Firm/Employee Matching: An Industry Study of American Lawyers

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Abstract

We study the sources of match-specific value at large American law firms by analyzing how graduates of law schools group into law firms. We measure the degree to which lawyers from certain schools concentrate within firms and then analyze how this agglomeration can be explained by "natural advantage" factors (such as geographic proximity) and by productive spillovers across graduates of a given school. We show that large law firms tend to be concentrated with regard to the law schools they hire from and that individual offices within these firms are substantially more concentrated. The degree of concentration is highly variable, as there is substantial variation in firms' hiring strategies. There are two main drivers of variation in law school concentration within law offices. First, geography drives a large amount of concentration, as most firms hire largely from local schools. Second, we show that school-based networks (and possibly productive spillovers) are important because partners' law schools drive associates' law school composition even controlling for firm, school, and firm/school match characteristics and when we instrument for partners' law schools.

1 Introduction

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 paper, we use lawyer biographies posted on large US law firms' web sites 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.

Using the Ellison and Glaeser (1997) index of concentration, we show that large law firms tend to be concentrated with regard to the law schools they hire from. That is, firms hire from groups of law schools in a way that does not appear to be random. Conditional on having some number of lawyers from a single school, another lawyer at that firm is more likely to have gone to that school. Our calculations show that the probability that, for the average firm, two attorneys selected at random attended the same law school is about six percentage points (or four times) higher than this number for two attorneys selected at random from the sample of all attorneys. We describe the concentration as economically meaningful, but not large.

We document substantial across-firm heterogeneity in law-school concentration. Thus, our sample firms appear to pursue markedly different hiring strategies. Some firms are unconcentrated; the distribution of law schools among such firms' employees is similar to the sample distribution of all attorneys. Other firms are quite concentrated. The most concentrated tend to be regional firms that hire exclusively from regional law schools. Other concentrated firms hire nationally, but only from the very top law schools. We also find that law offices are considerably more concentrated than law firms, but again that there is substantial heterogeneity in concentration. Breaking attorneys down by rank, we find that concentration measures do not differ much from partner to associate on average.

After establishing that law firms are concentrated with regards to the law schools their employees attended, we then decompose the sources of concentration. Using the terminology from Ellison and Glaeser (1999), 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 allow us to control for natural advantage in individual school/office pairs and then we recompute our concentration measure adjusting for these controls. This simple correction reduces concentration by about a third. We then adjust our concentration measure for crude measures of the degree to which firms and law schools "match" in terms of quality and prestige. This reduces our concentration estimates somewhat more.
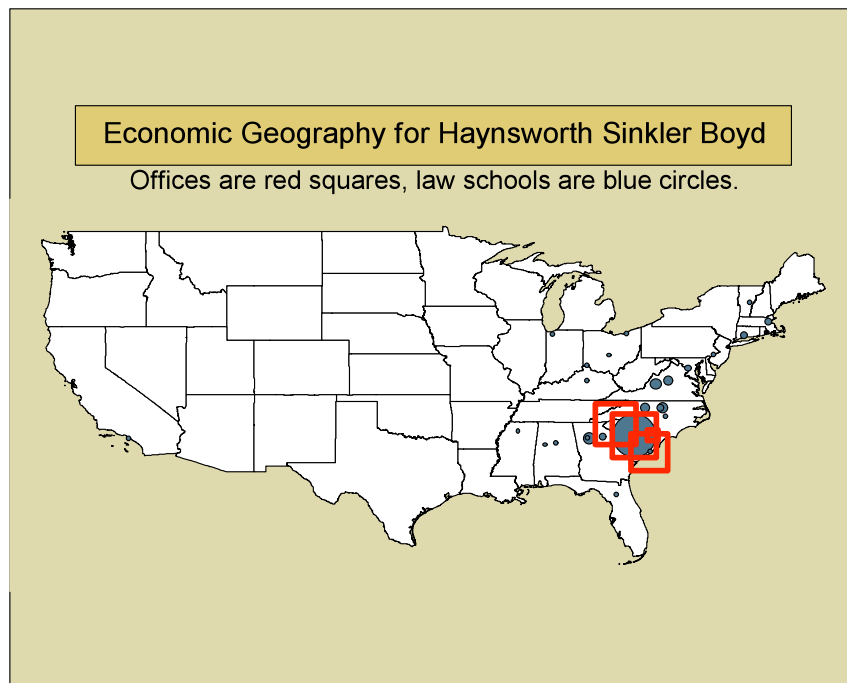
We then explore the importance of law school-based networks within law offices. There is a strong relation between partner concentration (at the office level) and associate concentration even controlling for firm, school, and firm/school match characteristics. Our point estimate of the effect of partner concentration on associate concentration is near 0.6, and it is statistically significant at well better than the 1% level. Also, when we instrument for partner law school concentration using law schools of firm founders, we find a similar relationship. We believe this analysis suggests that hiring networks and/or complementarities in working with graduates of the same school are important in this labor market. However, further research, probably using proprietary data to which we do not currently have access, would be required to determine the magnitude of the value created by networks and complementarities and how this value is split between firms and lawyers.

Figures 1 and 2 provide a useful illustration of some of our findings and help motivate the more detailed analysis to follow. 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 1(a) and 1(b)
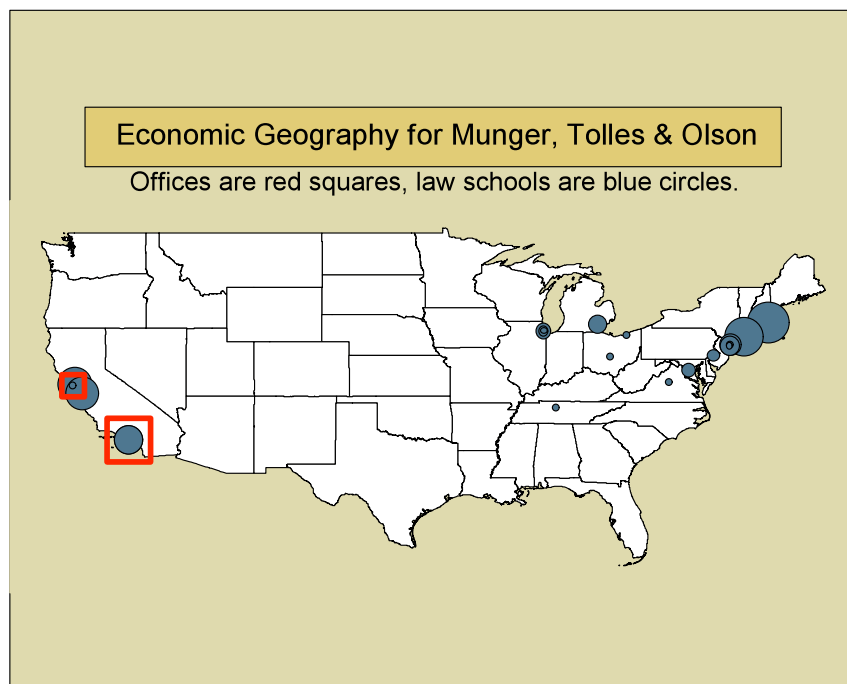
show firms that hire lawyers from a concentrated set of schools, but for very different reasons. Figure 1(a) maps Haynsworth Sinkler's four offices, all of which are in South Carolina cities: Charleston, Columbia, Greenville and Florence. Almost two-thirds of the firm's lawyers went to the University of South Carolina, with the remainder from a smattering of other schools in the Southeast. Munger Tolles, mapped in Figure 1(b), has offices only in San Francisco and Los Angeles. However, while some nearby schools are highly represented in this firm, they recruit 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 2(a), 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 DE. 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 ten lawyers from each of Boston College, University of Connecticut, Vanderbilt, and Villanova. Figure 2(b) maps DLA Piper, whose lawyers have a similar distribution of law schools. However, unlike Skadden Arps, these lawyers work in 21 offices spread out in small and large cities including Baltimore, Raleigh NC, and Sacramento CA. An office-level analysis of DLA Piper would show many of their offices hire in a localized manner (similar to Haynsworth Sinkler in Figure 1(a)), 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.

Our work is related to two strands of literature. First, there has recently 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 recent empirical studies of another high-skill group (specifically, economists), see Tervio (2011) and Goyal et al. (2006). For recent studies of how networks can affect labor market outcomes, see Bayer et al. (2008), Laschever (2009), and Dustmann et al. (2010). See Lazear

Economic Geography for Haynsworth Sinkler Boyd

Offices are red squares, law schools are blue circles.

(a) Haynsworth Sinkler

Economic Geography for Munger, Tolles & Olson

Offices are red squares, law schools are blue circles.
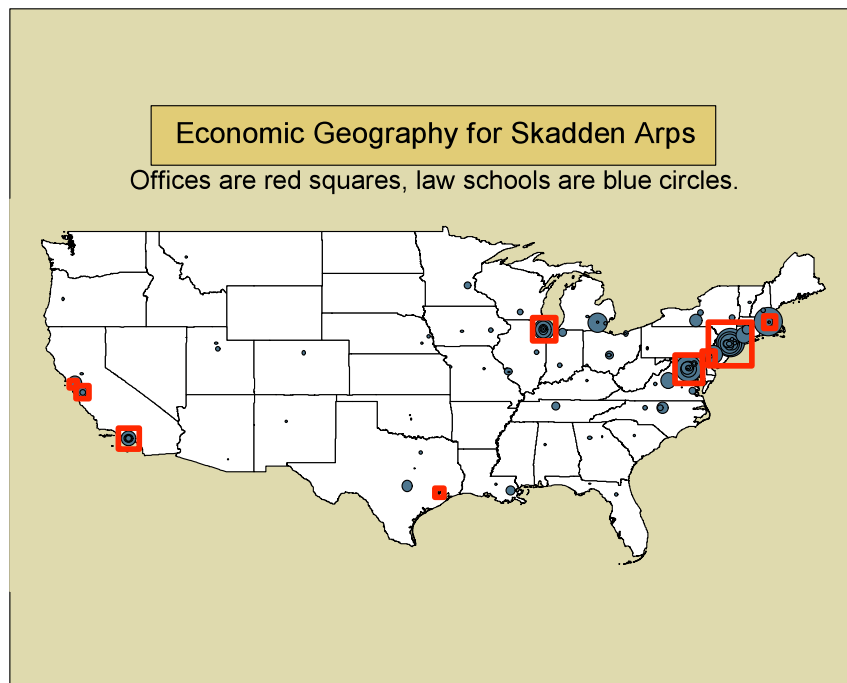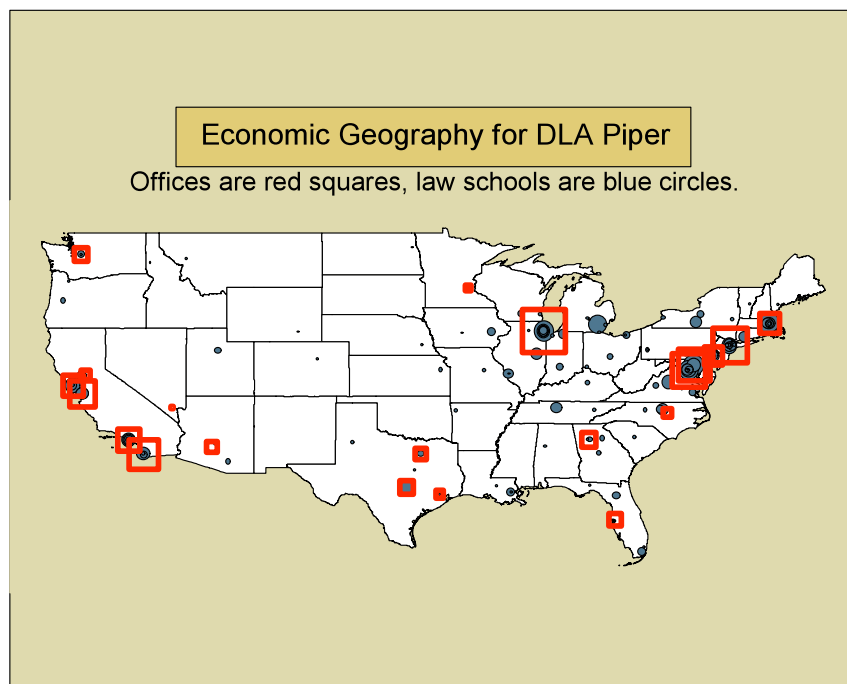
(b) Munger Tolles

Figure 1: Economic geography for two "concentrated" firms.

(a) Skadden Arps

(b) DLA Piper

Figure 2: Economic geography for two "unconcentrated" firms.

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 there is a large body of work analyzing this organizational form. We will not attempt to explain why these firms are organized the way that they are. Numerous theoretical explanations exist, including Kahn and Huberman (1988) who emphasize the importance of inducing investments in firm-specific human capital, Levin and Tadelis (2005) who focus on the importance of partners protecting the value of the firm's reputation, and Rebitzer and Taylor (2007) who consider how law firm organization may relate to the notion of property rights. Galanter and Palay (1991), among others, cite 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. Sauer (1998) does 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) study the relationship between market size, the organization of law firms, and the specialization of lawyers. They find that firms and lawyers are more specialized in larger markets. In related work, Garicano and Hubbard (2007) analyze the relationship between market size and the decision of lawyers to work alone or together. They argue 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) show 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 et al. (1996) study the work habits of lawyers and argue 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 touches on both the network and law firm literatures in her study of how school connections affect careers of lawyers. She also finds that law firms are concentrated in terms of the law schools they hire from. Her analysis focuses 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

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

firms.

2 Theoretical Background

2.1 Basic Model of Matching

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 law firms post reasonably detailed biographies of all their lawyers on a web site. In addition, because all lawyers go to law school, we can study the connection between law schools and law offices using a large and 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 where recruiting is of paramount importance.

To motivate the empirical analysis that follows, we begin by describing a 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 US 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. So, it begins by hiring the single lawyer that it thinks will be the most profitable, then hires another that 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.

There are at least two reasons why a firm may be inclined to hire more lawyers from a given law school than 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 resumè — 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 both the decision over 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 more on graduates of some schools than others is because a pair of lawyers generate some form of spillover. One potential spillover source is that graduates of a given law school may be more effective at hiring lawyers from the school they attended. This could be due to a transcript being more informative to an alumnus than to other lawyers, lawyers having relationships with professors or others at their alma mater that can provide information about individual students, or even a simple preference for hiring lawyers that went to the same school (though this last rationale would only increase firm profits if lawyers are willing to accept a compensating wage differential in order to work with people from their law school.) Another reason lawyers from the same school would be more productive when working together is if 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. That is, differences in law schools may help to screen lawyers into productive teams.[2] 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 interchangeably as lawyer complementarities, lawyer spillovers, and 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

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

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[2]For a more formal discussion and analysis of co-worker complementarity, see Hayes et al., 2006.

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 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 that 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 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 $g(.)$ were always zero and if $\log \overline{\Pi_i}$ 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 was 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 the concentration would relate to the stock of lawyers at a firm affecting the source of new lawyers that the firm adds.[3]

2.2   Measuring Concentration of Lawyers

Following Ellison and Glaeser (1997), we assume that the parameter γ^{na} captures the variation across law schools in natural advantage at firm j and that γ^s reflects potential lawyer complementarity. Both these parameters can vary from zero (if no law school has a natural advantage for firm j and if a newly hired lawyer's expected profit is independent of where the other lawyers went to school) to one (if a school has such strong natural advantage that firm j will hire all its lawyers from there and if hiring one lawyer from a school would lead firm j to hire all subsequent lawyers from that same school.) At any given firm, we will not be able to directly measure γ^s or γ^{na}, but we can construct a measure of concentration of lawyers at

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[3]We would ideally like to measure the degree to which agglomeration of lawyers by school creates value and how that value is split between firms and lawyers. This is not feasible, however, without detailed data on wages and productivity, which we do not have in this sample.

the firm, γ_j. We now explain how we generate this measure of concentration, how it relates to γ^s or γ^{na}, and how we will attempt to connect firm concentration to natural advantage and complementarity.

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 US law degree at law school i. Let x_i be the overall share of attorneys in the population of US lawyers who received their first US 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

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

This index has several useful properties. 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. 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. Finally, we can think of the firm index as an increasing function of the importance of natural advantage and spillovers at any given firm because Ellison and Glaeser (1997) show that, under certain conditions,

$$E(\gamma_j) = \gamma^{na} + \gamma^s - \gamma^{na}\gamma^s. \tag{2}$$

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 and all partners or associates at a firm or office (that is, we will measure γ_j where j indexes these other units). 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

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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.[4]

3   Empirical Analysis

3.1   Data

Our data primarily come from the web pages of law firms. [5] We began with a list of the 300 largest US 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 based on how prestigious it would be to work there.

We then wrote programs to access the lawyer bios listed on each firm's web site. The information in an online lawyer bio is fairly consistent across firms.[6] 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.[7] A few firms listed too little information on their lawyer bio pages to be useful, while others had web pages that were difficult for us to access using automated means. All lawyer bio data was collected during the first two weeks of July, 2008. We dropped all lawyers who work in foreign offices. Among those who work in US offices, we drop anyone who is not an associate, a partner, or "of counsel." We also drop 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.

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

[5]Throughout the paper, 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".

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

[7]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 affect our conclusions. We discuss these analyses briefly in Sections 3.4 and 4.

We use the law school of the lawyer's US-based JD, or, if the lawyer does not have a US-based JD, his or her first US law degree. Because rank is important for much of our analysis, we dropped seven firms for which more than 30% of lawyers' ranks were unavailable. Our final sample consists of 285 firms and 105,317 attorneys.

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 of 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 this data on individual lawyers with information about law firms and law schools. We assigned each lawyer to a metropolitan area based on their 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 where we categorized firms based on *American Lawyer*'s compensation per partner estimates and *Vault*'s prestige rankings and where we categorized schools based on 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 some basic information for a selection of the firms in our sample. Firms vary widely in the number of offices, their revenues per lawyer, and the fraction of their lawyers that are partners. For example, "leverage" is quite high at Cravath where 24% of lawyers are partners while more than half of Foley & Lardner's lawyers are partners. Some of the leverage differences are due to differences in organizational structure. Some firms have "income" partners that do not own part of the firm and still face an up-or-out promotion to "equity" partner. At Foley & Lardner, about half of the partners are income partners (based on comparing our count of partners to *American Lawyer*'s count of their equity partners) while Cravath makes no such

distinction. Unfortunately, we cannot distinguish equity partners from income partners, and 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 3(a), 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 office and 165 have an office in the New York City area. Huntsville TN, the Inland Empire area of California, Oklahoma City, Oxford MS, and Edwardsville IL 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, our sample of lawyers primarily works in large metropolitan areas. Also, state capitals are over-represented with several firms having reasonably large offices in, for example, Austin TX, Tallahassee FL, and Columbus OH.

In Figure 3(b), each circle is a single law school and circle size is proportional to the number of lawyers in our sample that 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 looks 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.

3.2 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 is 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 $s_{ji} = 0$

We also compute the law school share of all US attorneys (x_i). To do this, we compiled a list

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Table 1: Data on Selected Law Firms

| Firm Name	Offices	Attorneys	Partners	Profit per Partner	*Vault* Ranking	*US News* Median
Cadwalader	3	440	100	2900	36	22
Cahill Gordon	2	269	70	2575	56	13
Calfee	2	167	83	.	.	51
Carlton Fields	5	250	148	470	.	41
Chadbourne & Parke	4	215	88	1085	72	14
Chapman Cutler	3	211	128	615	.	22
Choate	1	173	88	1100	96	14
Clausen Miller	3	158	84	.	.	70
Cleary Gottlieb	2	506	107	2120	8	4
Cooley Godward	6	596	220	1000	52	14
Coughlin Stoia	8	161	76	.	.	58
Covington & Burling	3	540	172	1085	10	8
Cozen O'Connor	15	480	349	520	.	60
Cravath	1	367	87	3015	2	4
Crowell Moring	3	350	144	815	78	19
Cummings Lockwood	3	78	49	.	.	32
Curtis	3	139	68	.	.	14
DLA Piper	21	1451	694	1120	65	27
Davis Polk	3	527	138	1820	5	4
Davis Wright	7	430	273	365	.	27
Day Pitney	5	313	139	570	.	50
Debevoise Plimpton	2	476	115	1805	13	4
Dechert	11	760	213	1985	55	16
Dewey Leboeuf	13	807	265	1450	30	15
Dickinson Wright	1	227	151	.	.	34
Dickstein Shapiro	3	352	155	1080	.	19
Dilworth Paxson	4	98	54	.	.	60
Dinsmore & Shohl	8	232	122	420	.	56
Dorsey & Whitney	13	586	262	505	81	19
Dow Lohnes	2	145	75	950	.	14
Drinker Biddle	10	626	269	585	.	39
Duane Morris	18	575	363	730	.	42
Dykema	7	544	336	370	.	43
Eckert Seamans	8	253	170	.	.	60
Edwards Angell	8	492	237	740	.	27
Epstein Becker	8	371	168	595	.	42
Faegre Benson	4	445	230	435	.	19
Farella Braun	1	113	63	.	.	8
Fennemore Craig	4	177	105	.	.	43
Fenwick & West	4	254	91	945	88	14
Finnegan	4	324	144	1060	85	22
Fish Richardson	10	443	173	920	62	19
Fitzpatrick Cella	3	124	54	745	.	50
Foley Hoag	2	198	86	665	.	14
Foley & Lardner	17	951	499	890	66	22
Fowler White	6	170	109	.	.	41
Fox Rothschild	12	346	210	515	.	60
Fragomen	15	199	46	1805	.	65
Fredrikson Byron	2	222	131	.	.	19
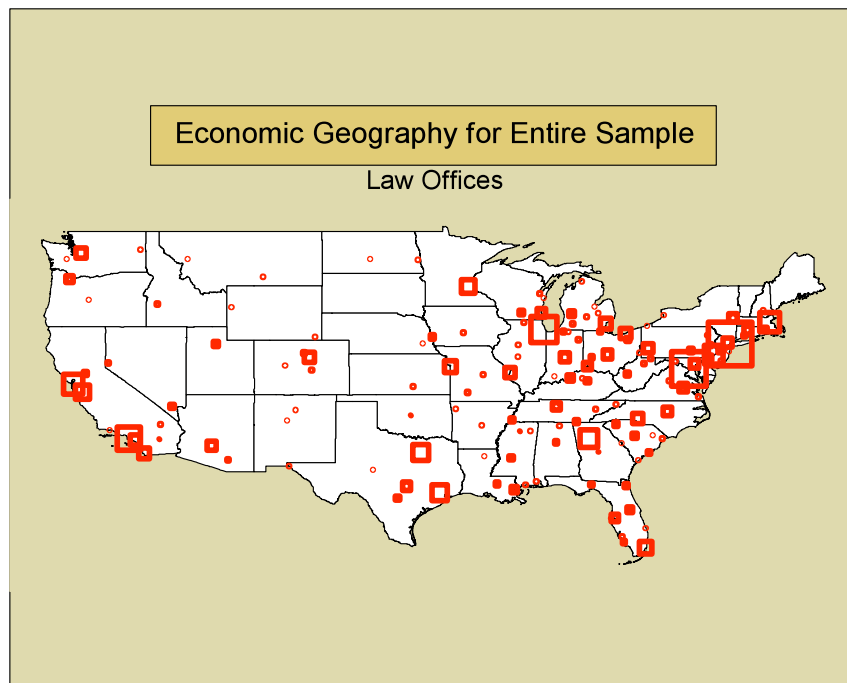
(a) Law Offices
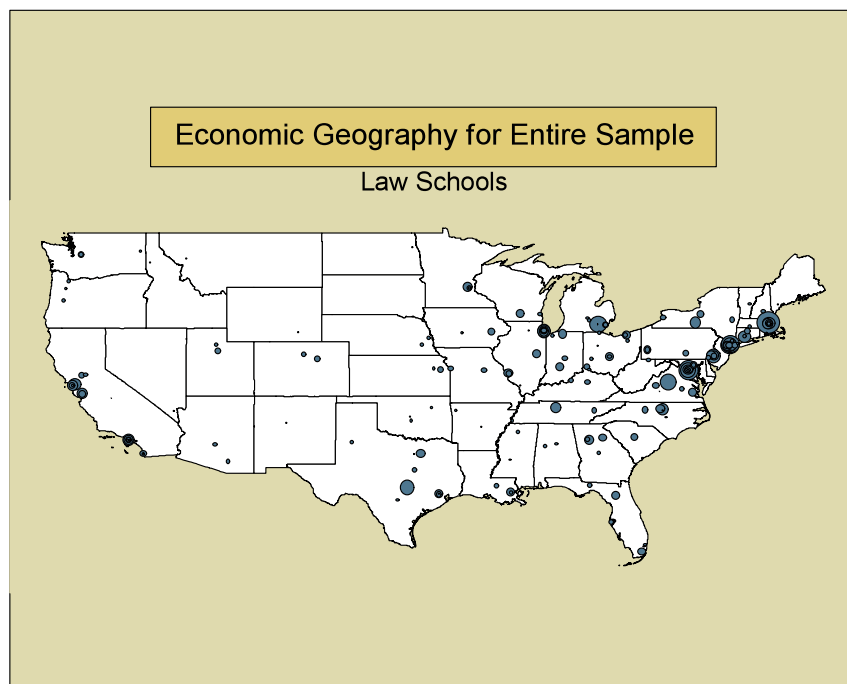
(b) Law Schools

Figure 3: Economic geography for law offices and law firms.

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. This sample, on average, went to less prestigious schools than the lawyers in our sample, which is what we would expect given that our sample includes the largest, most prestigious, and most expensive firms in the US. For example, while we estimate that 1.6%, 0.5%, and 0.5% of all US lawyers went to Harvard, Stanford, and Yale, respectively, these figures are 5.5%, 1.3%, and 1.6% for our 285 firm sample.[8]

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 are 4.9 percentage points more likely to have gone to the same law school than a pair of lawyers randomly selected from our sample as a whole. The probability that a random pair of lawyers from the US 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) report 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

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[8]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 US lawyers is more appropriate.

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

	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	1025

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

appear to dominate the firm/lawyer matching process.

Another comparison that helps put the results in Table 2 in some context is to look at law firm concentration relative to the concentration of where economists within universities' economics departments went to graduate school. Using the data from Tervio (2011), we calculated γ for 102 economics departments that have at least 15 faculty members. That is, we perform calculations analogous to our law firm concentration calculations, but treat economics departments similar 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.[9]

We now consider law offices as the unit of analysis and we again plot maps to illustrate sample hiring patterns. Figure 4 illustrates that Michigan-based Plunkett Cooney's Detroit office has a large number of attorneys from the University of Detroit. Further, the remainder of this office's attorneys come from other law schools within Metro Detroit. This one firm's hiring in this one area appears to be driven largely by geographic proximity. At the other extreme, Arnold & Porter's Washington DC office has sizable contingents of lawyers from many eastern

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[9]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 Tervio's sample. If we had the entire population of PhD economists, the measured concentration in economics departments would almost surely be higher.

and midwestern states.

The second column of Table 2 looks at the 1025 offices of our 285 firms which have at least twenty lawyers who graduated from US 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 paper 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 there are 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 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 get 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 to 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 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 Tervio (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
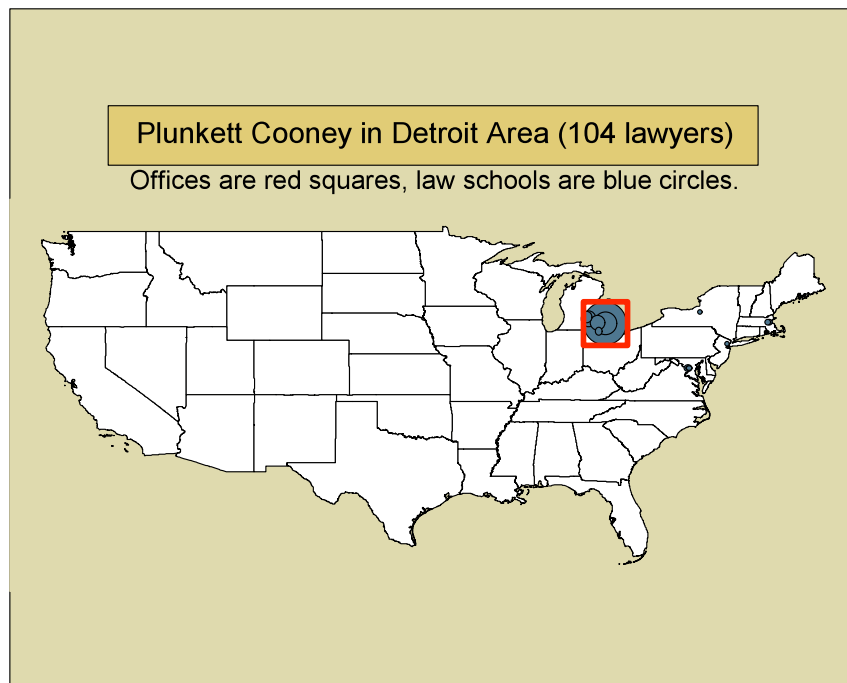
(a) Plunkett Cooney, Detroit Office
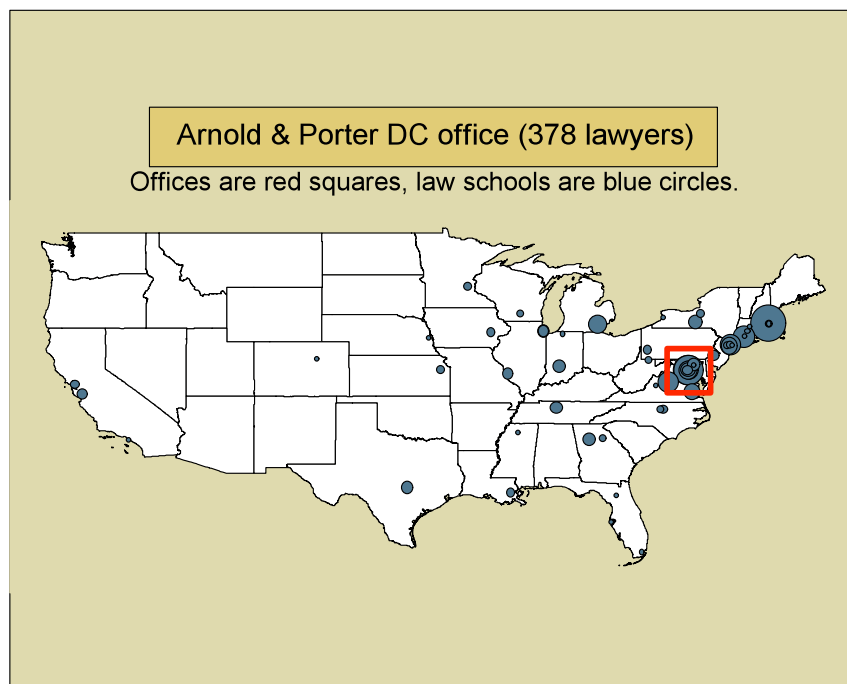
(b) Arnold & Porter, DC Office

Figure 4: Economic geography for one concentrated and one unconcentrated office.

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

	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

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

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 law school. Idiosyncrasy in state law seems to play a role as well; Louisiana is unique among states in that its legal code is based in part on civil law, and Baton Rouge law offices appear to have a disproportionate number of Louisiana State graduates. Offices in New York tend to have low concentration, but this outcome stems from two effects. Some New York offices have low concentration because they 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 three sub-samples. 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 are not in either ranking. Columns 1-3 of the table show that concentration increases substantially as we move from Tier I to Tier III. Tier I firms tend to hire from the national market (though there are offices such as the DLA Piper Austin office that 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 Monger Tolles map in Figure 1). However, even these firms hire from a sufficiently large set of

Table 4: Determinants of Law School Concentration at the Office Level					
City Fixed Effects	yes	no	yes	no	no
Firm Fixed Effects	no	yes	yes	no	yes
Law School in Same City				-0.0185	0.0226
				(0.0101)	(0.0110)
Top 25 Law School in Same City				-0.0455	-0.0275
				(0.0056)	(0.0059)
Flagship State School in Same City				0.0674	0.0650
				(0.0085)	(0.0087)
State Capital				0.0200	0.0206
				(0.0063)	(0.0066)
Largest City in State				0.0019	-0.0030
				(0.0052)	(0.0052)
Top 10 Law Market				-0.0285	-0.0199
				(0.0068)	(0.0073)
N	1025	1025	1025	1025	1025
R^2	0.7928	0.4649	0.8725	0.2797	0.5837

Dependent variable is office-level γ for offices with at least 20 attorneys. Standard errors in parentheses.

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 1-3 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.[10]

Table 4 is our first step to understand what factors contribute to office-level concentration of lawyers from certain schools. We regress office level γ's (that is, the 1,025 γ's that make up the distribution described in the right column of Table 2) on characteristics of firms and markets. Column 1 shows that fully 80% of the variation in γ's across these 1,025 offices can be explained by fixed effects for the locations of those offices. Column 2 shows that firm effects are also a useful predictor of concentration, with about half of the variation explained by firm effects. Column 3 shows that combining these two sets of fixed effects increased the R^2 of the regression to near 90%. Though far from conclusive, these three regressions indicate that geographic differences are a very strong contributor to patterns in lawyer agglomeration and that differences in firm hiring strategies also play a role in determining the level of lawyer concentration.

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[10]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 over-represented 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.

The regression in Column 4 replaces all these fixed effects with variables related to the legal environment and the law school recruiting environment in an office's city. Three of these variables stand out in the regression (and remain important when adding firm fixed effects in column 5). Law offices that share a city with the flagship campus of the state law school have γ's 0.07 higher than otherwise similar offices. This is almost as high as the office-level sample mean and higher than the median, indicating offices in these cities are roughly twice as concentrated as other offices. Offices in a city with a Top 25 law school (according to *US News and World Report*) have γ's 0.05 lower than otherwise similar offices. One might think this is less a reflection on the schools than it is on the types of cities that have top law schools (New York, Washington, Los Angeles, etc.). These are the markets where the most prestigious and expensive work is done, so they attract lawyers from all over. However, the negative effect of a top law school is both much larger than the effect of the office being in a Top 10 legal market and is large even though this other measure of the market is also in the regression. While these regressions are suggestive, they are limited by the fact that regressions of γ's do not allow us to take advantage of the variation in how well individual school characteristics match individual firms and offices.[11]

Overall, from Tables 2, 3, and 4, as well as the related maps, we see quite a bit of suggestive evidence that geography is an important determinant of hiring by law firms and that geography becomes more and more important as firm prestige goes down. Given the more prestigious firms tend to be more expensive and more profitable, lawyers appear to be willing to relocate further distances, and firms to recruit from further away, when the economic advantages are significant enough. We will study the relationship between lawyer concentration, geography, and prestige more formally below.

3.3   Concentration by Rank

Before analyzing how natural advantage and spillovers drive law office concentration, we consider whether the patterns in lawyer concentration from the last section differ by rank. We

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[11]Though not as large and significant, the coefficients on the "Law School in Same City" variable are also interesting. Given the other controls, this variable picks up the effect of having a law school that is outside the top 25 and is not the flagship state law school which essentially means the city has a law school but not a particularly good one. This would include cities such as Denver, San Diego, and Cleveland. As column 5 shows, concentration is marginally significantly lower in those cities. But, controlling for the firms that are in the city, concentration is higher by about a third of the median concentration. This likely indicates that the firms in these cities are more localized and hire from the local schools.

might expect that firms focus their new lawyer hiring on a small set of local schools and that they hire more senior lawyers from a variety of sources based on those lawyers' professional accomplishments.[12] More specifically, firms may have an informational advantage in choosing among potential lawyers at a particular school either based on local knowledge or their own school-specific knowledge. This informational advantage is likely to be less valuable in picking partners. Recent on-the-job performance is likely to be more important when hiring partners or moving them from one office to another within a firm. Therefore, we might expect law school concentration ratios to be lower for partners than for associates.

The first two columns of Table 5 show that school concentrations, when measured at the firm level, are slightly greater for partners than for associates. The mean (median) γ is 0.0707 (0.0520) for partners and 0.0667 (0.0500) for associates. There is considerable overlap in the list of firms with highest and lowest γ's for each rank and for the sample as whole. Also, while concentration is slightly higher within rank than for firms as a whole, the general magnitude is similar. This suggests that, at a broad firm level, the networks based on law school are at least as strong for partners as for associates.

Turning to law offices rather than firms, Figure 5 presents two examples of extreme concentration. As these figures show, when looking only at associates in the firm's biggest office, Skadden Arps continues to be quite diffuse in the law schools from which it hires while Nelson Mullins is extremely concentrated. This office features thirty-five graduates of the University of South Carolina law school, and one graduate each from ten other schools. The last two columns of Table 5 show the broader patterns for all office/rank combinations with at least twenty lawyers. This includes 662 offices for partners and 639 for associates. These tables and figures do not support the notion that concentration is greater at the associate level. The mean office-level γ is higher for partners, but the median is higher for associates. The differences between ranks are generally quite small, however, so there is no reason to think concentration, networks, or natural advantage affect associate hiring any differently than they affect the composition of partners.

Table 6 examines office/rank γ's in more detail by separating firms into the three tiers used in the prior section. As with the office-level analysis, office/rank γ's get decidedly smaller

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[12]Naturally, if law firms were up-or-out systems in the strictest sense, where lawyers only entered the firm as new graduates, then partner and associate concentration would be similar. However, as Galanter and Palay (1991) and Galanter and Henderson (2008) document, there is now considerable movement of lawyers from firm to firm, from office to office within a firm, or into law partnerships from other areas altogether.

Table 5: Law School Concentration at the Firm and Office Levels by Rank

	Firm-Level Concentration		Office-Level Concentration	
	Partners	Associates	Partners	Associates
Mean γ	0.0707	0.0667	0.0976	0.0922
Standard Deviation	0.0568	0.0569	0.0930	0.0694
First Quartile	0.0328	0.0276	0.0436	0.0467
Second Quartile	0.0520	0.0500	0.0695	0.0724
Third Quartile	0.0971	0.0880	0.1171	0.1144
Highest γ	0.4003	0.3712	0.8159	0.5993
Firm	Haynsworth Sinkler	Haynsworth Sinkler	Phelps Dunbar	Nelson Mullins
Office			Baton Rouge	Columbia SC
	63% from So. Car.	61% from So. Car.	90% from LSU	78% from So. Car
Lowest γ	0.0055	0.0027	0.0073	0.0026
Firm	Jackson Lewis	Milberg Weiss	Mayer Brown	Milberg Weiss
Office			LA	NYC
	4% from NYU	5 schools at 7%	5 schools at 8%	4 schools at 8%
N	284	283	662	639

See text for definition of concentration (γ). Offices are restricted to those with at least 20 attorneys at that rank.
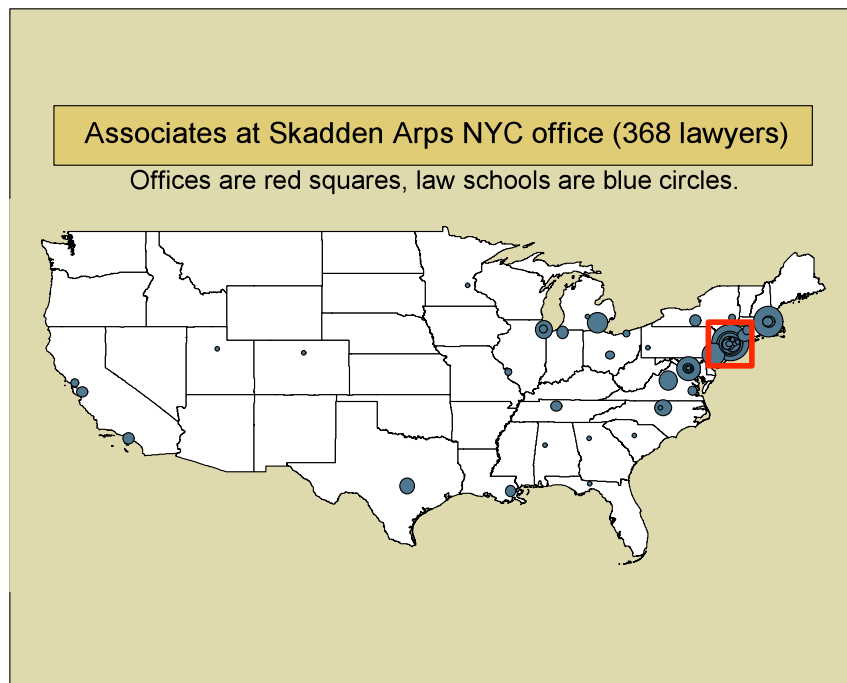
as firm prestige increases. However, these differences vary based on the rank of the lawyers. Comparing columns 1 and 4 shows that top tier law offices are quite a bit more concentrated in their associate composition than in their partner composition. Associate γ's are still low at Tier I firms relative to the other tiers, but they are somewhat larger than partner concentration for Tier I firms. The opposite is true for Tier III firms, where associate concentration is noticeably smaller than partner concentration.

We can only speculate as to why this difference exists at this point, but it may be indicative of differences in hiring and promotion strategies. For example, it may be the case that many lawyers from prestigious schools start their careers as associates of prestigious firms, fail to make partner at that firm, become partners in less prestigious firms, and displace associates at those less prestigious firms that went to less prestigious schools and do not make partner. There is some evidence in our data consistent with this. The distribution of *US News and World Report* rankings of associates and partners at Tier I firms in our sample are very similar, though the partners went to a slightly higher quality set of firms. In both Tier II and Tier III, however, the distribution of the partners' law school rankings is decidedly higher than that of the associates. The median (mean) ranking of Tier II associates' law schools is 43 (50.8) compared to 37 (44.3) for the partners at these firms. 1.7% of Tier II associates went to Harvard Law School and 0.5% went to Yale while 4.3% of Tier II partners went to Harvard and 1.1% went to Yale.
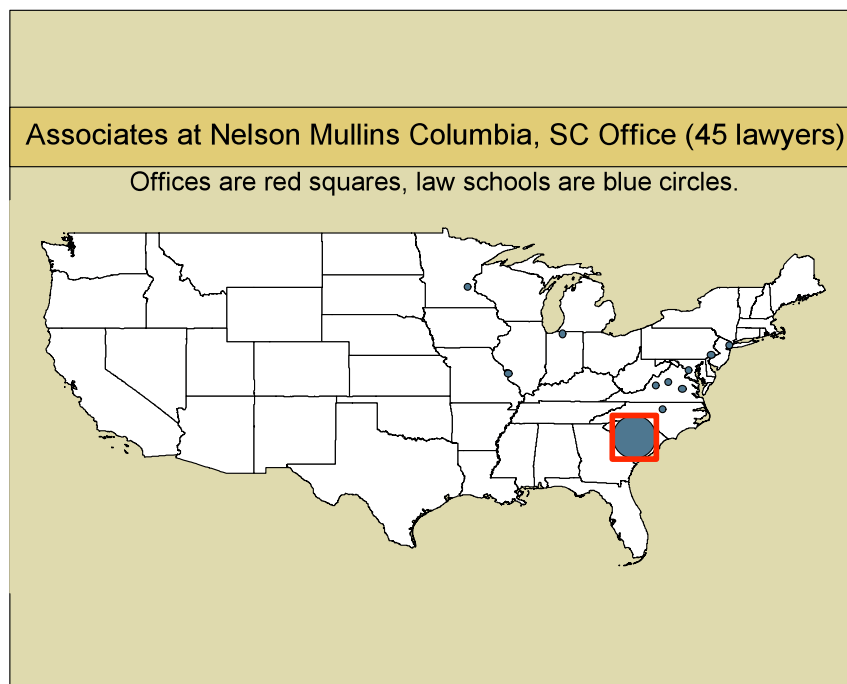
Table 6: Office-Level Law School Concentration by Firm Tier and Rank

	Panel A: Partners			Panel A: Associates		
	Tier I Firms	Tier II Firms	Tier III Firms	Tier I Firms	Tier II Firms	Tier III Firms
Mean γ	0.0670	0.1040	0.1549	0.0730	0.1025	0.1396
Standard Deviation	0.0490	0.0955	0.1277	0.0510	0.0737	0.0878
First Quartile	0.0379	0.0431	0.0751	0.0309	0.0526	0.0810
Second Quartile	0.0534	0.0782	0.1203	0.0604	0.0821	0.1194
Third Quartile	0.0783	0.1332	0.1898	0.0847	0.1307	0.1803
Highest γ	0.4071	0.7192	0.8159	0.3881	0.5993	0.5213
Firm	Foley & Lardner	Nelson Mullins	Phelps Dunbar	Vinson Elkins	Nelson Mullins	Phelps Dunbar
Office	Jacksonville	Charleston	Baton Rouge	Austin	Columbia, SC	Baton Rouge
	65% from FL	85% from So. Car.	90% from LSU	63% from TX	78% from So. Car.	72% from LSU
Lowest γ	0.0073	0.0131	0.0085	0.0125	0.0109	0.0026
Firm	Mayer Brown	Lewis Brisbois	Wiggin Dana	Foley & Lardner	Brown Rudnick	Milberg Weiss
Office	LA	Orange County	NYC	San Diego	NYC	NYC
	5 schools at 8%	12% from U of SD	4 schools at 10%	13% from Harvard, Seattle	14% Georgetown	4 schools at 8%
N	308	213	141	355	180	104

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

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Associates at Skadden Arps NYC office (368 lawyers)

Offices are red squares, law schools are blue circles.

(a) Skadden Arps, New York Office, Associates Only

Associates at Nelson Mullins Columbia, SC Office (45 lawyers)

Offices are red squares, law schools are blue circles.

(b) Nelson Mullins Columbia SC Office, Associates Only

Figure 5: Economic geography for associates at one concentrated and one unconcentrated office.

3.4 What Drives Concentration?

Next, we expand on the analysis of what factors lead to lawyer concentration that we began in Table 4 by running regressions with variables that vary at the firm/school level. As we explained in Section 2.2, our office level concentration (γ_j) measure is an increasing function of the importance of natural advantage and spillovers. We now decompose office-level concentration into parts due to natural advantage (γ^{na}) and parts due 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.[13]

In order to take advantage of measures such as geographic proximity between an office and a school, we run regressions where 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 associate that went to law school i and that x_i is the fraction of associates in the population that 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.

These regressions are a simplified version of the analysis in Ellison and Glaeser (1999). They study manufacturing industries and allow 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 point 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) show 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 of that candidate's law school from the firm's office. We would expect that, all else constant, law schools located near a given law office will be over-represented among that office's attorneys. Further, firms with better

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[13]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.

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 — due, perhaps, to 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 ten 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 Akerman Senterfitt 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.[14]

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, including those in the regressions in Table 4. So, 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 the firm/school tie 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 significant explanatory power to the regressions with school-to-office distance. However, the effect of firm/school prestige match goes away when controlling for distance/city interactions. This 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 far away prestigious schools than, for example, Jacksonville offices. This effect shows up in the regression by the distance effects being 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.

Note that, while we use metropolitan areas as our primary geographic unit of analysis, we

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[14]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.

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 as the most common bar exam taken by its graduates. This indicates that lawyers may choose their law school based on which state they want to practice in hoping that 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 looking 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 that 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 co-worker 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 were hired — and associate share, controlling for sources of natural advantage. Second, 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 only affect the composition of associates through its effect on partners. 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

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[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.

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 ninety years, that we do not think specialties or cultures instituted by the founders could drive current associate hiring directly.

Table 7 contains the results of these regressions.[17] The sample is smaller than in prior analyses because we only use offices with at least twenty associates and twenty 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 a law school that is under ten miles from an office. Within-ten-miles schools are predicted to have shares that are roughly seven percentage points higher compared to schools that are over 150 miles away. Taking residuals from this regression, we compute new γ_j's and report the mean and median in Column 2. 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 5, but differ slightly because the sample in Table 7 is limited to offices with at least 20 associates AND at least 20 partners. 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 over one-third of observed office-level law-school concentration for associates is explained by simple geographic proximity between offices and law schools.

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 equal, suppose a law office in Austin or any of these other cities had a share of lawyers from some school that was 100 miles away of 0.02. We would expect that, in Boston,

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[17]We adjust the standard errors using the methods in Cameron et al. (2011) to allow for correlation in the errors both by law school and by office.

Table 7: Determinants of Office-Level School Shares.

Panel A: Full Sample (553 offices)

		OLS	OLS	OLS	IV	OLS	IV	OLS	IV
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 Dist < 10		excluded				excluded	excluded		
Office/School Dist $\in [10, 150)$		-0.0675				-0.0283	-0.0342		
		(0.0088)				(0.0042)	(0.0058)		
Office/School Dist $\in [150, 500)$		-0.0837				-0.0351	-0.0424		
		(0.0085)				(0.0042)	(0.0065)		
Office/School Dist ≥ 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)

		OLS	OLS	OLS	IV	OLS	IV	OLS	IV
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 Dist < 10		excluded				excluded	excluded		
Office/School Dist $\in [10, 150)$		-0.0521				-0.0248	-0.0287		
		(0.0089)				(0.0047)	(0.0058)		
Office/School Dist $\in [150, 500)$		-0.0644				-0.0309	-0.0357		
		(0.0080)				(0.0044)	(0.0061)		
Office/School Dist ≥ 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

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 Dist < 10		excluded				excluded	excluded		
Office/School Dist ∈ [10, 150)		-0.0833				-0.0383	-0.0432		
		(0.0105)				(0.0062)	(0.0044)		
Office/School Dist ∈ [150, 500)		-0.1039				-0.0474	-0.0536		
		(0.0107)				(0.0063)	(0.0107)		
Office/School Dist ≥ 500		-0.1086				-0.0484	-0.0548		
		(0.0108)				(0.0064)	(0.0112)		
Partner Share				0.7859	0.7531	0.6538	0.5820	0.5397	0.5245
				(0.0337)	(0.0705)	(0.0356)	(0.1010)	(0.0360)	(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 Dist < 10		excluded				excluded	excluded		
Office/School Dist ∈ [10, 150)		-0.1310				-0.0351	-0.0627		
		(0.0161)				(0.0075)	(0.0155)		
Office/School Dist ∈ [150, 500)		-0.1529				-0.0415	-0.0736		
		(0.0165)				(0.0077)	(0.0172)		
Office/School Dist ≥ 500		-0.1589				-0.0429	-0.0763		
		(0.0164)				(0.0077)	(0.0176)		
Partner Share				0.8815	0.7452	0.7823	0.5570	0.7124	0.4839
				(0.0326)	(0.0638)	(0.0373)	(0.1043)	(0.0384)	(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

Unit of analysis is an office/school pair. Dependent variable is the office-level associate share from that law school. Sample is limited to offices with at least 20 associates. Standard errors (clustered by office and by law school) in parentheses.

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 where the only explanatory variable is partner school share in the office and shows 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 70-80% 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 over 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 combining 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, over 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 7 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 over 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 over 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 controlling for school-to-office distance quite flexibly. Given the strength of our results when using 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.[18]

Panels B, C, and D of Table 7 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, an office/school pair that is more than ten miles from one another is expected to have more than a 13% lower share at that office than an office/school pair within ten miles from 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-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 controlling 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 6-9% 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) shows a drop in the partner effect for this one specification. Finally, note that the overall importance of natural advantage and

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[18]We redid the analysis in Panel A of Table 7 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 importantly, 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 was 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.)

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 adjusting 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.[19]

4   Conclusion

We measured the level of law school concentration within law firms and decomposed this concentration into a part driven by geography and part driven by lawyer networks. We have shown that, even at the largest law firms in the US, hiring is largely driven by geography. We also showed, that, even controlling for geographic proximity quite flexibly and using 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 spillover or complementarity between lawyers from the same law school that attracts them to the same workplace (though we do not know the magnitude of spillover or 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 of 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 to ask whether the firm/worker match for lawyers is driven by demand for lawyers or supply of lawyers. Is geographic "natural advantage" important

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[19]Dustmann et al. (2010) find strikingly similar patterns in the hiring networks of a very different population — ethnic minorities in Germany. Similar to our findings for associates and partners, they find that the probability of a new hire 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 find that ethnic-based networks are less important for higher skill workers.

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 the undergraduate institution of a lawyer as an indication of geographic taste that is not directly related to law school or 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 provides suggestive, but far from conclusive, evidence consistent with firms finding it economical to recruit locally. In future work, we hope to more explicitly model and estimate lawyer location decisions.

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