC) and garden leaves (GL)	We find that if the firm wants to deter the manager from leaving, the NCC is more effective than the GL when the industry uncertainty is low, or the embargo period is long, or the salary of	

		the manager now or when working outside the industry is low, or the salary of the manager when working for the competitor or the gain of the competitor due to the arrival of the manager is high. Otherwise, the GL is more advisable. However, contrary to the usual higher tolerance about GL, our results show that, overall, NCC are less harmful than GL.	
Starr, Balasubramanian & Sakakibara 2018	This paper examines how the enforceability of noncompete covenants affects the creation, growth, and survival of spinouts and other new entrants. The data for the study (5.5 million new firms) come from two microlevel data sets at the U.S. Census Bureau: the Longitudinal Business Database (LBD) and the Longitudinal Employer Household Dynamics (LEHD).	The impact of non- compete enforceability on new firms is ambiguous, since noncompetes reduce knowledge leakage but impose hiring costs. However, we posit that enforceability screens formation of within-industry spinouts (WSOs) relative to non-WSOs by dissuading founders with lower human capital.	Though stricter enforceability may help managers retain employees for a longer time, it will make it harder for them to hire talented workers. This, in turn, can have negative productivity consequences. Thus, whether to support CNC enforceability may depend on the specific needs of the managers as well as perhaps the specific skills that the potential recruit is expected to bring in or develop.
Bird & Knopf, 2015	Using a novel regulatory and competitive environment as a natural experiment, we investigate the impact of restricted labour mobility, and thus the mobility of local knowledge, on three aspects of banks: new charters, employee costs, and bank profitability. Sample: the banking industry in the US between 1976 and 1994 (244,970 obs.).	We find that restrictions on the mobility of local knowledge negatively impact the incidence of new bank charters. We also find no impact on banks formed through mergers or acquisition where the acquiring bank can simply purchase the local knowledge available. We also find that restrictions on the mobility of local knowledge decrease labour expenses. We also find that increases in labor restrictions are positively correlated with profitability, benefiting established banks because it restricts competitive with potential new banks that could potentially exploit local knowledge more effectively.	
Youngue, Tong & Fleming 2015	The “Michigan natural experiment”: the 1985 legislature passed in Michigan regarding NCAs. Sample: all publicly traded firms in the United States between 1979 and 1998 that could potentially become an acquisition target.	We find causal evidence that constraints on employee mobility raise the likelihood of a firm becoming an acquisition target. The causal effect is stronger when a firm employs more knowledge workers in its workforce and when it faces greater in-state competition; by contrast, the effect is weaker when a firm is protected by a stronger intellectual property regime that mitigates the consequences of employee mobility.	Though acquirers can retain employees through others means during acquisition integration, we are not able to examine integration directly in this study, given our focus on acquisition likelihood and our research design requiring the inclusion of both acquisition events and “nonevents” in the sample.

			Extensions to our study could sample on realized acquisition deals before and after MARA to examine other important questions such as how the policy reversal may affect acquirers' bidding strategies and integration plans, and how acquisition performance may vary based on acquirers' capabilities to retain employees post-acquisition
Younge & Marx 2016	The sample for our formal analysis includes annual, firm-level data from Compustat for 1984 through 1989, the 3-year window before and 3-year window after MARA (Michigan Antitrust Reform Act). We selected all U.S. manufacturing firms publically listed prior to MARA that were physically headquartered in Michigan or a control state that did not enforce noncompetes either before or after MARA.	We find that noncompete enforcement boosted the short- term value of publicly traded companies by approximately 9%. The effect is increasing in local competition and growth opportunities, and offset by patenting.	We interpret our results cautiously. We perform a range of robustness and placebo tests, but cannot categorically rule out the possibility that other shifts in the treatment or control states affect our results. We only examine public firms, and it is likely that different dynamics hold for private firms, as well as smaller and more entrepreneurial firms. Moreover, our study explores a short time window, and there may be deleterious effects of noncompetes in the long-run due to the limited circulation of talent and ideas.
Hajdini & Raha 2018	German and Swiss franchise systems.	(1) The likelihood of specifying more contractual restraints is first decreasing and then increasing with rising environmental uncertainty. (2a) A positive influence of the franchisor's transaction-specific investments on the degree of specified contractual restraints is supported by all models. (2b) The prediction that franchisees' specific investments will negatively impact the degree of specified restraints in franchise contracts is weakly supported in the models. (3) Contract duration positively influences the number of contractual restraints.	This paper observes not only the effect of noncompetition clauses but instead it observes the effect of these clauses combined with other contractual restraints in franchise contracting.
Berger & Frey 2017	The introduction of MARA (Michigan Antitrust Reform Act) in 1985. CPS samples for the period	Industry switching increased substantially faster in Michigan relative to other U.S. states, following the introduction of MARA in 1985. We further show that workers leaving their industry after the	

	1977–2014, limiting our sample to employed workers aged 25–65.	introduction of MARA earned lower wages, implying that they shifted into jobs where their skills were less productive.	
Zhao 2018	The executive labour market in the U.S.	<p>The positive effects of market density on incentive alignment and firm performance are stronger in markets where executives are freer to move. The effect of market density on CEO turnover-performance sensitivity is smaller in states where CNCs are more enforceable.</p> <p>CNCs also reduce the positive effect of market density on firms' outside succession rate.</p> <p>Market density does not help dismissed executives find a new job more easily, and this result does not change across different levels of CNC enforceability.</p>	This paper does not only examine the effect of CNCs as a restraining factor in labour mobility but it is in fact only one of the factors affecting it.