FIRM/EMPLOYEE MATCHING: AN INDUSTRY STUDY OF U.S. LAWYERS

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The authors study the sources of match-specific value at large U.S. law firms by analyzing how graduates of law schools group into law firms. They measure the degree to which lawyers from certain schools concentrate within certain firms and then analyze how this agglomeration can be explained by "natural advantage" factors (such as geographic proximity) and by productive complementarities across graduates of a given school. Large law firms tend to hire from a select group of law schools, and individual offices within these firms are substantially more concentrated in terms of hires from particular schools. The degree of concentration is highly variable, as there is substantial variation in firms' hiring strategies. Two main drivers of variation in law school concentration occur within law offices. First, geography drives a large amount of concentration, as most firms hire largely from local schools. Second, school-based networks (and possibly productive complementarities) appear to be important because partners' law schools drive associates' law school composition even when controlling for firm, school, and firm/ school match characteristics and when instrumenting for partners' law schools.

Identifying the right employees is a crucial determinant of success for many (and perhaps most) firms. While economists have been modeling the process of employee search and selection for years, comparatively little is known about the methods and strategies that firms use to find employees in labor markets. For example, to what extent do firms rely on local labor markets to fill staffing needs rather than conducting national or global

searches? Do factors such as production complementarities between employees of shared backgrounds drive hiring choices? Can firms learn how to identify the most productive employees from a given talent pool and thus gain competitive advantage in hiring? What role do hiring "networks" play?

In this article, we use lawyer biographies posted on large U.S. law firms' websites to shed light on these questions. Legal services provide a useful and practical industry for studying the firm/worker matching process for at least four reasons. First, law firms are human-capital intensive, and hiring decisions are of the utmost importance. Second, law firms' hiring processes are often quite structured. Firms choose a specific set of law schools to visit, allowing us to make inferences about hiring strategies from observing the firm's workforce. In this way, lawyers are very representative of a broad and growing group of professional service employees recruited from professional schools such as MBA programs, accounting programs, and engineering schools. Third, all lawyers go to law school, so law schools are a potentially important and uniform source of labor market networks for virtually everyone in our sample. Finally, almost all large law firms list detailed demographic information for all attorneys on their publicly available corporate web pages. Thus, it is possible to gain detailed insight into the composition of the firm's workforce. For a sample of 285 firms and more than 105,000 attorneys, we download lawyer demographic information including law school, year of law school graduation, rank (e.g., partner or associate), and office location. We use this information to study across-firm variation in hiring strategies.

We use the Ellison and Glaeser (1997) index of concentration to determine the degree to which law firms tend to be concentrated with regard to the law schools they hire from. That is, we ask whether firms hire from groups of law schools in a way that does not appear to be random. We are able to use the across-firm heterogeneity in law school concentration to analyze the different hiring strategies of firms in our sample, both at the overall firm level and at the individual office level.

We go on to decompose the sources of concentration of lawyers within firms and offices. Using the terminology from Ellison and Glaeser (1997), we attempt to isolate the importance of "natural advantage" caused by physical proximity between a law school and a law office that employs attorneys. We run regressions that analyze how concentration is related to natural advantage and the degree to which firms and law schools "match" in terms of quality and prestige.

Finally, we explore the importance of law school–based networks within law offices through the relation between partner concentration (at the office level) and associate concentration. We use an instrumental variables approach, instrumenting for partner law schools with the law schools of firm founders, to establish the degree to which hiring networks and/or complementarities in working with graduates of the same school are important in this labor market. We are not able to draw strong conclusions, however, about the value created by networks and complementarities and how this value is split between firms and lawyers. Also, note that law school hiring networks can have positive effects from complementarities between

graduates of the same school (either because they are relatively productive when working together or because they simply enjoy working together more), but they can also help sustain inequities in hiring. The hiring networks we analyze could have a "disparate impact" on certain groups, but our analysis does not allow us to make strong statements about how networks perpetuate differences in opportunities.

Prior Literature

Our work is related to two strands of literature. First, there has been a burgeoning literature on the importance of networks in hiring as well as other areas such as organization of the workplace. The importance of referrals in hiring has been well known for a long time. See, for example, Montgomery (1991) for a discussion of earlier work in economics. The work of Mark Granovetter (for example, Granovetter 1974) and other sociologists has influenced prior economic studies. For more recent discussion of economic theories of networks, see Jackson (2007). For empirical studies of another high-skill group (specifically, economists), see Goyal, van der Leij, and Gonzalez (2006), and Terviö (2011). For studies of how networks can affect labor market outcomes, see Bayer, Ross, and Topa (2008), Laschever (2009), and Dustmann, Glitz, and Schoenberg (2010). See Lazear and Oyer (2012) for a discussion of the broader economic literature on personnel practices and Oyer and Schaefer (2011) for a review more focused on economic studies of hiring and matching.

Second, our sample firms are all "up-or-out" partnerships, and a large body of work has analyzed this organizational form. We will not attempt to explain why these firms are organized the way they are. Numerous theoretical explanations exist, including Kahn and Huberman (1988), who emphasized the importance of inducing investments in firm-specific human capital; Levin and Tadelis (2005), who focused on the importance of partners protecting the value of the firm's reputation; and Rebitzer and Taylor (2007), who considered how law firm organization may relate to the notion of property rights. Galanter and Palay (1991), among others, cited the Lazear and Rosen (1981) tournament model as a justification for legal partnerships.[1] There have also been empirical studies of the labor market for lawyers. Ferrall (1996) studied promotion incentives at 100 large U.S. law firms. He found that promotion incentives are strong and that partnership tracks are not used solely to screen for the most capable lawyers. Sauer (1998) did a structural empirical analysis of University of Michigan law graduates, showing how they move optimally between sectors of the lawyer labor market. Garicano and Hubbard (2009) studied the relationship between market size, the organization of law firms, and the specialization of lawyers. They found that firms and lawyers are more specialized in larger markets. In related work, Garicano and Hubbard (2007) analyzed the relationship

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[1]Kordana (1995), however, argued that tournament theory is not relevant to law firms. That article is one of many in the legal literature looking at the market for lawyers and the structure of law firms.

between market size and the decision of lawyers to work alone or together. They argued that the patterns in their data indicate that lawyers become more specialized and take greater advantage of organizational hierarchies as market size increases. Garicano and Hubbard (2005) showed that lawyers tend to work in firms with lawyers from schools of similar quality, both within and across levels of the firm hierarchy. We measure this and other sources of law school concentration within firms. Landers, Rebitzer, and Taylor (1996) studied the work habits of lawyers and argued that the standard partner-track organization of firms such as those in our analysis induces young lawyers to work inefficiently hard in order to earn promotion. For historical perspectives on the evolution of large law firms and their demand for lawyers, see Hobson (1986), Galanter and Palay (1991), Baker and Parkin (2006), and Galanter and Henderson (2008).

Parkin (2006) also touched on both the network and the law firm literatures in her study of how school connections affect careers of lawyers. She also found that law firms are concentrated in terms of the law schools they hire from. Her analysis focused on the effects of the school/firm connections on individual lawyers' success within the firm, while we focus on the roots of the school/firm connection and attempt to decompose the sources of law school concentration within firms.

Figures 1 and 2 provide a simple graphical illustration of some of our findings and show how our approach adds to this prior research. Each figure shows a map of where lawyers at a firm practice (hollow squares sized proportionately to the number of lawyers in that office) and where they went to law school (solid circles, again sized proportionately). Figures 1A and 1B show firms that hire lawyers from a concentrated set of schools but for very different reasons. Figure 1A maps Haynsworth Sinkler's four offices, all of which are in South Carolina cities: Charleston, Columbia, Greenville, and Florence. Almost two-thirds of the firm's lawyers went to the University of South Carolina, with the remainder from a smattering of other schools in the Southeast. Munger Tolles, mapped in Figure 1B, has offices only in San Francisco and Los Angeles. While some nearby schools are highly represented in this firm, it recruits a substantial fraction from top schools that are far away. So whereas the University of South Carolina is the common factor bringing lawyers together at Haynsworth Sinkler, prestigious law schools is the common factor at Munger Tolles.

Figure 2 shows two different firms that are not concentrated in terms of where they source their lawyers. That is, the distribution of their lawyers' schools is similar to that of the sample as a whole. Skadden Arps, shown in Figure 2A, is a large firm known for its finance work (including, for example, restructuring and mergers). The firm has nine offices in large metropolitan areas, as well as Wilmington, Delaware. As the distribution of circles on the map indicates, Skadden Arps lawyers went to law school all over the country. The firm has at least 10 lawyers from each of Boston College, University of Connecticut, Vanderbilt, and Villanova. Figure 2B maps DLA Piper, whose lawyers have a similar distribution of law schools. However,

*Figure 1.* Economic Geography for Two "Concentrated" Firms
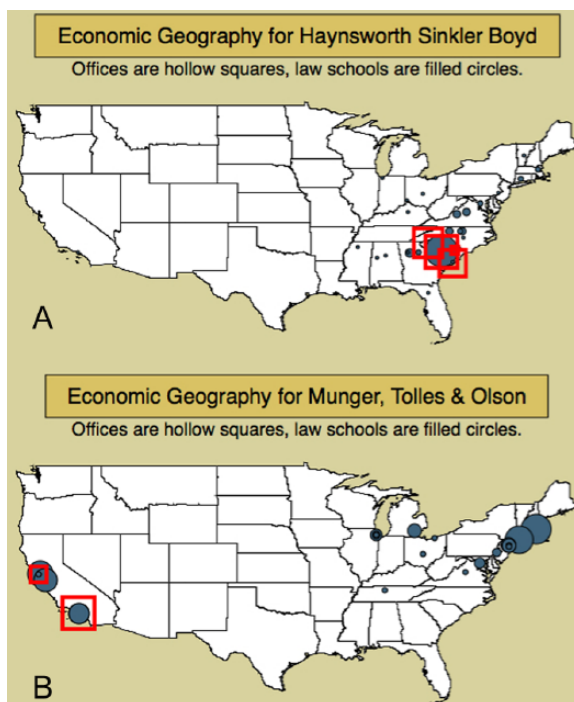
unlike Skadden Arps, these lawyers work in 21 offices spread out in small and large cities including Baltimore; Raleigh, North Carolina; and Sacramento, California. An office-level analysis of DLA Piper would show that many of its offices hire in a localized manner (similar to that of Haynsworth Sinkler in Figure 1A), but that on a firmwide basis DLA approximates our entire sample. Our analysis will measure the amount of concentration for our sample of 285 firms, describe the degree of variation across firms in this concentration, and then examine the common and heterogeneous factors that determine lawyer/firm employment matches.

Theoretical Background

Matching Framework

We are interested in how matching between firms and employees is driven by such factors as proximity between people and potential employers, observable characteristics (especially education), personal contacts and social networks, and other factors. We use the matching of lawyers to law firms because this setting has several attractive features for studying the matching of workers to firms. One pragmatic reason to study law firms is that most major firms post reasonably detailed biographies of all their lawyers on a website. In addition, because all lawyers go to law school, we can study the connection between law schools and law offices using a large and

Figure 2. Economic Geography for Two "Unconcentrated" Firms
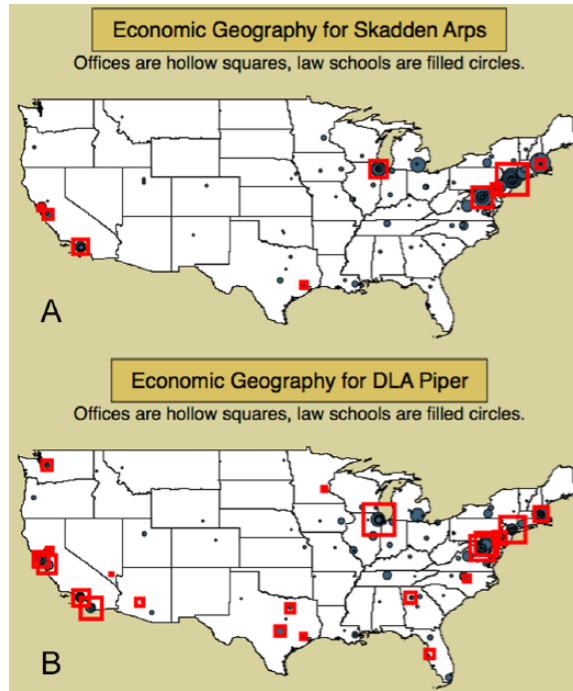
comparable sample of lawyers. Given that the law school/law firm relationship is affected by geography, educational characteristics, and the networks lawyers develop in school, we can draw inferences regarding many of the relevant issues in firm/worker matching. Finally, though law firm hiring practices may not be particularly generalizable to firm/worker matching in the economy as a whole, law is a human-capital-intensive industry in which recruiting is of paramount importance.

To motivate the empirical analysis that follows, we begin by describing a highly stylized model of law firms making hiring decisions. The model, which is an adapted version of a model derived by Ellison and Glaeser (1997) to examine geographic concentration of U.S. manufacturing by state, will generate a measure of the relationship between law schools and law firms and will be useful in interpreting our empirical results.

Consider a law firm that employs an exogenously determined *N* lawyers from a given set of law schools. The firm hires these lawyers sequentially. It begins by hiring the single lawyer who it thinks will be the most profitable, then hires another who will be the most profitable given the first lawyer it chose, then hires the most profitable lawyer given the two it already employs, and so on until it has *N* lawyers.[2]

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[2] Of course, firms can hire only those lawyers who want to work for them, and firms will be less myopic than our description indicates because they will consider the schools of future hires as well. But we think this simple approach will capture the hiring process as long as lawyers are generally likely to end up well matched to firms and if past hires are a factor (but not necessarily the *only* factor) affecting productivity. We also do not consider the matching process at the law school admissions phase—see Courty and Pagliero (2010).

There are at least two reasons why a firm may be inclined to hire more lawyers from a given law school than from others. First, a school may have what Ellison and Glaeser (1997) refer to as a "natural advantage" for a given firm because lawyers from that school may be particularly profitable for that firm. We will focus on two sources of natural advantage in our empirical analysis—geographic proximity and the match between firm and school prestige. Geography is likely to matter for several reasons. Effective hiring is likely to rely on "soft" information—that is, information that cannot be revealed on a résumé—and firms may find it easier to gather information about prospective hires when those individuals are close by. Recruiting locally means the firm can more easily engage in multiple rounds of interviews and gather information about individuals indirectly by networking with law faculty and placement offices. Geography may also be an important source of natural advantage if prospective employees have locational preferences that influence the decision over both where to attend law school and where to take a job. The match between firm and school prestige may lead to natural advantage if lawyers from prestigious law schools would have higher innate ability and would therefore have a comparative advantage in working on more complex cases of the type typically handled by the most prestigious firms.

The second reason a firm might focus its hiring of graduates more on some schools than on others is that a pair of lawyers generates some form of complementarity. A very simple potential source could derive from economies of scale in hiring. Firms typically do on-campus recruiting at a limited set of law schools because of the fixed costs of visiting any given school. Another recruiting-based explanation is that graduates of a given law school may be more effective at hiring lawyers from the school they attended. Another reason lawyers from the same school would be more productive when working together is that law schools teach things in different ways, and it is easiest to communicate with others who learned relevant material in a similar manner. Alternatively, law schools may have certain cultures or attributes that attract certain types of people who work well together.[3] In our discussion and analysis, we will refer to these potential advantages of lawyer concentration that are not related to natural advantage of an individual school as lawyer complementarities or lawyer social networks.

When hiring lawyer k, where $1 \leq k \leq N$, the firm considers the most profitable potential hire from each of the law schools. The expected log profit of hiring a lawyer from law school i is

$$\log \Pi_{ki} = \log \overline{\Pi}_i + g_i(v_1, v_2, ..., v_{k-1}) + \varepsilon_{ki}$$

where $\log \overline{\Pi}_i$ captures the average profitability of a lawyer from school i, $g_i(v_1, v_2, ..., v_{k-1})$ captures the additional profit expected from lawyer k given the law schools attended by the firm's previously hired lawyers, and ε

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[3]For a more formal discussion and analysis of coworker complementarity, see Hayes, Oyer, and Schaefer (2006).

captures factors idiosyncratic to lawyer k. The first term on the right-hand side of the equation captures the natural advantage of school i for the firm independent of the mix of law schools from which the firm has hired previously. The g function, on the other hand, captures the complementarities or network effects that come from hiring lawyers who went to the same school. That is, it captures the profit (or loss) from adding more lawyers from the same school while holding constant the average match value between the lawyer and the firm. Note that the natural advantage function is constant across potential lawyer hires for a given firm, while the network or complementarity effect (g) varies with the composition of the other lawyers already at the firm.

If $g(\cdot)$ were always zero and if $\overline{\log \Pi_i}$ were constant across law schools for the firm, then the firm would hire lawyers at random (at least in terms of which law school they attended.) If, on the other hand, the natural advantage function varied substantially from school to school, we would expect the firm to hire more lawyers from a select set of schools. In addition, if the g function were generally increasing with the stock of lawyers from school i, we would again expect concentration of lawyers from certain schools within the firm. In the first case, the concentration would relate to some factor connecting the school and firm, while in the second case it would relate to the fact that the stock of lawyers at a firm affects the source of new lawyers that the firm adds.

Measuring Concentration of Lawyers

We construct a measure of law school concentration within firms that we then relate to empirical proxies for natural advantage and lawyer complementarity. We denote this measure of concentration of lawyers at a firm as γ_j. To define the index, which is based on the methodology in Ellison and Glaeser (1997), we first introduce some notation. Define s_{ji} as the "law-school i share" for firm j; that is, it is the fraction of firm j's attorneys who earned their first U.S. law degree at law school i. Let x_i be the overall share of attorneys in the population of U.S. lawyers who received their first U.S. law degree at law school i. Let N_j be the number of attorneys working at firm j. Our index of firm j's law school concentration is

$$(1) \qquad \gamma_j = -\frac{1}{N_j - 1} + \frac{N_j}{N_j - 1} \frac{\sum_i (s_{ji} - x_i)^2}{1 - \sum_i x_i^2}.$$

This index has two properties that make it easy to interpret. First, the measure explicitly accounts for the fact that under random selection of attorneys by firms, we would still observe some concentration in realized law school shares. The Ellison-Glaeser index is calibrated so that $\gamma_j = 0$ if firm j is as concentrated as one would expect if the firm selected at random from

the set of available attorneys.[4] Second, the scale of the index can be given an economic interpretation. A value of $\gamma_j = 0.0650$ (as we show below, this is the average for firms in our sample) means two lawyers randomly selected from a firm have 6.5 percentage points higher probability of having attended the same school than two lawyers randomly selected from the sample.

In the next section, we will measure concentration at the firms in our sample and various subsamples of firms. We will also measure concentration at other levels of aggregation such as individual offices. We will then look at factors that affect these concentration measures. That is, we will decompose our measures of γ_j into parts due to natural advantage and parts due to lawyer complementarity or networking. One approach to this is to regress firm's γ_j's on measures of natural advantage and complementarity. However, this does not allow us to use measures that vary for firm/school pairs such as distance from a lawyer's school to her office or how many other lawyers at that firm went to the same school. Therefore, we focus on decompositions of firm (or office) concentration where we regress $s_{ji} - x_i$—that is, the deviation of firm or office j's law school i share from the population law school i share—on a set of explanatory variables that reflect potential sources of natural advantage or within-school lawyer complementarity.[5]

Empirical Analysis

Data

Our data come primarily from the web pages of law firms.[6] We began with a list of the 300 largest U.S. law firms, as listed on www.lawperiscope.com as of August 2007. Our sample subsumes two well-known ranked lists of law firms: the *American Lawyer 200* and the *Vault 100*. The *American Lawyer* rankings are based on gross revenues (including international revenue), while the *Vault* rankings are based on a survey of associates at leading law firms who are asked to rank firms according to how prestigious it would be to work there.

We then wrote programs to access the lawyer bios listed on each firm's website. The information in an online lawyer bio is fairly consistent across firms.[7] Typically, a bio lists the lawyer's name, which law school and undergraduate institution the lawyer graduated from, the date of graduation, the lawyer's rank at the law firm, law office where the lawyer practices, and the lawyer's specialties.[8] Eight firms listed too little information on their lawyer

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[4]Our concentration measure is derived directly from Equation (5) in Ellison and Glaeser (1997) (though there is a typographical error in the published version of the equation in their article). As they explain, the expected value of the index is zero if firms hire at random.

[5]Ellison and Glaeser (1999) derive a nonlinear relation between share and natural advantage, which they estimate with nonlinear least squares. We use a reduced-form version of this approach that makes empirical implementation and interpretation more straightforward.

[6]Throughout the article, we refer to most firms by the first two names unless they have another commonly used shorter name. For example, we refer to Akin, Gump, Strauss, Hauer, and Feld LLP as Akin Gump. We refer to Cadwalader, Wickersham & Taft LLP by its common nickname of Cadwalader.

[7]See Mukherjee (2006) for an analysis of firms' decisions to disclose information regarding employees.

[8]We do not report details of any of the analysis we did using specialties, gender (which we inferred using names and pictures), or undergraduate school, because the results did not affect our conclusions. We discuss some of these analyses briefly below.

bio pages to be useful (usually because they did not list lawyer ranks), three had web pages that were difficult for us to access using automated means, and three others were in the process of merging and were dropped so that individual lawyers would not appear multiple times in the data. We also dropped one firm that had very few U.S. lawyers because almost all its operations were overseas. All lawyer bio data were collected during the first two weeks of July 2008. We dropped all lawyers who work in foreign offices. Among those who work in U.S. offices, we dropped anyone who is not an associate, a partner, or "of counsel." We also dropped lawyers for whom we do not know the law school attended and lawyers who received their law degrees outside the United States. Many lawyers have multiple law degrees, adding an LLM or LLB after obtaining a JD. We use the law school of the lawyer's United States–based JD, or, if he or she does not have a United States–based JD, his or her first U.S. law degree. Our final sample consists of 285 firms and 105,317 attorneys.

The final sample is not representative of the population of U.S. lawyers, though we will compare our sample with this broader sample at various points. The lawyers in our sample went to more prestigious schools and have been more successful financially, on average, than the broader population of lawyers. Our sample is more focused on the law as well, given that many lawyers in the broader sample do things other than practice law as their primary occupation. Our sample is also selected, relative to the population of all law school graduates, by the fact that our entire sample passed the relevant state bar exams. For example, the concentration of University of South Carolina graduates at Haynsworth Sinkler could be partially attributable to the fact that the school is the only public law school in the state. So one reason for the concentration we will find could be that aspiring lawyers strategically pick law schools in the states where they want to practice. As we will show, we do not think this is a first-order driver of our results, though it could certainly be playing a part.

We do think our sample can be thought of as quite representative of the population of lawyers at the largest and most prestigious firms in the country (as of 2007). We were able to gather almost all lawyers from the 300 firms on our original list. The 15 firms that we dropped are a bit smaller than the rest of the sample, but they span the range of firm quality measures we will use. We do not believe their absence changes the sample relative to what it would be if we had included all 300 firms.

We used information provided on law firm web pages and elsewhere to gather as comprehensive a list as possible of where the founders of each firm in our sample attended law school. Our primary sources for this were historical descriptions of the firm on various websites, alumni magazines that had been put online, and obituaries. We define founders as the first people recorded to have worked at the organization that was the main component of the firm as it stands today. If there were mergers of equals along the way, we use founders of each part. We found no information regarding the founders of 83 of the 285 firms in our sample. All the founders of 38

other firms learned law by apprenticing for other lawyers rather than attending law school. We identified law schools for founders at 164 firms with a total of 247 firm/founder school matches.

We supplement these data on individual lawyers with information about law firms and law schools. We assigned each lawyer to a metropolitan area based on office location (for example, New York City, Salt Lake City, or Silicon Valley.) Using the zip code of the largest law office in each metropolitan area, the zip code of each law school, and Internet mapping programs, we calculated the driving distance between where each lawyer works and her law school. We used *US News and World Report*'s 2006 rankings of law schools to divide schools into "quality" quartiles, and we used *American Lawyer*'s profit-per-partner estimates to divide firms into prestige quartiles. We also performed some analyses in which we categorized firms according to *American Lawyer*'s compensation-per-partner estimates and *Vault*'s prestige rankings and in which we categorized schools on the basis of average LSAT scores of entering students. This did not change any of our conclusions, so we do not report results of these analyses.

Table 1 shows law firm summary statistics for our sample as a whole and then broken into three tiers. We define "Tier I" firms as those that are in the *Vault 100* prestige rankings (these firms are generally quite prestigious and reasonably large), "Tier II" firms as those that are in the *American Lawyer 200* rankings (these firms are all large but not as prestigious as the *Vault* firms), and then "Tier III" firms, which are not in either ranking.

As the table indicates, there is substantial variation in the size, number of offices, and typical law school quality at sample firms. As firms become less prestigious, they tend to be smaller and less "leveraged" (more associates per partner). Some of the leverage differences are due to differences in organizational structure. Some firms have "income" partners who do not own part of the firm and still face an up-or-out promotion to "equity" partner. For example, at Foley & Lardner, about half of the partners are income partners (discovered by comparing our count of partners with *American Lawyer*'s count of their equity partners) while Cravath makes no such distinction. Unfortunately, we cannot distinguish equity partners from income partners, and so we treat the two categories as one.

Revenue per attorney is taken from the *American Lawyer* 200, and *Vault* ranks only the top 100 firms by prestige. As a result, we have this information only for a subset of our sample. *US News* average is the average rank of the law schools of the firm's attorneys. *US News* ranks only the top 99 law schools; we assigned attorneys who attended schools outside this set a rank of 100.

Figure 3 provides a geographic perspective on our overall set of lawyers. In Figure 3A, each square is a geographic area (again, this could be New York, Salt Lake City, Silicon Valley, etc.) The size of the box is proportional to the number of lawyers in our data who work in that area and at any firm. In several areas, including Fargo, Little Rock, and Spokane, only one firm has an office. At the other extreme, 168 of the 285 firms have a Washington, DC

Table 1. Summary Statistics

Variable	All firms	Tier I firms	Tier II firms	Tier III firms
Offices	6.07	6.81	7.34	4.33
	(4.40)	(4.23)	(5.35)	(2.85)
Attorneys	369	631.9	336	171
	(275)	(319)	(132)	(68.6)
Partners	0.493	0.396	0.505	0.564
	(0.117)	(0.103)	(0.096)	(0.084)
Top 10 law school	0.230	0.396	0.185	0.145
	(0.165)	(0.103)	(0.110)	(0.117)
Median law school rank	36.7	17.5	40.8	49.7
	(22.7)	(8.41)	(19.3)	(23.0)
Revenue/lawyer	$714K	$835K	$594K	na
	($252K)	($254K)	($183K)	
N	285	90	90	105

Notes: "Top 10 law school" represents the fraction of firm's lawyers who went to a top 10 law school (as determined by *US News and World Report*). "Law school rank" is the average *US News and World Report* rank of firm's lawyers' law schools. Revenue/lawyer is from *American Lawyer* and is not available for all firms.

office, and 165 have an office in the New York City area. Huntsville, Tennessee; the Inland Empire area of California; Oklahoma City; Oxford, Mississippi; and Edwardsville, Illinois, have the fewest lawyers (that is, are the smallest boxes on the map) with a single lawyer. New York has 20,625 (19.6% of the sample), Washington has 13,158, and Chicago has 7,507. Naturally, the lawyers in our sample work primarily in large metropolitan areas. Also, state capitals are overrepresented, with several firms having reasonably large offices in, for example, Austin, Texas; Tallahassee, Florida; and Columbus, Ohio.

In Figure 3B, each circle is a single law school, and circle size is proportional to the number of lawyers in our sample who graduated from that school. The map shows that law schools are also concentrated in or near metropolitan areas and that the overall geographic distributions between the two maps look quite similar. Law school representation in our sample varies from one each from Appalachian Law School, California College of Law, Concord Law School (an online school), Glendale University College of Law, Liberty University, Northrop University School of Law, National University School of Law, San Joaquin College of Law, and Southern New England School of Law to 5,808 from Harvard and 4,202 from Georgetown.

Firm- and Office-Level Concentration

There would be no reason to think that natural advantage or lawyer networks are relevant in law firm hiring if there were no evidence of concentration by law school within firms. So we begin by asking whether there is any evidence of concentration and, if so, how much. We start by looking at firms as a whole. Analytically, we first generate law school shares (s_{ji}) for each firm/school combination, including those where $s_{ji} = 0$.

Figure 3. Economic Geography for Law Offices and Law Firms
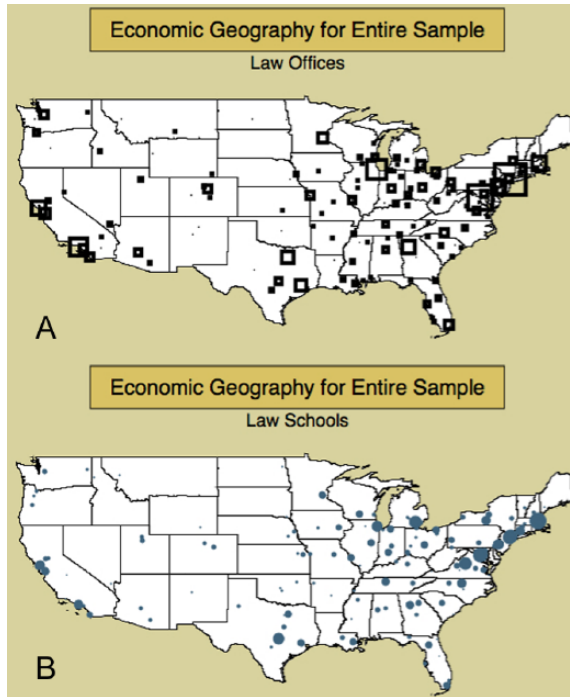
We also compute the law school share of all U.S. attorneys (x_i). To do this, we compiled a list of how many people graduated from each law school in 1970, 1980, 1990, 2000, and 2005. We assumed that the number of graduates in a given year was the same as the number in the closest year for which we had the exact count, and then we summed across our annual estimates to get a count for the entire period. The lawyers in this sample, on average, went to less prestigious schools than did those in our sample, which is what we would expect given that our sample includes the largest, most prestigious, and most expensive firms in the United States. For example, while we estimate that 1.6%, 0.5%, and 0.5% of all U.S. lawyers went to Harvard, Stanford, and Yale, respectively, these figures are 5.5%, 1.3%, and 1.6% for our 285-firm sample.[9]

Then we compute γ_j for each sample firm, using Equation (1). The first column of Table 2 provides information about the distribution of γ among the 285 firms. γ varies from basically zero to 0.3831. The mean is 0.0650 and the median is 0.0490. This means that, at a typical (that is, the median) law firm, a pair of randomly selected lawyers is 4.9 percentage points more likely to have gone to the same law school than a pair of lawyers randomly selected

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[9]We also did our analysis using our sample as the relevant population, so that x_i is the fraction of lawyers from a given school in our sample. This leads to slightly lower concentration because our sample is itself concentrated relative to the total lawyer population. Using this alternative population does not affect any of our conclusions, however, and we believe using the population of all U.S. lawyers is more appropriate.

Table 2. Law School Concentration at the Firm and Office Levels

Measure	Firm-level concentration	Office-level concentration
Mean γ	0.0650	0.0974
Standard deviation	0.0536	0.0887
First quartile	0.0287	0.0435
Second quartile	0.0490	0.0685
Third quartile	0.0852	0.1193
Highest γ	0.3831	0.6610
	Haynsworth Sinkler	Phelps Dunbar Baton Rouge
	62% from Univ. of South Carolina	81% from LSU
Lowest γ	0.0042	0.0055
	Jackson Lewis	Thompson Hine Atlanta
	3% from BU	3 schools at 9%
N	285	1,025

Notes: See text for definition of concentration (γ) and description of sample. Offices are restricted to those with at least 20 attorneys.

from our sample as a whole. The probability that a random pair of lawyers from the U.S. population went to the same law school is approximately 0.7% and the probability that a random pair from our whole sample went to the same school is 1.6%. Our figures indicate that a random lawyer pair from the median firm in our sample went to the same law school with probability 5.6%.

For comparison purposes, the law school distribution within these 285 firms is somewhat more concentrated than the geographic concentration of four-digit industries. Ellison and Glaeser (1997) reported a mean γ of 0.051 and a median of 0.026. We draw two conclusions that are quite similar to those they draw about manufacturing industries. First, there is significant concentration within law firms in terms of which law schools they recruit from because γ is greater than zero by a meaningful amount for most firms. Second, we might characterize the degree of concentration as meaningful but not large. Our estimates of γ generally indicate that while firms are more likely to hire a new lawyer from schools from which they already have lawyers, the effect of the current school distribution is marginal. Our maps of two highly concentrated firms in Figure 1 indicate that this effect is quite large at some firms, but these are the exceptions. So while schools may have some natural advantage in getting lawyers into firms and/or there may be networks from schools that affect firms' hiring, these factors do not appear to dominate the firm/lawyer matching process.

Another way that we can put the results in Table 2 into some context is to look at law firm concentration in comparison with the concentration of where economists within universities' economics departments went to graduate school. Using the data from Terviö (2011), we calculated γ for 102

economics departments that have at least 15 faculty members. That is, we performed calculations analogous to our law firm concentration calculations but treated economics departments similarly to law firms and institutions that grant PhDs to economists the same as law schools. We found that educational backgrounds are somewhat more concentrated in law firms than in economics departments. Average (median) γ in the economics sample is 0.0243 (0.0176), which is less than half the analogous 0.0650 (0.0490) in Table 2.[10]

We now consider law offices as the unit of analysis. The second column of Table 2 looks at the 1,025 offices of our 285 firms that have at least 20 lawyers who graduated from U.S. law schools. Defining s_{ji} as the law school i share for office j, we now define γ_j as the Ellison-Glaeser index of concentration for office j. The geographic advantage of a law school will be greater for a single office than for a multi-office firm, and lawyer networks may be somewhat localized, so it is not surprising to find that office γ's are about half again as large as those for whole firms. The most concentrated offices have γ's far higher than the highest firm-level concentration, and it appears that, at least in these examples, geography and/or law school networks are a dominant part of the hiring process.

Note that while we limit the formal statistical inference to the regressions in later tables, the gammas we show throughout the article are not random disturbances. To show this, we generate baseline random gammas by redistributing the lawyers in our sample across the same firm/offices as in the current data so that we have as many people from each school and each firm/office as before, but now they are randomly combined. Then we recalculate the gammas for lawyers in the 1,025 offices that we use in Table 2. The mean and median are always around 0.0045. This value is slightly greater than zero because the lawyers in our sample are concentrated relative to the larger population of lawyers that we use as the baseline. The standard deviation of these "random" office gammas is always near 0.0068 (when using firm, firm/office, or firm/office/rank combinations), indicating that any individual gamma greater than about 0.018 is statistically greater than the random gamma we might expect. In a typical simulation, we calculate one office gamma greater than 0.04, indicating a gamma greater than what would be a one-in-a-thousand event if the lawyers in our sample were distributed randomly across firms and offices.

We again evaluate the magnitude of these γ's by comparing them with concentration in other contexts. First note that the average office-level law firm γ is close to double the average γ of four-digit industries measured by Ellison and Glaeser (1997). The highest levels of office concentration are similar to the highest levels of four-digit industry geographic concentration, or, in other words, graduates of LSU law school are even more dominant

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[10]Part of the reason economics department concentration is lower than law firm concentration is that our population of economists is limited to those economists working on the faculty of the schools in Terviö's sample. If we had the entire population of PhD economists, the measured concentration in economics departments would almost surely be higher.

within the Baton Rouge office of Phelps Dunbar than Wisconsin and Utah are in the fur production industry and than California is in the wine industry. Second, as the figures from Terviö (2011) that we discussed above indicate, law offices are substantially more concentrated (in terms of where employees went to graduate school) than the typical economics department faculty.

We can identify a few patterns by looking at the most and least concentrated offices in Table 2. Clearly, offices are highly concentrated near a large law school and where the lawyer population of a city is small relative to the size of the school. Idiosyncrasy in state law seems to play a role as well. For example, Louisiana is unique among states in that its legal code is based in part on civil law so the fact that Baton Rouge law offices have a disproportionate number of Louisiana State graduates is probably related to the unique needs of prospective Louisiana lawyers. Offices in New York tend to have low concentration, but this outcome stems from two effects. Some New York offices hire nationally; Sutherland's five leading schools, for example, are American, Emory, Florida, Georgetown, and Harvard. Other New York offices' hiring strategies are more regional-based, but there are quite a number of law schools near New York.

Table 3 provides a more detailed look at office-level concentration by dividing the 285 firms into the tier subsamples. Columns 1 to 3 of the table show that concentration increases substantially as we move from Tier I (most prestigious) to Tier III. Tier I firms tend to hire from the national market (though offices such as the DLA Piper Austin office are about as concentrated as any others in the sample). A few firms have some degree of concentration because they focus on prestigious schools (recall the Munger Tolles map in Figure 1B). However, even these firms hire from a sufficiently large set of prestigious schools that their γ's are generally not more than 0.1. Some of the examples we have mentioned and the patterns in columns 1 to 3 of Table 3 suggest that geography becomes a much more important determinant of recruiting as firm prestige drops. We will address this hypothesis more formally below.[11]

Overall, we see quite a bit of suggestive evidence that geography is an important determinant of hiring by law firms and that it becomes more and more important as firm prestige goes down. Given that the more prestigious firms tend to be more expensive and more profitable, lawyers appear to be willing to relocate farther distances—and firms to recruit from farther away—when the economic advantages are significant enough. We will study the relationship between lawyer concentration, geography, and prestige more formally below.

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[11]Note that if we use our sample of lawyers as the relevant population of lawyers when computing concentration, the γ's at Tier I law offices decrease somewhat, as these firms are the ones that focus the most on the overrepresented top law schools. But the change does not have a large effect on the γ's for any of the tiers, does not change the relative concentration of firms in the different tiers, and does not materially affect any conclusions we would draw.

Table 3. Office-Level Law School Concentration by Firm Tier

Measure	Tier I firms	Tier II firms	Tier III firms
Mean γ	0.0709	0.1035	0.1469
Standard deviation	0.0604	0.0849	0.1199
First quartile	0.0383	0.0462	0.0711
Second quartile	0.0536	0.0775	0.1119
Third quartile	0.0819	0.1376	0.1755
Highest γ	0.6546	0.5716	0.6610
Firm	DLA Piper	Nelson Mullins	Phelps Dunbar
Office	Austin	Columbia, SC	Baton Rouge
	82% from Texas	76% from So. Car.	81% from LSU
Lowest γ	0.0059	0.0055	0.0084
Firm	Winston & Strawn	Thompson Hine	Shipman & Goodwin
Office	Charlotte	Atlanta	NYC
	3 schools at 9%	3 schools at 9%	4 schools at 9%
N	468	348	209

Notes: See text for definition of concentration (γ) and tier. Restricted to offices with at least 20 attorneys.

What Drives Concentration?

Next we analyze what factors lead to lawyer concentration by running regressions with variables that vary at the firm/school level. As we explained earlier, our office level concentration (γ_j) measure is an increasing function of the importance of natural advantage and complementarities. We now decompose office-level concentration into parts attributable to natural advantage (γ^{na}) and parts attributable to lawyer complementarity (γ^s). In order to focus on the most recent recruits and so that we can relate associate law schools with partner law schools, we focus on office-level concentration for associates only.[12]

To take advantage of measures such as geographic proximity between an office and a school, we run regressions for which the dependent variable is a key determinant of concentration rather than concentration itself. Recall that s_{ji}, in this context, is the share of office j's associates who went to law school i and that x_i is the fraction of associates in the population who went to school i. Our dependent variable is the deviation of office j's associate share from the sample average, or $s_{ji} - x_i$. We then use the residuals from these regressions—which, by construction, is the deviation of associate office share from sample share that is orthogonal to the explanatory variables—in place of $s_{ji} - x_i$ in our calculation of γ_j so that we can determine approximately what share of associate office concentration can be explained by various measures.

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[12]Concentration by office is similar for associates and partners, and the tier relationships to concentration are not dramatically different by rank. We did all of our analysis where we included all lawyers in an office as well. In the case of any variables that were available for both analyses, the results of the office analysis are similar to the results below for associates only.

These regressions are a simplified version of the analysis in Ellison and Glaeser (1999). They studied manufacturing industries and allowed state-industry employment shares to be related to state-level variation in natural resource, labor, and transportation costs. As an example of how such costs may affect industry agglomeration, they pointed out that the aluminum industry, which uses electricity intensively, is quite concentrated in the Pacific Northwest, where electricity prices have historically been low. Thus, firm-to-firm "spillovers" of the type commonly discussed with regard to Silicon Valley likely do not explain geographic concentration in aluminum production. Ellison and Glaeser (1999) showed that at least one-fifth of observed industry-level concentration of firms is attributable to natural advantage.

As an example of natural advantage in our context, note that the cost to a firm of identifying a promising job candidate is likely related to the distance from the firm's office of that candidate's law school. We would expect that, all else being constant, law schools located near a given law office will be overrepresented among that office's attorneys. Further, firms with better reputations are more likely to hire from more prestigious schools (see Garicano and Hubbard 2005). Specifically, if the highest-ranked law firms place the highest value on attorney ability—perhaps because of matching of the most challenging cases with the highest-skilled firms—then these firms will hire disproportionately from the top-ranked law schools.

We measure geographic proximity using categories that roughly correspond to quartiles in distance between a lawyer's school and his office by including dummy variables for an office/school distance of fewer than 10 miles, one for 10 or more and under 150 miles, one for 150 or more and under 500, and one for 500 miles or more. The distances were generated by entering the zip codes of the law school and the largest law office in any geographic area into a mapping website. For example, Akerman Senterfitt has the most lawyers in the Miami area of any firm in our data. To assess distance for its attorneys who attended the University of Florida Law School, we entered the University of Florida Law School zip code (32611) and the Akerman Senterfitt Miami office zip code (33131) into a mapping program and recorded the driving distance between the two.[13]

We also include city fixed effects related to the office location and interact these fixed effects with the distance from the school to the office. These interactions are meant to allow the distance variable to vary with a wide variety of potential natural advantage factors. For example, if the office is in the same city as the state university's flagship campus, that may make the firm/school tie even stronger than it would be if the school were a private law school located nearby. These distance/city interactions also appear to soak up the effects of firm/school prestige match. In unreported regressions, we found that interacting measures of firm prestige and school prestige add

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[13]For University of Hawaii graduates, driving distances are not available, but all those working on the mainland are coded as working more than 500 miles from their law school.

significant explanatory power to the regressions with school-to-office distance. The effect of firm/school prestige match goes away, however, when we control for distance/city interactions. This finding is likely because the effect of distance varies with the value of the work being done. So, for example, New York offices are more likely to hire lawyers from faraway prestigious schools than, for example, are Jacksonville offices. Thus in the regression the distance effects are much bigger in Jacksonville than they are in New York. As a result, we do not present the results with firm/school prestige match variables, leaving the distance category variables and interactions between these variables and office location fixed effects as our main measures of natural advantage.[14]

Note that while we use metropolitan areas as our primary geographic unit of analysis, we could also have done our analysis at the state level. Bar exams are generally done at the state level, and virtually every law school lists its own state's as the most common bar exam taken by its graduates. This indicates that lawyers may choose their law school according to which state they want to practice in, hoping that the schools will prepare them for the local bar exam.[15] However, while choosing a school based on state certainly may contribute to the geographic effects we will show, it is, at most, a small part of these effects. We found that the distance relationships we show below are virtually unchanged when we look only at school/office pairs in the same state or offices in a single state (such as Texas, New York, California, or Missouri, each of which has multiple schools and metropolitan areas). A few simple statistics show the importance of geography within states. For example, half the lawyers in St. Louis went to one of the two law schools in St. Louis and 1.4% of St. Louis lawyers went to the law school in Kansas City, while 17.4% of Kansas City lawyers went to law school in Kansas City and 3.5% went to law school in St. Louis. Also, 13.7% of San Francisco lawyers went to Berkeley and 7.9% went to UCLA, while 2.4% of Los Angeles lawyers went to Berkeley and 13.8% went to UCLA.

Our primary proxy for lawyer complementarity is the share of partners from an office who went to a given law school.[16] Our ideal would be to study the hiring decisions of two identical law offices with respect to a single law school, where the offices' current number of attorneys from that school varies exogenously. If a high current concentration of attorneys from a given school predicts a high rate of hiring from that school, then this would be evidence in favor of hiring networks or coworker complementarity.

We approximate this ideal experiment in two ways. First, we examine the relationship between partner share from a given law school—which was likely determined largely before the current group of associates was hired—and associate share, controlling for sources of natural advantage. Second,

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[14]Similarly, we found that once we control for city characteristics, the number of lawyers in a firm or an office has no relationship to gamma nor any explanatory power in these regressions.

[15]Also, see Pagliero (2008) for evidence that bar exams are more difficult in states where more lawyers want to work.

[16]More specifically, we use the deviation of partner share from the share for all lawyers in the population.

we instrument for partner share from a given school with a dummy for whether one of the firm's founders went to that school. The exclusion restriction for this instrument to be valid requires that the founders' law schools affect the law school composition of partners but affect the composition of associates only through founder law schools' composition effect on partners.[17] This restriction could be invalid if, for example, the founder of a firm put in place a corporate culture that fits graduates of one school particularly well or if the founder set the firm on a path of specializing in a particular type of law and graduates of his school are still particularly good in this area. These potential problems seem plausible, but we feel confident they do not present a large concern because the IV results we present below are essentially identical to those we get when we restrict our sample to firms that were founded in 1920 or earlier. The practice of law and the specialty of law schools have changed so dramatically in the intervening 90 years that we do not think specialties or cultures instituted by the founders could drive current associate hiring directly.

Table 4 contains the results of these regressions.[18] The sample is smaller than in prior analyses because we use only those offices with at least 20 associates and 20 partners. Panel A, which uses any office in our sample that meets these size criteria, shows that proximity is related to office-level law school shares. Column 2 shows that a law school 10–150 miles from a law office is predicted to have an excess share that is more than six percentage points lower than that for a law school that is under 10 miles from an office. Within-10-miles schools are predicted to have shares that are roughly seven percentage points higher than shares for schools that are more than 150 miles away.

We then use the residuals from these regressions to compute new γ_j's (see column 2). Specifically, we calculate the γ_j's based on Equation (1), but replacing $s_{ji} - x_i$ with the residual for the regression of $s_{ji} - x_i$ on the relevant regressors.[19] For comparison purposes, we also list the unadjusted γ_j in column 1. These unadjusted figures are analogous to those in the last column of Table 2 but differ slightly because the sample in Table 4 is limited to offices with at least 20 associates AND at least 20 partners, and the γ_js in Table 4 are for associates only. The mean value for γ_j falls from about 0.9 to about 0.6, or a drop of almost a third. The median γ_j falls by a similar magnitude. Thus it appears that more than one-third of observed office-level law-school concentration for associates is explained by simple geographic proximity between offices and law schools.

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[17]We do not present results from our first-stage regressions, which all indicate the instrument is strong. Having a founder who went to a given law school increases that school's share of the firm's partners by 5 to 12%. The F-statistic for the excluded instrument varies from 16 to 80, depending on specification.

[18]We adjust the standard errors using the methods in Cameron, Gelbach, and Miller (2011) to allow for correlation in the errors both by law school and by office.

[19]Note that though the mean of $s_{ji} - x_i$ is zero by construction, the distribution is skewed because S_{ji} is zero for most firm/school combinations. However, the distribution of the errors is much closer to zero on average. Also, we ran 90th-percentile quantile regressions (just under 90% of the dependent variables are negative in our sample), which led to similar conclusions.

Table 4. Determinants of Office-Level School Shares

Panel A: Full sample (553 offices)

Regression type		*OLS*	*OLS*	*OLS*	*IV*	*OLS*	*IV*	*OLS*	*IV*
City fixed effects/distance interactions		No	Yes	No	No	No	No	Yes	Yes
Office/school distance < 10		Excluded				Excluded	Excluded		
Office/school distance ∈ [10,150]		−0.0675				−0.0283	−0.0342		
		(0.0088)				(0.0042)	(0.0058)		
Office/school distance ∈ [150,500]		−0.0837				−0.0351	−0.0424		
		(0.0085)				(0.0042)	(0.0065)		
Office/school distance ≥ 500		−0.0887				−0.0362	−0.0441		
		(0.0086)				(0.0043)	(0.0069)		
Partner share				0.7846	0.7000	0.6816	0.5790	0.5846	0.5129
				(0.0328)	(0.0718)	(0.0340)	(0.0792)	(0.0345)	(0.0608)
N		100,093	100,093	100,093	100,093	100,093	100,093	100,093	100,093
R^2		0.2758	0.4695	0.5803	0.5735	0.6154	0.6077	0.6588	0.6559
Mean γ	0.0929	0.0612	0.0389	0.0262	0.0269	0.0221	0.0220	0.0171	0.0174
Median γ	0.0728	0.0469	0.0305	0.0193	0.0202	0.0155	0.0158	0.0114	0.0123

Panel B: Tier I firms (294 offices)

Regression type		*OLS*	*OLS*	*OLS*	*IV*	*OLS*	*IV*	*OLS*	*IV*
City fixed effects/distance interactions		No	Yes	No	No	No	No	Yes	Yes
Office/school distance < 10		Excluded				Excluded	Excluded		
Office/school distance ∈ [10,150]		−0.0521				−0.0248	−0.0287		
		(0.0089)				(0.0047)	(0.0058)		
Office/school distance ∈ [150,500]		−0.0644				−0.0309	−0.0357		
		(0.0080)				(0.0044)	(0.0061)		
Office/school distance ≥ 500		−0.0693				−0.0323	−0.0375		
		(0.0086)				(0.0045)	(0.0064)		
Partner share				0.7282	0.6316	0.6250	0.5364	0.5589	0.5125
				(0.0422)	(0.0883)	(0.0418)	(0.0784)	(0.0424)	(0.0643)
N		53,214	53,214	53,214	53,214	53,214	53,214	53,214	53,214
R^2		0.2556	0.3861	0.5204	0.5112	0.5643	0.5584	0.5982	0.5968
Mean γ	0.0703	0.0474	0.0357	0.0238	0.0246	0.0198	0.0204	0.0168	0.0169
Median γ	0.0591	0.0395	0.0286	0.0177	0.0184	0.0142	0.0146	0.0116	0.0122

(continued)

Panel C: Tier II firms (163 offices)

Regression Type		OLS	OLS	OLS	IV	OLS	IV	OLS	IV
City fixed effects/distance interactions		No	Yes	No	No	No	No	Yes	Yes
Office/school distance < 10		Excluded				Excluded	Excluded		
Office/school distance ∈ [10,150]		-0.0833 (0.0105)				-0.0383 (0.0062)	-0.0432 (0.0044)		
Office/school distance ∈ [150,500]		-0.1039 (0.0107)				-0.0474 (0.0063)	-0.0536 (0.0107)		
Office/school distance ≥ 500		-0.1086 (0.0108)				-0.0484 (0.0064)	-0.0548 (0.0112)		
Partner share				0.7859 (0.0337)	0.7531 (0.0705)	0.6538 (0.0356)	0.5820 (0.1010)	0.5397 (0.0360)	0.5245 (0.0970)
N		29,503	29,503	29,503	29,503	29,503	29,503	29,503	29,503
R^2		0.3254	0.5500	0.5692	0.5682	0.6155	0.6120	0.6880	0.6879
Mean γ	0.1036	0.0617	0.0328	0.0304	0.0305	0.0244	0.0249	0.0156	0.0151
Median γ	0.0825	0.0458	0.0288	0.0229	0.0245	0.0168	0.0168	0.0101	0.0104

Panel D: Tier III firms (96 offices)

Regression type		OLS	OLS	OLS	IV	OLS	IV	OLS	IV
City fixed effects/distance interactions		No	Yes	No	No	No	No	Yes	Yes
Office/school distance < 10		Excluded				Excluded	Excluded		
Office/school distance ∈ [10,150]		-0.1310 (0.0161)				-0.0351 (0.0075)	-0.0627 (0.0155)		
Office/school distance ∈ [150,500]		-0.1529 (0.0165)				-0.0415 (0.0077)	-0.0736 (0.0172)		
Office/school distance ≥ 500		-0.1589 (0.0164)				-0.0429 (0.0077)	-0.0763 (0.0176)		
Partner share				0.8815 (0.0326)	0.7452 (0.0638)	0.7823 (0.0373)	0.5570 (0.1043)	0.7124 (0.0384)	0.4839 (0.1166)
N		17,376	17,376	17,376	17,376	17,376	17,376	17,376	17,376
R^2		0.3569	0.5442	0.7050	0.6881	0.7222	0.6919	0.7580	0.7360
Mean γ	0.1440	0.0832	0.0514	0.0239	0.0267	0.0210	0.0261	0.0148	0.0186
Median γ	0.1227	0.0649	0.0291	0.0178	0.0211	0.0146	0.0203	0.0092	0.0101

Table 4. Continued

Notes: Unit of analysis is an office/school pair. Dependent variable of the regressions is the office-level associate share from that law school. Gammas in the first column are the raw gammas, calculated as in previous tables. Gammas in other columns are calculated using residuals from the corresponding regression in place of $s_{ji} - \varkappa_i$ (office-level share–average share). Sample is limited to offices with at least 20 associates. Standard errors (clustered by office and by law school) in parentheses.

The regression in column 3 shows that distance matters differently depending on where the office is located. Adding distance/city interactions increases the explanatory power of the regression substantially and explains another large portion of office-level concentration. The effect of distance varies quite a bit. For example, the effect of being from a school that is 10–150 miles from the office is 0.4 more in Austin than in Boston, Chicago, or Washington, DC. That is, other things being equal, suppose a law office in Austin or any of these other cities had a share of lawyers of 0.02 from some school that was 100 miles away. We would expect that, in Boston, Chicago, or DC, the office's share from a school in the same city would be about 0.08. But in Austin, we would expect the share of a school in that city to be 0.48. For this regression, the adjusted γ_j's now average 0.0389 and have a median of 0.0303, which means that distance from the school to the office, when allowed to vary by city, can explain well over half the office-level variation of our sample. This makes it clear that the geographical aspects of natural advantage are very important in sorting lawyers into law firms.

Columns 4 and 5 show specifications in which the only explanatory variable is partner school share in the office and show that partner share is closely related to the office's associate school share. In column 5, we use an indicator variable for whether any of the firm's founders went to the relevant law school as an instrument for partner share from the school. Roughly 70 to 80% of any difference across offices in partner share is reflected in associate share as well. The adjusted γ_j's at the bottom of the table show that this one variable can explain more than two-thirds of associate office concentration, which is much more than the distance and distance/city interactions can explain. In the final four columns, we combine the geography and partner share measures (with and without the instrument for partner share). Though this mutes the partner/associate share relationship somewhat, even controlling for distance effects and distance effects by city, our OLS and IV point estimates of the marginal effect of partner share on associate share are between 0.5 and 0.6 (implying strong economic significance) and are statistically significant at much better than the 1% level. The office-level associate γ_j's are lowered somewhat when we combine all the variables, but partner share alone can explain almost as much as the whole set of variables. The unconditional median associate-level γ is 0.0728, but the associate-level γ is only about 0.012 after conditioning on distance and partner share. Thus, more than 80% of associate-level concentration can be explained by these variables. To the extent that one accepts founder law school as a valid instrument for partner law school share, we can interpret this as a causal effect of partner law school share on the law schools from which associates are hired.

Overall, the results in Panel A of Table 4 make it clear that geography matters a great deal in placing lawyers at law firms but that the effect of geography differs substantially from city to city. We found that geographic natural advantage can explain a little more than half of the concentration of graduates of law schools into law firms and that a combination of natural

advantage and our only direct measure of lawyer complementarity (partner share) can explain more than 80% of concentration. We also showed that there is a very close relationship between partner and associate school shares within law offices. While some of this relationship could reflect the geographic proximity we measured separately, the partner/associate share relationship continues to be quite strong even when we control for school-to-office distance quite flexibly. Given the strength of our results when we use a plausible instrument for partner school share, we believe this is compelling (or, at the very least, strongly suggestive) evidence of school-based hiring networks within law offices.[20]

Panels B, C, and D of Table 4 repeat the analysis in panel A, limiting the sample to Tier I, Tier II, and Tier III offices, respectively. Column 2 of these three panels confirms that geography matters more at less prestigious firms. Specifically, at Tier III firms, office/school combinations where the office and school are more than 10 miles apart are expected to have more than a 13% lower share at that office than two lawyers within 10 miles of each other. This is much larger than the 5% difference we would expect in similar office/school pairs at a Tier I firm. Just adjusting for distance category lowers the γ's for Tier III firms by about the size of the unconditional γ's of Tier I firms. Including the city/distance interactions has an additional large effect—these natural advantage variables can explain about two-thirds of the associate office-level concentration at Tier II and Tier III firms.

Columns 4 and 5 of Panels B through D show that the general conclusions about the relationship between partner share and associate share are the same for each of these subgroups as they are for the sample as a whole. That is, partner share is strongly associated with associate share when we control for distance and city/distance interactions and whether or not we instrument for partner share. For firms in all three tiers, we would expect that at offices of firm A and firm B in the same city where firm A has 10% of its partners from some law school and firm B has no partners from that school, firm A's associate share would be 6 to 9% higher than firm B's. However, we also find some evidence that the strength of this relationship is decreasing in prestige. In nearly all OLS specifications, the coefficient on partner share is monotonically decreasing in prestige, and the Tier III partner share coefficient is statistically significantly larger than the other two. The differences are less statistically distinct in the IV regressions, both because the standard errors are higher and because the IV regression with all controls using Tier III firms (see the right-most column of Panel D)

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[20]We redid the analysis in Panel A of Table 4 separately by gender and by specialties within an office (for example, litigators only or corporate attorneys only). The overall concentration levels were not noticeably larger for these subgroups, and the effects of distance were similar to those in the table. Most important, the effects of partner share on associate share were no larger within these groups than for the office as a whole (for example, the effect of female partner share on female associate shares or the effect of litigator partner share on litigator associate share), and the effects across these groups were no smaller (for example, the effect of male partner share on female associate shares or the effect of litigator partner share on corporate associate share).

shows a drop in the partner effect for this one specification. Finally, note that the overall importance of natural advantage and lawyer complementarity is clearly decreasing in prestige given that the unadjusted concentration is lower at high-prestige firms (column 1) but the concentration measures are similar for all three tiers after we adjust for distance from office to school, office location, and partner share (column 6).

These differences suggest that the lawyer labor market is much less geographically localized at high-prestige firms, suggesting a willingness on the part of firms to search widely (and, on the part of lawyers, to move widely) in order to match the best lawyers to the most important work. They also suggest that lawyers at higher-prestige firms are more willing to go outside the law school network they know in order to find new members of the firm.[21]

Conclusion

We measured the level of law school concentration within law firms and decomposed this concentration into a part driven by geography and a part driven by lawyer networks. We have shown that even at the largest law firms in the United States hiring is driven largely by geography. We also showed that even when we control for geographic proximity quite flexibly and use an instrument for partners' law schools, partners hire associates that went to the same law schools they went to much more than would be expected by chance. This suggests that there is some source of complementarity between lawyers from the same law school that attracts them to the same workplace (though we do not know the magnitude of complementarity or how any value created is split between firms and lawyers).

While geography and lawyer complementarity are important for most of our sample of large law firms, they appear to be much more important outside the most prestigious firms. The labor market for large-firm lawyers is quite geographically concentrated, but this is noticeably less true at the most prestigious and profitable firms. This is consistent with there being a high return to getting the very top legal talent for certain types of legal work, while thick local markets can satisfy demand for lawyers who do more basic legal work.

A natural question for future research is whether the firm/worker match for lawyers is driven by demand for lawyers or supply of lawyers. Is geographic natural advantage important because firms value hiring from local schools, or do lawyers go to school and then live in areas they like? One possible way to address this would be to use a lawyer's undergraduate institution as an indication of geographic taste that is not related directly to law school or to

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[21]Dustmann et al. (2010) found strikingly similar patterns in the hiring networks of a very different population—ethnic minorities in Germany. As we found in the case of associates and partners, they found that the probability of a new hire's coming from a given ethnic group is strongly increasing in the fraction of the firm's current workers from that ethnic group. Also, just as we find that school-based networks are less important at lower-prestige firms, they found that ethnic-based networks are less important for higher-skill workers.

where the lawyer practices. Though a formal analysis along these lines would require different methods than we have used so far, we have looked at the relative distances from lawyers' undergraduate institutions to their law school and to their office. The median lawyer travels almost twice as far from his undergraduate school to his law school as from his law school to his office. Similarly, the median undergraduate school-to-office distance is almost twice the law school-to-office distance. We think this finding provides suggestive, but far from conclusive, evidence consistent with the assumption that firms find it economical to recruit locally. In future work, we hope to more explicitly model and estimate lawyer location decisions.

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