Specialization, Firms, and Markets:
The Division of Labor Within and Between Law Firms

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Abstract

What is the role of firms and markets in mediating the division of labor? This paper uses confidential microdata from the Census of Services to examine law firms' boundaries. We first examine how the specialization of lawyers and firms increases as lawyers' returns to specialization increase. In fields where lawyers increasingly specialize with market size, the relationship between the share of lawyers who work in a field-specialized firm and market size indicates whether firms or markets more efficiently mediate relationships between lawyers in this and other fields. We then examine which pairs of specialists tend to work in the same versus different firms; this provides evidence on the scope of firms that are not field-specialized. We find that whether firms or markets mediate the division of labor varies across fields in a way that corresponds to differences in the value of cross-field referrals, consistent with Garicano and Santos' (2001) proposition that firms facilitate specialization by mediating exchanges of economic opportunities more efficiently than markets.

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1. Introduction

While the central importance of specialization for economic growth has been a concern of economics since Adam Smith, surprisingly little theoretical and empirical work has been undertaken probing the factors affecting specialization and the relation between specialization and economic organization. When is the division of labor best mediated by markets? When is it best mediated within firms? These issues have important implications for understanding how firms and industries are organized, and how industrial organization affects growth.

This paper studies the role of the market and the firm in mediating relationships between specialists, focusing on the United States legal services industry. Our analysis relies on law office-level data collected by the Bureau of the Census. A key question in the survey form law offices receive asks how many lawyers in the office specialize in each of 13 areas of the law. These data provide us a rare opportunity to examine relationships between individual and firm specialization, and to relate each of these to other variables that depict local market characteristics.

We employ two empirical approaches. One approach relies on cross-sectional variation in lawyers' returns to specialization (due to different market size) to identify when the division of labor between lawyers is best mediated by firms versus markets. When the division of labor between specialists in a particular field and other fields is efficiently mediated by firms, firms should not become more specialized as individual lawyers do. Thus the share of lawyers who work at a specialized firm should not increase with market size, even if the share of lawyers who specialize in the field does. On the other hand, if markets better mediate the division of labor between this and other fields, the share of lawyers who work in firms that specialize in the field should increase with market size at the same rate as the share of lawyers who specialize in the field. Fields only should be covered in the same firm if they are covered by the same individual; whenever the field becomes covered by a specialized individual, it should then become covered by a specialized firm. Thus, for fields in which lawyers increasingly specialize with market size, the relationship between the share of lawyers who work in a field-specialized firm and market size provides evidence regarding whether firms or markets more efficiently mediate relationships between lawyers in this and other fields.

The other approach investigates which pairs of specialists tend to be found in the same versus different firms. In this approach, we adapt a statistic developed by Ellison and Glaeser (1997), used in urban economics to examine the geographic agglomeration of firms. This statistic provides evidence regarding which pairs of specialists are more or less likely to be found in the same firm, compared to if they were randomly allocated. This evidence complements that of the first approach by providing additional evidence with respect to the scope of non-specialized firms. Whereas the first approach could identify fields in which specialists tend to work at the same firm as specialists in other fields, it could not identify which other fields.

We find that for most fields, the share of lawyers who specialize in the field increases with market size: individual specialization generally increases with market size, and does so across a broad range of market sizes. Other results indicate that whether firms or markets mediate the division of labor differs systematically across fields. The share of lawyers that specialize in fields where clients primarily demand expertise in the process of structuring transactions ("ex ante" fields) increases with market size but the share of lawyers that work at field-specialized firms does not. As lawyers become more specialized in "ex ante" fields, relationships between them and specialists in other fields are mediated by firms, not markets. We find a different pattern for fields where expertise is demanded for dispute resolution, litigation, and other problems associated with existing contracts ("ex post" fields). Both the share of individuals specializing in these fields and the share of individuals working at field-specialized firms increase with market size. As individuals become specialized in these fields, relationships between them and other specialists are mediated by markets. Finally, our analysis of the agglomeration of lawyers into firms indicates that specialists in "ex ante" fields tend to work with specialists in other "ex ante" fields, but not individuals in "ex post" fields.

As we explain in more detail below, these results indicate that firms' horizontal scope does not merely reflect the scope of individual clients' demands, but also organizational trade-offs associated with relationships between lawyers. Whether firms or markets mediate the division of labor varies across fields in a way that corresponds to differences in the value of cross-field referrals, consistent with Garicano and Santos' (2001) proposition that firms facilitate specialization by mediating exchanges of economic opportunities more efficiently than markets.[1]

[1] Similarly to Holmstrom and Milgrom (1994) and Holmstrom (2000), our account emphasizes how firms can outperform markets by weakening individual incentives. Because the trade-offs we investigate are different, so are

The rest of the paper is organized as follows. Section 2 discusses previous approaches to the relationship between specialization, firms and, markets. Section 3 provides the context to our analysis, and discusses the main institutional features that characterize law firms. Section 4 presents our theoretical framework and discusses how it will inform our empirical approach. Section 5 presents the data. Sections 6 and 7 present the empirical analysis from our two approaches. Section 8 concludes.

2. The Organization of Specialization: The Role of Firms and Markets

As Adam Smith first pointed out, specialization is central to economic growth because it is a source of increasing returns. The indivisibility of human capital investment implies a fixed cost element independent of subsequent utilization of skills, which means that two identical individuals gain by specializing, as they increase the utilization rate of the knowledge they acquire (Rosen, 1983).

The existence of these increasing returns does not mean, however, that specialization is only limited by the extent of the market. As Becker and Murphy (1992) note, specialists with overlapping skills are found in almost every market.[2] The reason, they argue, is that as specialization increases, the costs of coordinating the specialists involved in producing a particular good increase, so that coordination costs generate a source of decreasing returns that limit specialization even if market size is very large. If we accept the hypothesis that coordination costs are a key limit on our ability to benefit from the increasing returns derived from specialization, designing the right institutions to minimize such costs seems crucial.

Whether markets or firms are best at mediating transactions between specialists, and whether increasing specialization will take place within or between firms has been long debated. A view of the role of firms holds that the coordination of a group of specialists in a particular task must take place within a firm.[3] Empirically, this view implies that as specialization

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our predicted relationships between specialization (job design) and optimal organizational form. We do not address other incentive problems, such as those deriving from the risk of expropriation of specific investments (Klein, et al. (1978)) or to the role of physical assets in providing incentives in the presence of incomplete contracts (Grossman and Hart (1986), Hart and Moore (1990)), which may be more important in other environments.

[2] In their words "every reasonably large metropolitan area has several, often many, persons who have essentially the same specialized skills and compete in the same market. (…) The division of labor cannot be limited mainly by the extent of the market when many specialists provide essentially the same skills."

[3] Most notably, John Bates Clark [1909] first held the view that the role of entrepreneurs is the coordination of different types of labor and capital:'[The entrepreneur function] in itself includes no working and no owning of

increases, the set of tasks undertaken by an individual firm should not change, so that individual specialization should be entirely unrelated to firm specialization. On the other hand, as Hayek (1945) noted, the market appears ideally suited to the coordination of different specialized tasks and the reliance on divided knowledge. A theory consistent with this alternative argument was espoused by Stigler (1951), who argued that as an industry grows, vertical disintegration should be the norm as the different cost functions involved in the different aspects of the production of a good lead to different optimal efficient scales. Such a view implies that increases in the returns to individual specialization should lead to greater firm specialization, so that the two should move together.

Which pattern do we observe empirically? Is it the case that individual specialization moves together with firm specialization so that specialization takes place between firms? Or rather is it the case that specialization takes place within firms, so that no firm-level specialization is observed as individuals become more specialized?[4] Which pattern appears depends on the relative ability of the firm and the market to solve the actual coordination problems present in specific contexts. In itself, neither the fact that a large market size leads to a lot of individual specialists working together nor the fact that production involves a large number of complementarities requires that a firm coordinate all tasks. What must then be explored are the specific organizational trade-offs involved in the coordination of specialists for the production of a particular good or service.

3. The Provision of Legal Services

3.1 Lawyers and Specialization

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capital: it consists entirely in the establishing and maintaining of efficient relations between the agents of production.' (Chapter 1).

[4] An example of an industry where a huge market size leads to the emergence of a few huge, generalist firms that coordinate, mostly in-house, the work of specialists is the U. S. automobile industry. Alternatively, we observe the alternative, Stiglerian pattern, where specialization at individual level is manifested at the firm level so that most transactions between specialists are coordinated in the market, in the U.S. motion picture industry (see Enright (1995)). Here, as in the auto industry, a large number of complementary inputs are required to produce each final product. The production is tightly coupled and requires a lot of coordination. However, inputs are provided by individual specialists in very small specialized firms, so that individual specialization corresponds closely to firm specialization.

Legal services are supplied by lawyers, often with the assistance of paralegals and other office staff. Most practicing lawyers work in private law offices. We focus on these, since our data only include information on offices of privately-practicing lawyers.[5]

Many lawyers specialize in one or more areas of the law.[6] Broad fields of specialization include corporate law, criminal law, environmental law, family law, patent law, real estate law, tax law, and many others. These broad fields can be further subdivided into more specialized doctrines. For example, many specialists in corporate law specialize further in specific areas of corporate law (mergers and acquisitions, joint ventures, securities law, and so on). Subspecialization of this kind sometimes closely corresponds to client type, such as when tax or real estate lawyers specialize in areas of their field that concern businesses rather than individuals. In some fields involving interactions with courts, lawyers subspecialize according to whether they serve plaintiffs or defendants. For example, this is true of lawyers specializing in negligence law and criminal law. (In the latter, lawyers in private practice serve on the defendant's side.)

The demand for legal services arises when an individual or firm requires legal advice or assistance. Some of the services sought are forward-looking. For example, firms often demand legal advice regarding how business transactions should be structured. Demand can therefore arise when firms consider buying out another company, building a new plant, starting a new product line, and so on. Most transactions can be structured in many different ways, some more advantageous than others in light of the law, for example because they minimize parties' tax or legal liability. Individuals also sometimes demand advice of this sort, particularly for complex or unusual transactions. For example, individuals usually demand legal advice when they are arranging an estate. Other services are more backward-looking; business and individual clients seek legal advice on such matters as whether they broke a law or regulation, which contingency of an existing contract is applicable, and the extent to which parties are liable on matters not covered by existing contracts. These sources of demand often involve disputes that have the potential to be resolved in court, though the vast majority are not.

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[5] Bureau of Labor Statistics' Industry-Occupation Employment Matrix reports that in 2000, about 80% of lawyers worked out of law offices, 13% worked for a Federal, state, or local government, and 7% worked for firms not specializing in legal services. The latter includes lawyers working as "in-house counsel."

[6] The National Association for Law Placement's *The Official Guide To Legal Specialties* (Abrams (2000)) contains detailed descriptions of many classes of legal specialties. This subsection relies heavily on these accounts.

We classify the sources of demand according to when they arise along a contractual timeline. Figure 1 depicts a timeline in which the contractual relationship between two parties has four stages. In the first stage, contracts are proposed. In the second, parties agree to contractual terms and the agreement takes force. In the third, parties take actions and uncertainty is resolved about eventualities that may or may not have been contemplated in the contractual agreement. In the final stage, outcomes are observed, and liability is determined and transfers are made in light of the contractual agreement. We propose that demand for legal services can arise either before the contract is signed, when lawyers may be involved in drafting the contract and predicting the contingencies that may need to be dealt with, or after contractual terms are agreed upon and take force, when lawyers may be involved in dispute resolution and litigation. We label these "ex ante" and "ex post" services, respectively.

Expertise in different areas of the law tends to be demanded at different points on the contractual time line in Figure 1. Expertise in some fields tends to be demanded more before contractual terms are agreed upon than after. As a consequence, specialists in these fields tend to supply "ex ante" services. For example, although some demands for expertise in corporate law concern litigation, most revolve around structuring business transactions.[7] Similar statements apply to other fields, including banking, environmental, patent, real estate, and tax law. In contrast, expertise in other areas of the law tends to be demanded "ex post." Expertise in insurance law is usually demanded to help resolve claims associated with insurance contracts, and expertise in negligence law is demanded when liability is in question. Considering fields that apply primarily to individuals, demands in criminal and family law tend to be ex post, the latter because most demands concern dispute resolution in light of existing marriage contracts. Probate and estate law has more ex ante elements than other individual-oriented specialties, as it involves arranging trusts, wills, and estates.

Survey data confirms these cross-field differences in the source and timing of demands. Table 1 reports from an extensive interview-based survey ("Chicago Lawyers II") of Chicago lawyers completed in 1995 by Jack Heinz and Bob Nelson of the American Bar Foundation.[8]

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[7] "What is Corporate Law?: Whether negotiating the acquisition of a multibillion dollar company or assisting a small Internet start-up company, corporate lawyers are involved in advising business on their numerous legal rights, responsibilities and obligations." Abrams (2000:89)

[8] These data were collected as a follow-up project to Heinz and Laumann's (1982) book on the sociology and organization of the Chicago bar during the 1970s. Heinz and Nelson surveyed a random sample of Chicago-based

Questions in this survey ask privately-practicing lawyers what share of their time they spend on business, non-business organizational (e.g., governmental), and individual clients, and how many days per month they spend in state and Federal court. Days per month in court is a good indicator for the degree to which lawyers provide "ex ante" or "ex post" services. We report the average response by specialty for specialty categories that closely match those in the Census data that we use later in the paper.[9] The table indicates a sharp break in the share of time lawyers in different fields spend on business clients. Specialists in personal injury (on the plaintiff's side of the bar), criminal, divorce, and probate law spend almost all of their time on individual clients. The rest (except specialists in municipal law, which predominantly have governmental clients) spend the majority of their time on business clients. Likewise, personal injury, criminal, and divorce specialists spend more days in court than lawyers in any of the other specialties, consistent with the idea that demands for expertise in these fields tend to be more "ex post" than other fields. Although the number of observations is very low, probate specialists appear to spend less time in court than other specialists that serve individual clients, reflecting that the demand they face tends to be more for "ex ante" services.

In our analysis of specialization and firms' boundaries, we will classify fields as "ex ante" or "ex post," depending on when expertise in the field is primarily demanded. This distinction will be important within both our analytic framework and our discussion of the empirical results.

3.2: The Organization of Legal Services: Law Offices and Firms

The structure of the legal services industry is highly skewed and highly fragmented. There are some large, well-known law firms with hundreds of lawyers, but most law offices are small and most law firms consist of a single office. The 1992 Census of Services reports that of the 134,520 law offices operating throughout 1992, 69% had fewer than five employees (not

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lawyers taken from the State of Illinois' lawyer registration records. They collected the data by conducting one-hour interviews with subjects at their offices. In all, 788 lawyers from this random sample were interviewed, 526 of whom were in private practice. See Heinz, et. al. (1998) for more details. We are extremely grateful to Jack Heinz and Bob Nelson for sharing their data.

[9] Even these do not always match perfectly. For example, the Chicago Lawyers II survey does not include a separate category for "insurance law," but the Census data does. Jack Heinz reported to us that he believes that most of those reporting "insurance law" to the Census would classify themselves in the Chicago Lawyers II survey as "personal injury-defendant." Fifteen lawyers in the Chicago Lawyers II report themselves to be specialists in "securities;" these lawyers would probably be classified as "corporate" in the Census data. These lawyers'

including partners) and 0.7% had 100 or more employees. The 50 largest law firms in the United States combined account for only 10% of revenues and payroll in the industry. Only about 2% of law firms had more than one office and over half of these had only two. Firms with multiple offices account for only about one-third of industry revenues. The median lawyer works in a firm with fewer than 50 employees. (Bureau of the Census (1996))

Law firms in the U.S. are always structured around revenue-sharing agreements among the firm's partners, regardless of their legal form of organization. Although there is some variation in the form of these agreements, they share the feature that all partners receive some share of the revenues derived from each client.[10]

In the rest of this subsection, we provide some evidence on some more detailed aspects of revenue sharing and law firm organization using results the Chicago Lawyers II survey. This evidence helps guide our analytic framework.

Table 2 contains evidence on the importance of various factors in how partners split profits, as reported by the partners interviewed in Chicago Lawyers II. Partners were asked: "How important are each of these factors in decisions regarding the division of the profits of the firm?" The table contains the share of partners reporting "very important" and "important" for each of seven factors. Most partners in this survey report that "bringing in new business," "hours billed," and "client ties," are either important or very important. Other factors are important far less frequently. For example, only 38% of partners report that a senior partner's decision is an important or very important factor in how profits are divided, and an even lower share report that personal favoritism is. Few partners report that seniority is very important, indicating that "lock-step" compensation methods, where all partners with equal seniority share equally in the income of the firm, are rare.[11]

We draw two inferences from this table. One is that partners are rewarded for bringing in clients that other lawyers serve. Basing partners' share of profits on business generation as well as hours billed does this. The other concerns the mechanism through which quality incentives

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responses to the time allocation and days in court questions are very similar to the "general corporate" lawyers reported in Table 1.

[10] See Cotterman (1995) and the Survey of Law Firm Economics by Altman, Weil, and Pensa (2000).

[11] Cutterman (1995) reports that only a small number of firms employ lock-step methods, although this group includes some prestigious law firms, such as Cravath, Swaine and Moore; Cleary, Gotlieb, Steen, Hamilton; and Covington and Burling.

are given to lawyers. The survey responses do not indicate that the division of partnership profits depends directly on partners' assessment of the quality of each others' work. Since the quality of a lawyer's work is hard to evaluate according to objective criteria, such an assessment would have to be based on subjective performance evaluations made by senior partners. If firms commonly based profit shares directly on such assessments, one would expect more partners to report that their firms divide profits on the basis of senior partners' decisions. Note that this statement neither implies that partners have weak quality incentives, nor that partners do not assess each others' work. Lawyers likely pay attention to who does high quality work, but in most firms the mechanism through which such work is rewarded appears to take the form of an greater demand for higher quality lawyers' services, either directly from clients or indirectly through more referrals from lawyers in their or other firms.

The Chicago Lawyers II survey also sheds some light on how frequently partners work in teams with each other. It asks lawyers working in firms with at least 5 lawyers how frequently they work with lawyers at the same level, and how frequently they work with lawyers at levels above them. As Table 3 shows, of the 182 partners answering the question, 34 reported that they seldom or never work with lawyers at the same or higher levels.[12] This strongly suggests that while most partners in this survey work in teams with other partners at least occasionally, a substantial fraction does not. One explanation would be that partners who do not work in teams with other partners work in very small firms or departments. However, as depicted in the table, these respondents work in large divisions of large, multi-divisional firms: on average, they are in divisions with 22 partners and firms with 79 partners. Moreover, partners who do not work in teams with other partners report similar revenue sharing structures to those that do work in such teams.[13]

It is not unusual for a lawyer to be a partner in a firm, but rarely work with any other partners in their firm. This casts doubt on the hypothesis that the benefit of organizing partners within firms only has to do with facilitating team production. Partners who seldom or never work with any other partners in their firm nevertheless find it worthwhile to share revenues with

[12] While some of these may be the firm's highest-ranked partner, it is unlikely that many of them are. One third of these lawyers work at firms with one class of partners, and two thirds report that they have never served on their firm's management committee.

these other partners, and there is no evidence that the structure of revenue sharing differs with whether lawyers work in teams with other partners.

Finally, Table 4 shows that law firms often share the use of capital equipment and support staff when they otherwise would not be able to utilize them intensively enough to exploit scale economies. The table reports the responses of solo practitioners to Chicago Lawyer II survey questions that ask whether they have sole use of, or share the use of, a list of office equipment and support staff. The table indicates that most solo practitioners have access to these resources, although many of them do so by sharing these with other firms: over 65% of the sample of solo practitioners shares such resources as office space, a fax machine, a copying machine, or a receptionist.[14] Such resource-sharing highlights the importance of incentive-related trade-offs with respect to firms' boundaries: the size and scope of law partnerships are not simply determined by efficiencies from utilizing capital or support staff intensively.

Together, these facts shape the analytic framework that we present in the next section. Law firms' boundaries cannot just reflect trade-offs related to team production or neoclassical scale economies: law firms sometimes include partners who rarely work with any other partner, and firms share fixed factors to exploit scale economies. Law firms are organized around revenue-sharing arrangements; partners thus benefit when they identify clients that others in their firm serve. This is reflected in the high reported importance of business generation and client ties in profit-splitting. In contrast, there is far less sense that lawyers' compensation is based directly on assessments of the quality of their work.

Our analytic framework therefore de-emphasizes issues related to team production, neoclassical scale economies, and quality-related performance incentives, and emphasizes trade-offs related to providing lawyers incentives to refer clients to one another. The framework analyzes the costs and benefits of revenue sharing arrangements' general rather than specific features, since our primary data source does not contain information on the specific compensation methods individual firms use. We will then apply this framework to understand the field (horizontal) scope of law firms, since from the perspective of the partnership, including

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[13] One cannot reject the null that lawyers' reports of these structures are the same across these categories, using chi-squared tests of any conventional size. The details of how lawyers are compensated may, of course, differ. We have also checked whether specialization patterns differ across these categories, and find no evidence that they do.

a field within the firm involves including one or more partners in the field in their revenue-sharing agreement.[15]

4. Coordination of Legal Specialists In the Firm and the Market: The Role of Referrals

4.1. The Matching Problem

A fundamental problem that law firms confront as lawyers specialize is that of implementing mechanisms that lead to an efficient match between problems and specialists. A lawyer who knows that a particular client has a legal problem may conclude that she is herself the right person for the job or, alternatively, she may determine that some other lawyer should deal with the problem. In the latter case, she must refer it to another lawyer, potentially losing the rents that could be derived from dealing with the problem herself. A trade-off exists because mechanisms that encourage lawyers to work hard on clients' problems also, by necessity, weaken their incentives to refer problems to others. For example, allowing lawyers to receive all the revenues associated with their own work encourages them to keep problems all to themselves, and discourages them from asking other lawyers for help. A leading Boston lawyer best put the problem in a classic 1940 article on the organization of the law firm:[16]

> "But most clients do not go to lawyers because they are specialists in a given field; they generally are not even aware of it. They go to a given lawyer because they know, like and trust him. The client with a tax case is just as likely to go to the real estate expert and the client with a land problem to go to the tax expert. Each lawyer who has received a case is hesitant about referring it to the appropriate expert. Perhaps he ought to and if he is very busy, he may, but it is human nature not to want to lose a case and possibly a client. Self-preservation is here at cross-purposes with efficiency (…) The partnership form permits a group of members of the Bar who are specialists to associate themselves together in one organization. Then, to continue our analogy, the client with the tax case who comes to the partner who happens to be a real estate expert need not be sent out of the office; the attorney can either get the advice from his own partner who is a

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[14] The relatively low figure for databases such as Lexis-Nexis likely reflects that contractual restrictions inhibit resource-sharing. It also probably understates solo practitioners' access to such databases, as many obtain access through public and university law libraries.

[15] Levin and Tadelis (2002) emphasize another role of revenue sharing arrangements: they increase agent's incentives to hire high quality colleagues, as they care about average, rather than total, output. This can be valuable when clients are unable to distinguish good quality work. We view this theory as complementary to our analytic framework, which focuses instead on the effect of revenue sharing arrangements on firm scope.

[16] Reginald Heber Smith, the author, was the managing partner of Hale and Dorr in Boston and is credited (see, e.g., Cutterman 1995) with originating objective compensation systems used in law, accounting, and some other professional services.

tax export or he can introduce his client to that partner. There will be just one fee and that must somehow be shared by the two partners."

Reginald Heber Smith, *American Bar Association Journal*, 1940.

Failing to solve this incentive problem can have extremely negative consequences for a law firm. The literature is full of instances where a failure to solve the referral problem led to the fracture or even disappearance of a law firm. Watson, Leavenworth, Kelton, and Taggart, the premier patent and law firm at the time, disappeared when "the client-share system encouraged Watson, Leavenworth, Kelton, Taggart, lawyers to guard their clients' affiliation against intrusion by others, creating an atmosphere of competition among partners. Some partners suspected others of hoarding cases..."[17]

When lawyers are not specialized at all, the problem of matching problems to lawyers is trivial: all lawyers are equally good matches. As specialization increases, referrals may become needed in order to allocate problems efficiently.

When are referrals between lawyers likely to be most valuable? One answer is that referrals' value will tend to vary with clients' ability to identify the range of expertise their situation requires. They will tend to be valuable when clients are uncertain about the range of legal issues and the range of expertise a particular case may involve. In such cases, referrals will improve the match between lawyers and problems. In contrast, referrals between lawyers will not tend to be valuable when clients can clearly determine the type of legal problem their situation presents; they do not improve much on the match between lawyers and problems when clients can match themselves to lawyers well.

It follows that referrals between specialists in different areas of the law will tend to be more valuable when clients have ex ante than ex post demands. It is generally difficult for clients demanding ex ante services to determine the range of legal expertise that is relevant to their situation. These services are demanded in anticipation of potential future disputes among parties or conflicts with the law, and can potentially involve many different areas of the law. Legal expertise is valuable for determining which of these areas are important. In contrast, it tends to be less difficult for clients demanding ex post services to determine the range of relevant legal expertise. The interaction between a client's situation and the law is often clear, even to non-

experts. For example, expertise in criminal law is valuable to a person accused of a crime; expertise in torts is valuable to a company being sued for negligence. While legal expertise is generally valuable for such clients, referrals across specialists in different areas of the law tend not to be because the scope of most clients' legal problems is well-defined at this point in contractual time. We expect this difference in value of cross-field referrals to play a key role in determining the way transactions between specialists are mediated.

We present next an analytical framework that relates firms' boundaries to trade-offs related to referrals. Later, we use the framework to inform and interpret the results of our empirical analysis of law firms' boundaries. Our empirical results provide evidence consistent the framework's main implications, suggesting that while law firms' boundaries may also reflect trade-offs not addressed in our framework, law firms' horizontal scope reflects referral-related trade-offs.

4.2. Referrals and the Scope of the Partnership

Matching (legal or other) problems to individual suppliers requires that someone first diagnose the problem. Suppliers often complete diagnoses when their expertise gives them a comparative advantage relative to demanders. However, suppliers obtain private information in the process of diagnosing clients' problems about the existence and nature of economic opportunities. The supplier completing the diagnosis may decide that she is the right person for the job or, alternatively, that she should refer all or part of it to someone else. In the latter case, she potentially gives up some rents from her knowledge of the opportunity. This would discourage her from referring problems that others have a comparative advantage in solving, and thus lead to inefficient matches between problems and individuals. How do markets and firms differ in their ability to address this problem? Garicano and Santos (2001) analyze this issue. Below we sketch their argument, which will inform our analysis.

Garicano and Santos (2001) first note that information asymmetries favor those who have private information about opportunities, regardless of whether firms or markets mediate relationships between individuals. Giving away this information is equivalent to giving away rents. As a result, transactions take place under some incomplete information, with an

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[17] The example is reported by Weingarten (1981). We thank Tano Santos for this example.

informational asymmetry that favors the referrer. Such asymmetries rule out fixed price transactions, since adverse selection would lead only the least valuable opportunities to be transferred in equilibrium. Instead, incentive (truth-telling) constraints require that optimal contracts be based on sharing the income derived from the opportunity.

Garicano and Santos (2001) propose that firms are defined by the scope of ex ante revenue sharing arrangements across individuals. These arrangements are "ex ante" in the sense that they are in place before individuals obtain information about specific economic opportunities, and have the feature that all individuals receive some share of revenues from the services any of them supply (although the share the involved individuals receive may be higher). Garicano and Santos (2001) then argue that such arrangements facilitate the exchange of referrals. When firms mediate relationships between individuals, individuals share revenues regardless of who supplies the service. In contrast, when markets mediate such relationships, individuals with private knowledge about an opportunity only share revenues with others if a referral actually takes place.[18] Individuals' incentives to hold on to problems that others have a comparative advantage in solving are weaker when firms mediate relationships than markets, because they share revenues even when no referral takes place.

Ex ante revenue sharing arrangements effectively *tax* individuals when they hold on to opportunities themselves, thus weakening their incentives to hold onto opportunities for which they are not best qualified to serve. Thus, the benefit of partnership-like arrangements – the benefit of transacting "within a firm" – is that they improve the efficiency of the exchange of referrals relative to alternative organizational structures.

Garicano and Santos (2001) also propose that the drawback to such arrangements, the drawback of transacting within firms, is that effort incentives are weaker, conditional on the match between individuals and opportunities: taxing individuals via revenue-sharing arrangements weakens effort incentives. Firms' boundaries, therefore, reflect trade-offs between facilitating the exchange of referrals and effort incentives.

[18] Lawyers in different firms are generally allowed to compensate each other for referrals as long as the terms are disclosed to clients. This is unlike the medical profession, in which compensation for referrals is (nominally) prohibited.

It follows that whether firms or markets mediate the division of labor between individuals should depend on referrals' role in matching opportunities to individuals. A central proposition from Garicano and Santos' theory is that *in contexts where referrals among suppliers are valuable and the risk of misappropriation of an opportunity by an agent not best qualified to deal with it important, specialization should take place within the firm, rather than in the market*.

The next subsection describes the two empirical approaches we use to analyze law firms' boundaries in light of this theory.

4.3 Empirical Approaches

One approach uses cross-sectional variation in lawyers' returns to specialization to identify when the division of labor between lawyers is mediated by firms versus markets. The idea behind this approach is the following. When two fields of the law are covered by the same individual, by definition they are covered within the same firm. Organizational trade-offs do not affect whether the firm encompasses these two fields. But when they are covered by different individuals, organizational trade-offs matter; whether these fields are found within the same firm depends on whether the relationship between these individuals is best mediated within a firm or through a market. If the latter, dividing tasks across individuals implies dividing them across firms. Variation in the returns to specialization thus provides us a way of inferring how incentive trade-offs, which appear only when fields are covered by different individuals, affect firms' horizontal scope. Observing whether firms specialize more as lawyers do is therefore evidence whether relationships between lawyers are efficiently mediated within firms or through markets.

We therefore examine how the specialization of lawyers and firms increases as lawyers' returns to specialization increase. We first examine the relationship between the share of lawyers that specialize in a particular field and market size. Positive relationships indicate fields that are increasingly covered by specialized lawyers as market size increases. For these fields, we then examine relationships between the share of lawyers who work at a firm that specializes in the field and market size. If the division of labor between specialists in this field and others is always efficiently mediated by firms, firms should not become more specialized as individual lawyers do. One should therefore not observe that the share of lawyers who work at a specialized firm increases with market size, even if the share of lawyers who specialize in the

field does. If, on the other hand, the division of labor is always efficiently mediated by markets, the share of lawyers who work at a specialized firm should increase with market size at the same rate as the share of lawyers who are specialized. In such cases, fields only should be covered in the same firm if they are covered by the same individual; whenever the field becomes covered by a specialized individual, it should then become covered by a specialized firm.

Thus, for fields in which lawyers increasingly specialize with market size, the relationship between the share of lawyers who work in a field-specialized firm and market size provides evidence regarding whether relationships between lawyers in this and other fields are efficiently mediated by firms or markets.

This evidence will shed some light on Garicano and Santos' theory. If firms mediate referrals more efficiently than markets, then whether increases in the division of labor across individuals lead to more specialized firms should depend on the extent to which referrals are valuable. Above we argue that referrals should be less valuable between ex post specialists and other specialists than between different ex ante specialists because clients' ability to "self-refer" is greater. Thus, it follows that as lawyers specialize in more ex post fields (such as insurance law), these fields should be covered increasingly by lawyers working at specialized firms. This should be less true when looking at ex ante fields. Thus, we will examine whether, in fields where lawyers specialize more when market size increases, the relationship between the share of lawyers working in specialized firms and market size differs systematically between ex ante and ex post fields. Finding that it is stronger for ex post fields is consistent with the hypothesis that firms' boundaries reflect the referral-related trade-offs discussed above.

Our second approach examines which pairs of specialists tend to be found within the same versus different firms. This approach is more conceptually similar to existing empirical studies of organizational form than the first, as it takes the tasks individuals perform as given: holding constant what two individuals do, what is the likelihood that transactions between them are mediated by firms or markets? This approach provides less evidence than our first approach on whether increases in the division of labor across individuals occur within or between firms. But it sheds more light on the scope of non-specialized firms. While our first approach could identify fields in which specialists tend to work at the same firm as other types of specialists, it could not identify *which* other types of specialists.

This will therefore provide additional evidence regarding Garicano and Santos' view of firms' role in mediating referrals. Pairs of specialists across which referrals are not valuable, or for which there is no risk of misappropriation, should not tend to be found within the same firm. Thus, while ex ante specialists might not tend to work in field-specialized firms, they should not work at the same firm as lawyers who specialize in ex post business fields, or fields that tend to serve individual clients. Ex ante specialists should instead tend to work at the same firm with people in other ex ante fields: for example, specialists in corporate law should tend to work at the same firm with specialists in tax law. If this is not the case, this is evidence against the idea that firms' boundaries reflect the referral related trade-offs in Garicano and Santos' theory.

While our empirical results will provide evidence with respect to this particular contractual theory of organization (and possibly others as well), they will also provide some evidence regarding the degree to which firms' boundaries reflect production-related contractual trade-offs more broadly rather than simply the range of individual clients' demands. Regarding the latter, one explanation for why corporate and tax specialists might tend to work in the same firm is that many clients' demands include corporate and tax work, and providing clients "one-stop shopping" is valuable.[19] Corporate and tax specialists might be found within the same firm, regardless of whether they ever interacted with each other. Relationships between specialists in ex post business fields and other specialists are interesting in this respect. Most firms demanding the services of, for example, specialists in insurance law have a wide range of legal demands. Finding that ex post specialists tend not to work at the same firm as ex ante specialists is evidence that firms' boundaries do not simply reflect the range of clients' legal needs: clients with demands in both ex ante and ex post fields are served by lawyers in different firms. Finding that ex post legal services are increasingly supplied within specialized firms as market size increases is evidence that such clients are increasingly served by lawyers in different firms as market size increases. If so, this would be evidence against the idea that law firms' boundaries merely correspond directly to individual clients' needs.

5. Data

[19] This explanation might be viewed as simplistic in light of recent organizational theory – one-stop shopping need not imply that all production takes place within a single firm.

The data are from the legal services portion of the 1992 Census of Services. Like in other industries, the Census surveys individual establishments in this industry. Forms are sent to all law offices that surpass a size threshold (approximately ten employees) or that are part of multi-establishment firms. In addition, forms are sent to a random sample of smaller offices, where the sampling rate is set to obtain reliable MSA-level estimates. In all, the Census sends survey forms to law offices that account for approximately 80% of revenues in the industry. Details are in Bureau of the Census (1996). The Census publishes MSA-level estimates derived from this survey in Bureau of the Census (1996); in preliminary work (Garicano and Hubbard (2001)), we used these data. In this paper, we use establishment-level data, which are not publicly available.

Along with standard questions regarding revenues, payroll, and employment, the survey asks law offices industry-specific questions that provide detailed information about the distribution of workers across job titles and the distribution of lawyers across field-defined specialties. (See Appendix 1.) It asks how many individuals working out of the office are lawyers, paralegals, professional staff, and non-professional staff. It also asks how many lawyers are partners versus associates. Finally, it asks respondents to categorize the lawyers that work in the establishment by their primary specialty, and report how many are in each category: how many lawyers at the establishment specialize in corporate law, for example. When lawyers work in multiple specialties, they are classified as "general practitioners." The survey thus provides unusually detailed information about organization and skill specialization at the establishment level. In this paper, we exploit data that depict the specialization of lawyers within law offices. We use data from 1992 because it is the most recent year for which the Census asks the specialty questions.

In all, the Census received responses to these organizational questions from about 28,000 law offices. We omit from our sample law offices with inconsistent responses for the total number of lawyers; for example, those where the number of lawyers summed across the specialty categories does not equal the number of partners plus the number of associates. Our final sample includes 26,151 law offices and 219,033 lawyers. These constitute about 17% of law offices and 50% of privately-practicing lawyers in the United States in 1992.

We merged these data with data from 1992 County Business Patterns. County Business Patterns (CBP) provides county-level information regarding the distribution of employment across industries and the employment size distribution of establishments. We compute

employment shares for each of seven major (one-digit) industries (e.g., manufacturing) for each county; although information is available for more detailed industry definitions for many counties, the Census withholds more detailed data in many cases because of confidentiality-related restrictions.[20] We also compute the share of establishments within various employment size categories in the county, and an estimate of employees per establishment by major sector. We derive the latter by multiplying the size category shares by the midpoints of the employment size categories.

The CBP data thus provide information about the distribution and size of local demand for legal services. The employment shares characterize the local economy, and depict the extent to which local demand for legal services comes from different classes of firms: manufacturing versus financial services, for example. They also depict whether local demanders are small or large firms overall and within sectors. For example, counties where the average establishment size in financial services is large contain the country's most important financial districts. Holding constant employment shares, cross-county differences in total employment pick up differences in the size of local demand for legal services. If the employment shares capture differences in the distribution of local demand well, one can think of increases in total employment, conditional on these shares, as rotations in the demand curve for legal services: proportionate increases in the various legal problems encountered by individuals and businesses located in the county.

Using these variables to capture differences in demand has drawbacks. One is that individuals as well as businesses demand legal services, and employment-based measures may not capture the size and distribution of individual demand well. Better measures of individual demand would be population- rather than employment-based, and demographic variables might capture certain demands well (for example, the demand for probate work should be higher in regions with many elderly residents). We will incorporate such measures in future versions of this paper.

Another drawback is that while the vast majority of most lawyers' business comes from local demanders, some lawyers serve regional or national markets rather than local ones. If employment differences between the very largest counties and smaller counties understate

[20] We have run specifications with two-digit controls, using imputations for county-sectors for which the Census does not report figures. None of the results differ from those that use one-digit controls.

differences in the demand faced by lawyers in these counties, relationships between specialization and employment size will tend to overstate true relationships between specialization and market size. One would expect this issue to arise particularly for lawyers in multi-office firms, in part because they might serve clients based in all of the regions their firm is located.

We address this in a manner that we describe in the following section. At a narrow level, what we do controls for the possibility that lawyers in multi-office firms may draw clients from other markets in which their firm has offices; more broadly, it controls for the possibility that such lawyers draw clients from systematically wider geographic regions than those in single-office firms. As a consequence, our main results primarily reflect relationships between specialization and market size for lawyers in single-office firms, so the market definition issue is largely confined to lawyers in single-office firms. This does not eliminate the issue: some lawyers in single-office firms – particularly those in big cities such as New York and Los Angeles -- may serve broad geographic markets. However, we do not think that this effect is driving our results. As we report below, our main results appear even when looking across relatively small markets, regions where it is unlikely that many lawyers in single-office firms serve many non-local clients.

Table 5 contains some summary statistics. The average law office in our data has 3.56 lawyers, and the average firm has 3.65 lawyers, a reminder that the average law firm in the U.S. is a very small, single-establishment enterprise. 71% of the lawyers in our sample are reported to work in one of the Census-defined specialty fields. 37% of law offices and 28% of firms are specialized, in the sense that all of their lawyers are in a single specialty. 28% of lawyers work in multiestablishment firms, but only 5% of offices are part of multiestablishment firms. Although only 2% of the law firms in our sample have multiple locations, those that do are much larger than most single establishment firms.

Table 6 provides a more detailed look at specialization patterns. We classify areas of the law according to whether expertise in the field is demanded by businesses or individuals, and of those demanded by businesses, whether demands are ex ante or ex post as defined earlier. Our classification follows the splits in Table 1. We define a field as a business field if a substantial share of demand comes from businesses, and an individual field if all or nearly all demand comes from individuals. Hence, under this classification, real estate law and tax law are labeled

business fields, even though individuals sometimes demand expertise in real estate and tax law. Similarly, we define a business field as an "ex ante" field if a substantial share of demand is for ex ante work, and an "ex post" field if all or nearly all demand is for "ex post" work. Two fields fall in the latter category: insurance law and negligence-defendant. Expertise in insurance law is generally demanded to assess insurance claims or provide defense for parties covered by insurance. (Abrams (2000)) Expertise in negligence is demanded by defendants in tort-related matters.

The first column reports the share of lawyers in each of the specialties, and several groups of specialties. 27% of lawyers specialize in an "ex ante" business field; about a third of these are corporate law specialists. 13% specialize in an "ex post" business field. 15% specialize in an individual field; about half of these are classified as "negligence-plaintiff." The second and third columns report the share of lawyers working in specialized offices and firms, by specialty. These figures are very similar because individual offices within large multi-establishment firms are generally not specialized by field: if a multi-establishment firm contains lawyers in different specialties, its offices usually do as well. The final column reports the fraction of specialists that work in specialized firms, by specialty. The notable pattern here is that, with the exception of patent lawyers, ex ante business specialists are less prone to work in a specialized firm than ex post business or individual specialists. Over a third of ex post specialists, and nearly half of individual specialists, work at specialized firms, but less than 20% of ex ante specialists do. The lowest fraction among the specialties is for corporate law: only 5% of corporate law specialists work at firms with only corporate law specialists.

6. Market Size, Individual Specialization, and Firm Specialization

6.1 Empirical Framework

Our empirical framework for examining relationships between market size and individual specialization is simple. Let the probability that lawyer i in market j is a specialist of some sort be p_i, where:

$$p_i = f(X_j \beta_1)$$

X_j is a vector of observable characteristics of local market j and β_1 is a parameter vector. The coefficient on our proxy for local market size, county employment, will be of particular interest. We interpret variation in this variable, conditional on our controls for the distribution of local

demand, as proportionate differences in the demand for the spectrum of services lawyers provide.

Our data are at the level of the law office rather than the lawyer. It is easy to show that one can estimate β_1 using these grouped data, using the expression:

$$s_k = f(X_j \beta_1)$$

where s_k is the share of lawyers in law office k that are specialists of some sort, and one weights each observation by the number of lawyers working at the law office. In this version of the paper, we assume that f is linear, so:

$$s_k = X_j \beta_1 + \varepsilon_{1k}$$

This produces a grouped data analog to the linear probability model; β_1 can thus be interpreted as a probability derivative. It captures reduced-form relationships between specialization shares and market characteristics.

We estimate analogous specifications for particular specialties and for groups of specialties. These, for example, relate market size and composition to the share of lawyers who specialize in corporate law, or in any one of the ex ante business fields.

This specification contains an important assumption concerning market definition: lawyers' specialization decisions reflect only the size and distribution of demand in the area in which their office is located. But as noted above, this assumption is problematic when lawyers work in multi-office firms. If lawyers in multi-office firms serve clients based in other markets in which their firm has offices, these lawyers' specialization decisions could reflect the size of demand in these other markets as well as their own.

To account for this, we estimate specifications where our proxy for market size is:

$$emp_j \left[\frac{\sum_m emp_m \delta_{mk}}{emp_j} \right]^{\gamma}$$

where emp_j is employment in county j ("local market size"), m indexes counties, and δ_{mk} equals one if office k's firm has an office in market m and zero otherwise. The numerator of the bracketed expression can be though of as "firm-level market size." It is just employment summed across all of the counties where office k's firm has an office. γ is a parameter that indicates the degree to which lawyer specialization reflects local or firm-level market size. If

γ=0, the bracketed expression drops out and only the size of the local market matters; if γ=1, emp_j drops out and lawyer specialization reflects firm-level market size.

Market size enters our empirical specifications in log form. Thus, market size enters these specifications through the expression:

$$\beta_1 \ln(emp_j) - \beta_1 \gamma \ln(share_{kj})$$

where $share_{kj}$ is local market size divided by firm-level market size for office k. Note that $\ln(share_{kj}) = 0$ for offices in single-office firms. Including $\ln(share_{kj})$ controls for the possibility that lawyers in multi-office firms may base specialization decisions on demand outside of their local market.

Below we present specifications that include and exclude $\ln(share_{kj})$. None of our estimated relationships between specialization and market size change when doing so, indicating that these estimates are robust to how we define the geographic market for lawyers in multi-office firms. This probably reflects that our results are driven by the nearly three-quarters of lawyers that work in single-office firms, so this issue is irrelevant for the vast majority of our sample.

Our second set of specifications provides evidence regarding relationships between firm specialization and market size. These relate the probability that an individual works at a specialized law firm to market characteristics.[21] Let p_i^{sf} denote the probability that an individual is a specialist and works at a firm where all of the lawyers share the same specialty. We specify:

$$p_i^{sf} = f(X_j \beta_2)$$

As before, because the unit of observation is the law office rather than individual, we estimate specifications based on the equation:

$$s_k^{sf} = f(X_j \beta_2) = X_j \beta_2 + \varepsilon_{2k}$$

where s_k^{sf} is the share of lawyers at office k who are in a specialized firm and we weight observations by the number of lawyers. Note that $s_k^{sf} = 0$ if lawyers at office k do not share the same specialty as all other lawyers in their firm and $s_k^{sf} = 1$ if they do; this is a discrete dependent variable model. As above, we estimate analogous specifications for individual

[21] Very few lawyers work in field-specialized offices that are part of non-specialized multi-office firms. Thus, our results and conclusions would be exactly the same if we analyzed relationships between market size and the specialization of law offices rather than firms.

specialties and groups of specialties, and where our proxy for market size reflects both local and firm-level market size.

Combined, β_1 and β_2 depict how much individual specialization increases with market size, and whether increases in the division of labor across individuals take place within or between law firms. When β_1 is positive, β_2/β_1 indicates the degree to which relationships between specialists are mediated by markets rather than within firms. If $\beta_2/\beta_1 = 1$, this indicates that when lawyers become more specialized, firms do as well: the division of labor is taking place not just between lawyers but also between firms. Markets rather than firms are mediating relationships between specialized lawyers. In contrast, if $\beta_2/\beta_1 = 0$, the division of labor is taking place between lawyers but within firms. Firms, not markets, mediate relationships between lawyers.

Finally, we note that the ratio β_2/β_1 is an instrumental variables estimate of the effect of lawyer specialization on law firm specialization if county employment is a valid instrument for lawyer specialization. This can be seen by writing the ratio as:

$$\frac{\beta_2}{\beta_1} = \frac{\partial s_k^{sf} / \partial(\ln(county\ employment))}{\partial s_k / \partial(\ln(county\ employment))} = \frac{\partial s_k^{sf}}{\partial s_k}$$

If $\beta_2/\beta_1>0$, this would indicate that increases in the specialization of individuals cause firms to be more specialized. For county employment to be a valid instrument, market size must be related to firms' boundaries only through its effect on lawyers' specialization patterns. This would require organizational trade-offs associated with firms' boundaries to be independent of market size: this condition would fail if, for example, clients' ability to self-refer or lawyers' ability to monitor each other differs between small and large markets. This condition could also fail if firms' boundaries reflect factors not accounted for by organizational theories. For example, if clients in larger markets are willing to pay a premium for field-diversified firms, for reasons other than any production-related organizational efficiencies diversification provides, then market size would affect firm specialization directly.

We will not emphasize this interpretation of the results. But we view this interpretation as intriguing in light of the view implicit in most recent economic theories of organization that the demand for a good (or service) and the organizational structure through which a good is produced are distinct. For example, demands exist for goods, and these goods might be efficiently produced within large firms, but demands do not inherently exist for large firms. If so, then cross-market differences in demand should not directly affect how legal services are organized. As the causal interpretation requires, demand variation would then affect the organization of legal services only through how it affects lawyers' specialization decisions.

6.2 Market Size and Lawyer Specialization

Table 7 contains results regarding individual specialization and market size. It presents estimates of β_1, the coefficient on ln(county employment), from twelve different regressions. In the top panel, the dependent variable is s_k, the share of lawyers at law office k who are specialized in one of the fields described above. In the first column, there are no control variables. β_1 is positive and significant: the share of lawyers who specialize in one of our fields is higher in larger counties. The point estimate indicates that doubling market size is associated with a 9.2% increase in the share of lawyers who are specialists. Moving from the smallest counties in our sample to the largest changes the predicted share of specialists from about 40% to about 85%.

Moving to the right, the second column contains results including a set of controls that reflect the composition of the local economy in which the law office is located: sector employment shares, average establishment size by major sector, and a state capital dummy. The estimate of β_1 falls by about 10% from 0.092 to 0.083 when introducing these controls.[22] While part of the simple relationship between individual specialization and county employment reflects differences in the composition of demand for legal services between small and large markets, the relationship between market size and specialization remains strong when including these controls. The notable patterns in the controls are that specialization is greater in counties with than without state capitals, and in counties where the average establishment size in construction,

[22] We have run various specifications that control for the composition of the local market in various ways – for example, controlling for the size distribution of firms with employment size class shares rather than averages. The coefficient on ln(county employment) changes little.

manufacturing, transportation/utilities, or financial services is large. Specialization tends to be low in counties where the share of employment in the manufacturing or wholesaling sectors is low relative to the omitted category, which includes construction and mining. (See Table A1 for the full set of estimates.)

The third column includes ln(share) in the specification. As outlined above, including this variable accounts for the possibility that lawyers in multi-office firms may base specialization decisions on demand in markets outside of their local area. The estimate of β_1 barely changes when including this variable, indicating that the pattern in the second column is primarily driven by relationships between specialization and market size for lawyers in single-office firms. This is not surprising given that most lawyers work in such firms.

The bottom three panels present results from analogous specifications, where the dependent variable is the share of individuals that specialize in ex ante business fields, ex post business fields, and individual fields, respectively. In each of these panels, the estimates of β_1 in the second and third columns are positive, significant, and of about the same magnitude: about 0.020.[23] Table 8 reports results from 13 additional regressions where the dependent variables are the share of lawyers that specialize in each of the fields in our data. The estimates of β_1 are positive and significant for some of the ex ante business fields and both of the ex post ones. In contrast, the only individual field for which the coefficient is positive and significant is negligence-plaintiff; there is no evidence that the share of lawyers specializing in probate, criminal, or domestic law increases with market size. Indeed, the share specializing in probate and domestic law decreases slightly.

Assuming that changes in our market size measure alter the size but not the distribution of demand for legal services, fields for which the coefficients are positive – banking, corporate, real estate, insurance, and negligence law -- are those that tend to be covered by "general practitioners" in small markets but specialists in large ones.

In sum, our evidence on individual specialization is that lawyers specialize more in several business-oriented fields as market size increases, but we find no evidence that this is true for most individual-oriented fields. Increases in specialization with market size reflect that

[23] Ln(county employment) ranges from about nine to about fourteen in our data. Hence, the coefficient estimate implies a difference in each of these three specialty shares of about ten percentage points between very small and very large markets.

lawyers serving businesses in small markets supply services that usually cross field boundaries, but this becomes less and less true as market size increases. The next section examines whether firm specialization increases in the same way. In fields for which individual specialization increases with market size, this will indicate the degree to which increases in the division of labor take place within or between firms.

6.3 Market Size and Firm Specialization

The first row of Table 9 contains results from regressions that are analogous to those in the middle column of Table 7, but use s_k^{sf} rather than s_k as the dependent variable. These regressions relate the share of lawyers working in specialized law offices to market size and composition. They capture whether firms become specialized as market size increases. These relationships will be particularly interesting for the fields in which individual lawyers specialize more with market size. Finding that lawyers, but not firms, become more specialized as market size increases indicates where relationships between lawyers tend to be mediated by firms rather than markets: circumstances where a division of labor between individuals tends to imply a division of labor within rather than between firms.

In the first column, the dependent variable is the share of lawyers who work in a field-specialized law firm. β_2, the coefficient on ln(county employment), is positive and significant: as market size increases, a larger share of lawyers works in field-specialized firms. The point estimate is 0.039, indicating that doubling market size is associated with a 3.9 percentage point increase in the share of lawyers working at specialized firms. This is about one-fourth of the sample mean of 16.2%. The bottom of the table contains the estimates of β_1 from the middle column in Table 7, which track relationships between individual lawyer specialization and market size. The ratio of the point estimates, β_2/β_1, equals 0.47, indicating that about half of the overall increase in the division of labor is happening between rather than within firms.

The other three columns break things down by specialty class as before. In the second column of the top row, the dependent variable is the share of lawyers that work at an office where all lawyers specialize in a single ex ante business field. The coefficient on market size is very small and not statistically significantly different from zero. Table 7 indicated that as market size increases, lawyers specialize more in these fields; this result indicates that lawyers are not more likely to work in field-specialized firms. The ratio β_2/β_1 is approximately zero, indicating that all of the increase in the division of labor is occurring within rather than between firms. In

contrast, in the next column of the top row, the dependent variable is the share of lawyers that work at an office where all lawyers specialize in a single ex post business field. Here, the coefficient on market size is positive and significant. From before, as market size increases, more lawyers become insurance and negligence-defendant specialists. Here, we see that a substantial fraction of these specialists work in specialized law offices. The ratio β_2/β_1 provides an estimate of this fraction: 57%. Like the ex ante business fields, the division of labor increases with market size; unlike the ex ante business fields, a significant fraction of it happens between rather than within firms.

This result indicates that ex post business fields tend only to be covered in the same firm as other fields when they are covered by the same person, but ex ante business fields tend to be covered in the same firm as other fields even when they are covered by different individuals. Assuming that variation in our market size proxy captures differences in the size but not the distribution of demand, demand for services that involve each of these fields of the law exists in smaller markets, but the individuals supplying these services tend not to be specialized. For example, lawyers who advise clients on insurance law issues might also advise clients on corporate and tax law issues. When individual lawyers have multiple specialties, so do firms. As market size increases, lawyers specialize more: different lawyers begin to advise clients on different areas of the law. As lawyers specialize, some specialties remain within the firm and some are spun off: the scope of the firm continues to include corporate and tax law, but it often no longer includes insurance law.

Table 10 provides a more detailed view. The dependent variables in these regressions, analogous to Table 8, are the share of lawyers working in particular specialized fields. The contrast in Table 9 between ex ante and ex post specialties holds in this table as well. None of the coefficient estimates in the first row show statistically significant relationships between market size and the fraction of lawyers working in field-specialized firms for any of the ex ante fields. But both of the coefficient estimates in the second row are positive and significant. As market size increases, a greater share of lawyers specializes in both insurance and negligence-defense, and a greater share of lawyers work in offices that specialize in each of these fields. β_2/β_1 for insurance and negligence-defense equals 0.58 and 0.30, respectively. In contrast, while the division of labor increases with market size for some of the ex ante specialties, there is no strong evidence that much of this is taking place between firms. Firms' boundaries often change

once individuals specialize in ex post fields, but there is little evidence that they do once individuals specialize in ex ante fields.

Figures 2 and 3 summarize the general patterns for ex ante and ex post business fields, respectively. The top line in each represents the share of lawyers in a specialized field, and the bottom line represents the share of lawyers working at a field specialized law firm. For the ex ante fields, the distance between the lines increases with market size; an increasing share of lawyers work as specialists but in non-specialized firms. The bottom line is flat. For the ex post fields, the distance between the lines increases somewhat but the bottom line is upward sloping. More lawyers specialize in these fields as market size increases, and an increasing share of lawyers work in specialized firms.

We view these patterns as consistent with the Garicano and Santos' general hypothesis that firms' boundaries reflect trade-offs related to referrals, assuming that clients are better able to self-refer when problems require ex post than ex ante legal services. Although the share of lawyers that specialize increases with market size for both ex ante and ex post fields, the relationship between the share of lawyers working in specialized firms and market size differs systematically. The share of lawyers working in specialized firms increases significantly for ex post business fields, but we find no evidence that it does for ex ante business fields.

The final column in Table 9 examines relationships between market size and the likelihood an individual works at an office that specializes in a field that tends to serve individuals. The coefficient is positive and significant, indicating that the share of lawyers working in such offices increases with market size. The coefficient estimate is 0.019, which is about the same as the analogous estimate in Table 7. This suggests that as lawyers specialize more in individual fields, the division of labor between them and lawyers in other specialties takes place entirely between firms. Table 10 provides more detail. The coefficient on ln(county employment) in the negligence-plaintiff column indicates that as market size increases, the share of lawyers working at firms that specialize in this field increases. The ratio β_2/β_1 equals 0.72, indicating that most of the increase in the division of labor between negligence-plaintiff specialists and other lawyers is taking place between rather than within firms. The coefficient on ln(county employment) in the criminal column is positive and significant; as market size increases, a greater share of lawyers work in specialized criminal law offices. Our earlier results did not show any evidence that a greater share of lawyers specialize in criminal law as market

size increases. Combined, these results indicate that specialists in criminal law are, for some reason, more likely to work in the same office as other types of specialists in smaller markets. In general, however, we view our "individual specialty" results as very preliminary because the controls we use in this version of the paper probably do not capture differences in demand for these specialties well.

Finally, Table 10 reports estimates of β_1 and β_2 when running the regressions on observations in small and large markets separately. We divide the sample roughly in half, distinguishing between offices in counties with less than and greater than 200,000 employment.[24] The main result from this table is that the overall relationships between lawyer and firm specialization and market size in Table 9 appear throughout the range of our sample.[25]

This robustness is of interest for the following reasons. First, as alluded to earlier, it gives us some confidence that our results are not driven by assumptions about market definition. A county-based definition for lawyers' geographic market seems particularly sensible for lawyers in small markets, and our results show up when restricting the analysis to such markets. The other reason concerns the β_1 estimates. One might not expect β_1 to be positive in the bottom panel, since markets with at least 200,000 employees (at least the size Fresno, CA or Des Moines, IA) are probably large enough to support individual specialization in any of the fields in our data. The positive coefficients on β_1 in the bottom panel suggest to us that lawyers specialize along multiple dimensions, including some that are not captured by the Census' categories: for example, for example, by industry. If this is the case, then it is easy to explain why field-based specialization might increase with market size, even when comparing relatively large markets. In medium-sized markets, some lawyers specialize by industry but not field (e.g., they handle corporate and tax work for utilities); as market size increases, they specialize by industry and field. The idea of examining how firms' boundaries change with individual specialization produces interesting results across a surprisingly large range of the data because individuals specialize by field more in larger markets, even when comparing relatively large markets.

[24] Counties with approximately 200,000 employees include Fresno County, CA, and Polk County, IA. The latter is the county in which Des Moines is located.

[25] One can see this as well using a series of market size dummies rather than ln(county employment) in the regressions.

7. Agglomeration

7.1 Tools and Theory

The previous section established that certain classes of specialists tend to work at non-specialized firms. It did not, however, investigate which combinations of specialists tend to be found within the same firm and which combinations tend to be found in different ones. This section deepens the previous analysis by providing evidence regarding agglomeration and co-agglomeration patterns of specialists within firms. This part of the analysis provides greater detail about the scope of non-specialized firms.

We adapt a tool used in urban economics to investigate agglomeration patterns: the Ellison-Glaeser (EG) statistic. In its original application, this statistic was used to investigate the degree to which manufacturing plants within an industry are located in the same geographic region, above and beyond what one would expect if plants chose regions randomly. We use this statistic to evaluate the degree to which individual lawyers that share a specialty tend to work at the same firm, above and beyond what one would expect if lawyers chose firms at random. Whereas in the context of geographic agglomeration, the statistic measures correlations between individual plants' location choices, in our context it measures correlations between individual lawyers' choice of firms. Ellison and Glaeser also develop analogous co-agglomeration measures, which they use to investigate the degree to which plants in different industries are co-located. We adapt their co-agglomeration measure to investigate the degree to which individual lawyers in different specialties work within the same firm. These co-agglomeration measures are of particular interest in our context because they will provide evidence regarding which pairs of specialists tend to be found together within the same firm.

Ellison and Glaeser are careful to state that while their statistic measures agglomeration, it does not distinguish between agglomerations that are due to natural advantages and spillovers. In their context, natural advantages are factors that affect plant location decisions independently of other plants' location. For example, locating near a body of water is important for a ship building plant, irrespective of where other ship building plants are located. These will induce correlations in plants' location decisions even when the value of a particular location is independent of which other plants choose to locate nearby. In our context, natural advantages are factors that affect individual lawyers' choice of firms, independently of how other lawyers are allocated across firms. One class of natural advantages that would drive such correlations is

the distribution of demand for particular specialists. For example, the demand for insurance lawyers may be higher in some cities than others (e.g., Hartford, CT), and such regional differences would induce a correlation between insurance lawyers' choice of firms. This effect will be more prominent when we calculate agglomeration measures nationally than locally. Other natural advantages could arise from firm-level factors. If a firm has resources that are particularly valuable for insurance lawyers, and whose value is independent of the lawyers that work at the firm, this also would induce a correlation between insurance lawyers' choice of firms. One potential resource in this class is a firm's reputation or brand name. However, firms' reputations in this industry often hinge greatly on which lawyers work at the firm; in fact, brand names are the names of the firm's most prominent members. As a consequence, reputation or brand name effects may be more closely related to "spillovers" than "natural advantages" in this context. To the degree that the value of important resources within law firms are dependent on the lawyers that work there, local agglomeration and co-agglomeration measured by our statistics will have to do with spillovers of some form rather than natural advantages.

Our agglomeration measure with respect to a particular specialty is thus:

$$\gamma = \frac{\sum_{i=1}^{M}(s_i - x_i)^2 - (1-\sum_{i=1}^{M} x_i^2)\sum_{j=1}^{N} z_j^2}{(1-\sum_{i=1}^{M} x_i^2)(1-\sum_{j=1}^{N} z_j^2)}$$

$$= \frac{\sum_{i=1}^{M}(s_i - x_i)^2 - (1-\sum_{i=1}^{M} x_i^2)\frac{1}{N}}{(1-\sum_{i=1}^{M} x_i^2)\frac{N-1}{N}}$$

s_i is firm i's share of the particular specialty: the number of such specialists at firm i divided by the total number of such specialists in our sample. x_i is firm i's share of lawyers. M is the number of firms in the sample. z_j is the lawyer j's share of the capacity within the specialty; N is the number of lawyers in the specialty in the sample. For simplicity, we assume that lawyers have the same share of capacity. This simplifies the expression to that in the second line.

The measure is scaled such that $\gamma = 0$ if specialists are allocated at random across the firms in our sample, accounting for the size distribution of firms. Positive gammas indicate

positive within-specialty agglomeration: for example, a positive gamma for insurance lawyers would indicate that they tend to work at the same firm more than they would if they were randomly allocated. Negative gammas indicate negative within-specialty agglomeration.

Although the sign of this statistic is easily interpreted, the magnitude is somewhat harder. Ellison and Glaeser provide some guidance. Suppose there are no natural advantages, and that the observed allocation of specialists across firms reflects a rational expectations equilibrium in which individuals choose among firms with full information about the value of working in the same firm with each other individual. Suppose that spillovers are either absent or infinite; if spillovers exist between lawyers, they are certain to work at the same firm. Then γ indicates the fraction of pairs of lawyers for which spillovers exist. This is probably not a reasonable interpretation in our context, even if natural advantages are absent. One reason is that individual lawyers do not know the spillovers that would exist from working at the same firm with every other lawyer in the economy. If so, one might change the interpretation of γ to the fraction of pairs of lawyers for which spillovers exist of which lawyers are aware. γ's calculated at the national level are very small in magnitude and are smaller than those calculated more locally, in part for this reason. While this makes γ's calculated across different levels of aggregation difficult to interpret, it should not affect comparisons of γ's calculated at the same level of aggregation. If γ for one specialty is twice as high as another, the correlation between individuals' choice of firms is twice as high as well.

Our coagglomeration measure for a pair of specialties denoted 1 and 2 is:

$$\gamma_{12} = \frac{\dfrac{\sum_{i=1}^{M}(s_{12i} - x_i)^2}{1 - \sum_{i=1}^{M} x_i^2} - \dfrac{1}{N_1 + N_2} - \gamma_1 \dfrac{N_1(N_1 - 1)}{(N_1 + N_2)^2} - \gamma_2 \dfrac{N_2(N_2 - 1)}{(N_1 + N_2)^2}}{1 - \left(\dfrac{N_1}{N_1 + N_2}\right)^2 - \left(\dfrac{N_2}{N_1 + N_2}\right)^2}$$

s_{12i} is firm i's share of specialties 1 and 2 combined: for example, the number of corporate and tax lawyers working at firm i divided by the number of corporate and tax lawyers in our sample.

N_j is the number of lawyers in specialty j in our sample. γ_j is our estimate of agglomeration within specialty j, as described above.

γ_{12} is a measure of the correlation between the choice of firms of lawyers in different specialties. Much of the discussion above about interpreting the sign and magnitude of agglomeration measures apply also to the co-agglomeration measures.

7.2 Agglomeration Results

Table 11 contains the main output of this exercise, a matrix that contains the agglomeration measures on the diagonal and the co-agglomeration measures on the off-diagonal terms. We have multiplied all of the measures by 10000, and shaded cells with values of greater than 1/10000 for purposes of presentation.[26] This matrix summarizes our evidence with respect to which specialists tend to work in the same rather than different firms. There are several things to note.

First, as expected, the measures are extremely small. The correlation between the firms at which two random lawyers practicing somewhere in the U.S. work is very low.

Second, we observe positive levels of agglomeration within all fields. Furthermore, for each of the specialties, the agglomeration measure on the diagonal is greater than any of the co-agglomeration terms associated with the specialty. A lawyer in one field is more likely to work at the same firm with a lawyer in the same field than one in any other field. This is true not just for specialists that tend to work in specialized firms (e.g., insurance lawyers), but also those that do not (e.g., corporate lawyers). The measure is largest for patent lawyers and smallest for probate lawyers.[27] In general, it tends to be greater for specialties that tend to serve businesses than individuals.

As noted above, these measures could reflect either that "natural advantages" or "spillovers" are greater for lawyers that work in the same than different fields. If it reflects only the latter, and if lawyers do not specialize within fields, then the fact that agglomeration

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[26] We calculated the standard deviation of γ under the null of zero correlation applying the formula in footnote 13 in Ellison and Glaeser (1997), and found that it is on the order of 10^{-7}. Thus all of the coefficients in this table are statistically different from zero. This reflects that in the firm choice model that underlies this calculation, we have over 26,000 observations of lawyers. The shading therefore uses a criterion based on the economic rather than statistical significance of the measures.

measures are larger than any of the co-agglomeration measures is inconsistent with the view that law firms' boundaries reflect trade-offs related to the value of referrals: if time constraints are not binding, referrals are not valuable between lawyers with exactly the same skills. However, this pattern may reflect that lawyers specialize within fields. One possibility is that lawyers may specialize "horizontally" within fields in subspecialties, and referrals may be valuable across subspecialties. Alternatively, it may reflect that lawyers specialize "vertically" within subspecialties, and within subspecialty referrals are valuable because they divide work among lawyers according to their skills (e.g., between partners and associates). Finally, it could reflect "natural advantages" – corporate lawyers work at the same firm with each other because the firm's name is valuable for each of them independently – though these would be difficult to disentangle from spillovers in this context. We view this result as an interesting stylized fact consistent with various theories that would predict some form of field-specific scale economies, but are unable to distinguish among explanations for this fact given the data at hand.

Third, some of the co-agglomeration measures are positive and most are negative, indicating that lawyers in some pairs of fields are more likely to work within the same firm, and lawyers in most other pairs of fields are less likely to work within the same firm, than if lawyers were allocated across firms at random. These measures are generally positive for pairs of ex ante business specialists: lawyers in each of these fields tend to work at the same firm with lawyers in the other fields. They are also generally positive, though smaller in magnitude, for pairs of the individual specialists: for example, probate specialists tend to work at the same firm as negligence-plaintiff, domestic relations, and criminal specialists, and to a somewhat lesser extent, with real estate specialists. In contrast, they are almost always negative for pairs involving the ex post business specialties: insurance and negligence-defendant specialists.

The co-agglomeration measures provide additional evidence with respect to firms' scope. The regression evidence above suggested that corporate lawyers tended to work at the same firm with lawyers in other specialties, but did not indicate which other specialties. Here, we find that they tend to work at the same firm with other ex ante business specialists – especially environmental, governmental, and tax specialists -- but not with ex post business specialists or

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[27] Interpreting the magnitudes in light of a model where they only reflect "all or nothing" spillovers between pairs of lawyers, the measure for patent lawyers would imply that spillovers exist between 1/248 (0.004026) pairs of patent lawyers; the corresponding figure for corporate lawyers is 1/775.

with individual specialists. Similar statements are true for the other ex ante specialties. This evidence is consistent with Garicano and Santos' view that firms' boundaries reflect referral-related trade-offs.

The fact that ex ante and ex post business specialists tend not to work at the same firm with each other is of interest for at least two additional reasons. First, it indicates that firms' scope does not always correspond directly to the range of individual clients' legal needs. Most firms demanding the services of insurance or negligence defense specialists have demands for other legal services as well. But these demands appear to be met by lawyers who work at different firms. Second, it stands in contrast to a main result in Heinz and Laumann's (1982) well-known sociological study of the structure of the Chicago bar. Heinz and Laumann conclude that the social structure of the Chicago bar in the 1970s was divided into two broad sectors, one of which served small clients (individuals and small businesses) and the other of which served large corporate clients. Our evidence indicates that the clustering of lawyers into firms does not quite take this shape. While specialists serving individuals tend not to work at the same firm with those serving businesses, some pairs of specialists that serve businesses – pairs involving ex post specialties -- also tend not to work at the same firm with one another. In sum, this fact is evidence that firms' boundaries do not reflect just the range of individual clients' needs or sociological factors.[28] They may also reflect differences in the value of firms' role in mediating referrals.

We have two final remarks about our agglomeration results before concluding.

First, we have also computed our agglomeration measures at more local levels. Specifically, we computed this matrix for each of the over 100 counties in which we observe at least one lawyer in each of the specialty categories. As expected, the absolute values of these measures are much larger when they are computed at the local than national level. We then summarized these results in a matrix that contains the medians for each measure. The basic patterns in this matrix of medians look very similar to those in Table 11, indicating that those in Table 7 are not driven by the geographic distribution of demand across specialties.

Second, it is hard to reconcile the patterns in Table 11 with the view that firms' boundaries in this industry reflect risk-pooling-related trade-offs. Gilson and Monookin (1985)

[28] See also Phillips and Zuckerman (2000), who investigate whether Silicon Valley law firms' scope includes family law.

propose that law partnerships are risk-pooling arrangements undertaken to encourage human capital investments by lawyers in specialized areas which have uncertain future demand. If so, pairs of specialists for whom demands are highly positively correlated should not tend to be found within the same firm. Instead, specialists in corporate law, for example, should work at the same firm as lawyers who have demands are not positively correlated: say, divorce lawyers. The co-agglomeration patterns above suggest the opposite. While risk-pooling arrangements may benefit lawyers, and lead some lawyers to work together in the same firm, our results provide no evidence that partnerships' risk-pooling benefits are systematically important in determining firms' horizontal boundaries.

8. Conclusion

Service industries make up an increasing share of economic activity in developed countries. In the U.S., the service sector's share of GDP (not including financial services) increased from 12% to 22% between 1970 and 2000; this sector is currently about 40% larger than manufacturing.[29] Smith's and Rosen's points about the relationship between specialization and growth are likely to be particularly relevant in this and other human-capital-intensive sectors. And as human capital becomes an increasingly important source of increasing returns, it becomes increasingly important to understand how well economic institutions can motivate individuals to specialize and mediate relationships between specialists.

Service industries have received far less attention in the industrial organization literature than other industries. Part of the reason is that the much of the traditional literature focuses on issues related to the monopoly problem -- explaining industrial concentration, regulatory issues, and so on -- and service industries tend not to be concentrated. Another part of the reason is that many service industries, particularly professional service industries, do not fit well with existing theoretical frameworks. Neoclassical theories of the firm frame supplier relationships around the exchange of intermediate goods. However, in many service sectors there are no physical intermediate goods analogous to those in manufacturing. Individuals involved in supplying the good often exchange information rather than physical goods, and this can affect how these exchanges are best organized. Economic theories of organization have the potential to explain

[29] See *Economic Report of the* President, February 2002, p. 336. In contrast, manufacturing's share fell from 24% to 16% during this time.

how these industries are organized, in part because they focus less on the exchange of physical goods. But since Klein, Crawford, and Alchian (1978) and Williamson (1979, 1985), many theories have analyzed firms' boundaries in contexts where production involves relationship-specific physical assets. While these theories can help explain how some service industries are organized,[30] production in many service industries involves mostly human capital, and the physical assets that are used tend not to be relationship-specific. It is hard to imagine how ownership of any of the physical assets used in the production of legal services can affect lawyers' incentives, and thus law firms' boundaries, in the manner contemplated, for example, in Grossman and Hart (1986).[31]

This paper presents evidence on how one service industry – legal services – is organized. We find that individual specialization in many fields increases with the size of the market, but whether firms or markets mediate the division of labor between lawyers differs across specialties. Relationships between specialists in different ex ante fields such as corporate law and tax law tend to be mediated within firms. Relationships between specialists in an ex post field such as insurance law and other classes of specialists tend to be mediated by markets. Ex post fields tend to be covered by the same firm as other fields only when the two fields are covered by the same lawyer. Together, our results indicate that law firms' horizontal scope reflects not just the scope of individual clients' demands, but also organizational trade-offs related to relationships between lawyers. More narrowly, the patterns in our data are consistent with Garicano and Santos' (2001) proposition that firms mediate referrals more efficiently than markets. While law firms' boundaries may also reflect factors not directly considered in our analysis, our evidence suggests that they reflect the value of cross-field referrals.

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[30] Indeed, one of us has argued that the incentives created by truck ownership affects various aspects of how the U.S. trucking industry is organized, and provided empirical evidence consistent with propositions derived from this literature. See Baker and Hubbard (2001, 2003), Hubbard (2001).

[31] Some have tried to adapt these frameworks to service contexts by analyzing how "ownership of the client" or client list affects incentives. Our view is that "ownership of the client" usually is less about "ownership" and more about information about economic opportunities. Individuals do not have property rights over clients in the same way they do over assets, since clients can choose who serves them.

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Table 1
Share of Time on Business Clients, Days per Month in State or Federal Court
Selected Specialties

Specialty	Share of Time Business Clients (percent)	Days per Month In State or Federal Court	N
Commercial Law: Banking	91.3	6.4	8
General Corporate	86.1	1.8	12
Municipal Law	35.6	0.5	6
Environmental Law	82.3	2.8	12
Real Estate	69.9	2.9	43
Tax	64.7	1.3	32
Patents, Trademarks or Copyrights	89.8	2.0	25
Personal Injury -- Defendant	88.3	11.6	20
Personal Injury -- Plaintiff	7.6	13.9	16
Criminal	10.0	16.7	9
Divorce (including family, adoption, etc.)	8.0	16.7	7
Probate (wills and trusts)	3.8	6.0	4

Source: Chicago Lawyers II survey.
Specialty categories are as listed on Chicago Lawyers II survey forms.

Table 2
How Are Profits Divided Within Law Firms?

Partners Only

Factor	Share Very Important	Share Important	Share Very Important or Important
Bringing In New Business	52.3	38.6	90.9
Hours Billed	26.7	58.5	85.2
Client Ties	29.5	54.9	84.4
Seniority	8.2	31.9	40.1
Decision of a Senior Partner	10.6	27.6	38.2
Area of Practice	2.4	28.0	30.4
Personal Favoritism	2.4	17.5	19.9

Source: Chicago Lawyers II survey.
Question was asked of 176 partners of Chicago law firms with five or more lawyers.

Table 3
Work Patterns and Organizational Characteristics

Partners Only

	Seldom or Never Work with Others At or Clearly Above Their Level	All Others
N	34	148
Average Department Size	43	37
Partners	22	18
Associates	21	19
Average Firm Size	192	148
Partners	79	71
Associates	113	77
Firm Divided Into Departments?	73.5	71.4
Share Reporting that Factor Is Very Important or Important in How Profits of Firm Are Divided (percent)		
Bringing In New Business	91.2	91.5
Hours Billed	85.3	85.6
Client Ties	88.2	83.3
Seniority	45.5	54.4
Decision of a Senior Partner	29.4	40.8
Area of Practice	38.2	28.6
Personal Favoritism	33.3	16.7

Source: Chicago Lawyers II survey.
Differences in shares at the bottom of the table are not statistically significant, using a chi-squared test of size 0.05.

Table 4
Solo Practitioners' Use of Capital and Human Resources

	Sole	Shared	None
Office Space	26.7	70.0	3.3
Fax Machine	33.7	63.0	3.3
Copying Machine	23.4	69.1	7.4
Personal Computer	71.9	16.9	11.2
Secretary	48.4	36.3	15.4
Library	21.8	58.6	19.5
Receptionist	14.1	65.9	20.0
Law Clerk or Paralegal	26.8	24.4	48.8
Computerized Research Connection (e.g. Lexis)	21.4	26.2	52.4

Source: Chicago Lawyers II survey.
N ranges between 82 and 94, depending on the question.

Figures give shares of answers to the question: "Does your law firm have sole use of, or share the use of, any of the following types of services and facilities with other firms?"

Table 5
Summary Statistics -- Lawyers, Law Offices, and Law Firms

	Lawyers	Offices	Firms
N	219033	26151	23465
Average Number of Lawyers		3.56	3.65
Share Specialized	0.71	0.37	0.28
Share Multiestablishment	0.28	0.05	0.02

Averages and shares computed using sampling weights supplied by the Bureau of the Census.

Table 6
Shares of Lawyers in Specialized Fields, Offices, and Firms

	Share of Lawyers In Specialized Fields	Share of Lawyers In Specialized Offices	Share of Lawyers In Specialized Firms	Fraction of Specialists In Specialized Firms
Ex Ante Business Specialty	0.270	0.047	0.044	17.4%
Banking	0.047	0.006	0.005	12.9%
Corporate	0.083	0.004	0.004	4.8%
Environmental	0.016	0.001	0.001	6.2%
Governmental	0.015	0.002	0.002	13.7%
Patent	0.020	0.014	0.014	70.4%
Real Estate	0.062	0.014	0.013	22.7%
Tax	0.028	0.005	0.005	17.9%
Ex Post Business Specialty	0.128	0.044	0.044	34.5%
Insurance	0.061	0.025	0.023	40.8%
Negligence-Defendant	0.066	0.018	0.018	27.2%
Other Specialized Field	0.155			
Individual Specialty	0.158	0.071	0.071	44.9%
Criminal	0.024	0.012	0.012	49.7%
Domestic Relations	0.026	0.009	0.009	34.8%
Negligence-Plaintiff	0.074	0.042	0.041	57.1%
Probate	0.035	0.008	0.008	23.1%
General Practice	0.289			

All shares computed using Census-provided sampling weights.

Table 7
Market Size and Lawyer Specialization

Estimates of Beta1 in Individual Specialization Regressions

Dependent Variable			
Share Any Specialty	**0.092** **(0.002)**	**0.083** **(0.003)**	**0.084** **(0.003)**
Share Ex Ante Specialty	**0.050** **(0.001)**	**0.020** **(0.002)**	**0.022** **(0.002)**
Share Ex Post Specialty	**0.014** **(0.001)**	**0.021** **(0.002)**	**0.021** **(0.002)**
Share Individual Specialty	**-0.008** **(0.001)**	**0.017** **(0.002)**	**0.016** **(0.002)**
Controls			
Employment Shares in Major Sectors	N	Y	Y
Avg. Estab. Size in Major Sectors	N	Y	Y
Ln(Share)	N	N	Y

Table contains estimates of the coefficient on ln(county employment) in 12 different regressions.
N=26130

Table 8
Market Size and Lawyer Specialization

Ex Ante Business Specialties

Dependent Variable	Share Banking	Share Corporate	Share Environmental	Share Governmental	Share Patent	Share Real Estate	Share Tax
ln(county employment)	**0.008**	**0.005**	0.000	-0.001	-0.001	**0.010**	0.000
	(0.001)	**(0.001)**	(0.000)	(0.001)	(0.001)	**(0.001)**	(0.001)

Ex Post Business Specialties

Dependent Variable	Share Insurance	Share Negligence-Def
ln(county employment)	**0.015**	**0.006**
	(0.001)	**(0.001)**

Individual Specialties

Dependent Variable	Share Criminal	Share Domestic Rel.	Share Negligence-Pla	Share Probate
ln(county employment)	0.001	**-0.002**	**0.022**	**-0.004**
	(0.001)	**(0.001)**	**(0.002)**	**(0.001)**

N=26151
All regressions contain segment shares, average employment size within segments, state capital as controls.

Table 9
Market Size, Lawyer, and Law Firm Specialization

Dependent Variable	Share Any Specialty	Share Ex Ante Business Specialty	Share Ex Post Business Specialty	Share Individual Speciality
Market Size and Law Office Specialization Regressions (Beta2)				
ln(county employment)	**0.039**	0.000	**0.012**	**0.019**
	(0.003)	(0.002)	**(0.002)**	**(0.002)**
Market Size and Individual Specialization Regressions (Beta1)				
ln(county employment)	**0.083**	**0.020**	**0.021**	**0.017**
	(0.003)	**(0.002)**	**(0.002)**	**(0.002)**
Beta2/Beta1	0.47	-0.02	0.57	1.12

Controls include share of employment in 7 major sectors, average establishment size within each of these sectors, and a state capital dummy

Table 10
Market Size and Law Firm Specialization

Estimates of Beta2, by Specialty

Ex Ante Business Specialties

Dependent Variable	Share Banking	Share Corporate	Share Environmental	Share Governmental	Share Patent	Share Real Estate	Share Tax
ln(county employment)	0.000	0.001	0.000	0.000	-0.001	0.002	-0.001
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)

Ex Post Business Specialties

Dependent Variable	Share Insurance	Share Negligence-Def
ln(county employment)	**0.009**	**0.003**
	(0.001)	**(0.001)**

Individual Specialties

Dependent Variable	Share Criminal	Share Domestic Rel.	Share Negligence-Pla	Share Probate
ln(county employment)	**0.003**	0.001	**0.016**	**-0.001**
	(0.001)	(0.001)	**(0.001)**	**(0.001)**

N=26151
All regressions contain segment shares, average employment size within segments, state capital as controls.

Table 11
Market Size, Lawyer, and Law Firm Specialization

Small and Large Markets

Dependent Variable	Share Any Specialty	Share Ex Ante Business Specialty	Share Ex Post Business Specialty	Share Individual Speciality
Small Markets Only (counties with employment less than 200,000)				
Beta2	**0.051**	**-0.010**	**0.012**	**0.032**
	(0.005)	**(0.002)**	**(0.002)**	**(0.003)**
Beta1	**0.113**	**0.020**	**0.031**	**0.046**
	(0.006)	**(0.002)**	**(0.003)**	**(0.004)**
Large Markets Only (counties with employment greater than 200,000)				
Beta2	**0.026**	-0.004	**0.011**	**0.023**
	(0.006)	(0.003)	**(0.003)**	**(0.003)**
Beta1	**0.084**	**0.022**	**0.020**	**0.018**
	(0.005)	**(0.004)**	**(0.004)**	**(0.004)**

Beta1 is the coefficient on ln(county employment) in regressions where the dependent variable is the share of individuals who are specialized.

Beta2 is the coefficient on ln(county employment) in regressions where the dependent variable is the share of individuals who work in field-specialized firms.

Controls include share of employment in 7 major sectors, average establishment size within each of these sectors, and a state capital dummy

Table 12
Agglomeration and Co-agglomeration Measures

	Banking	Corporate	Governmental	Environmental	Tax	Real Estate	Patent	Insurance	Negligence Defendant
Banking	6.62								
Corporate	0.50	12.89							
Governmental	1.39	2.36	22.09						
Environmental	2.30	2.70	4.92	19.85					
Tax	1.36	4.43	2.78	2.49	8.01				
Real Estate	0.16	0.31	0.31	0.23	0.43	2.35			
Patent	0.60	0.67	0.09	0.15	0.24	0.85	40.26		
Insurance	0.85	3.17	1.55	0.93	2.41	0.95	1.41	12.56	
Negligence-Def	0.32	2.36	1.34	0.30	1.20	0.48	1.05	0.37	10.52
Criminal	0.37	1.79	1.47	1.85	0.25	0.14	1.19	0.26	0.51
Domestic	0.75	2.74	1.48	2.24	2.01	0.12	0.92	0.36	0.11
Negligence-Pla	0.69	2.88	1.30	2.21	2.04	0.19	0.89	0.22	0.12
Probate	0.23	0.94	0.63	0.77	0.52	0.23	0.91	0.18	0.05
Other	0.32	1.11	0.41	0.59	0.97	0.08	0.78	1.86	1.68
General Practice	0.90	2.72	1.50	1.80	1.66	0.28	0.88	0.02	0.41

	Criminal	Domestic	Negligence Plaintiff	Probate	Other	General Practice
Criminal	9.90					
Domestic	1.13	4.09				
Negligence-Pla	0.65	1.20	3.65			
Probate	0.68	0.74	0.38	2.03		
Other	1.18	1.09	1.35	0.51	3.96	
General Practice	0.41	0.90	0.83	0.20	1.17	1.63

All values multiplied by 1000.
Agglomeration measures are on the diagonal; co-agglomeration measures are on the off-diagonal.

Figure 1
Generic Contractual Timeline and Demand for Legal Services

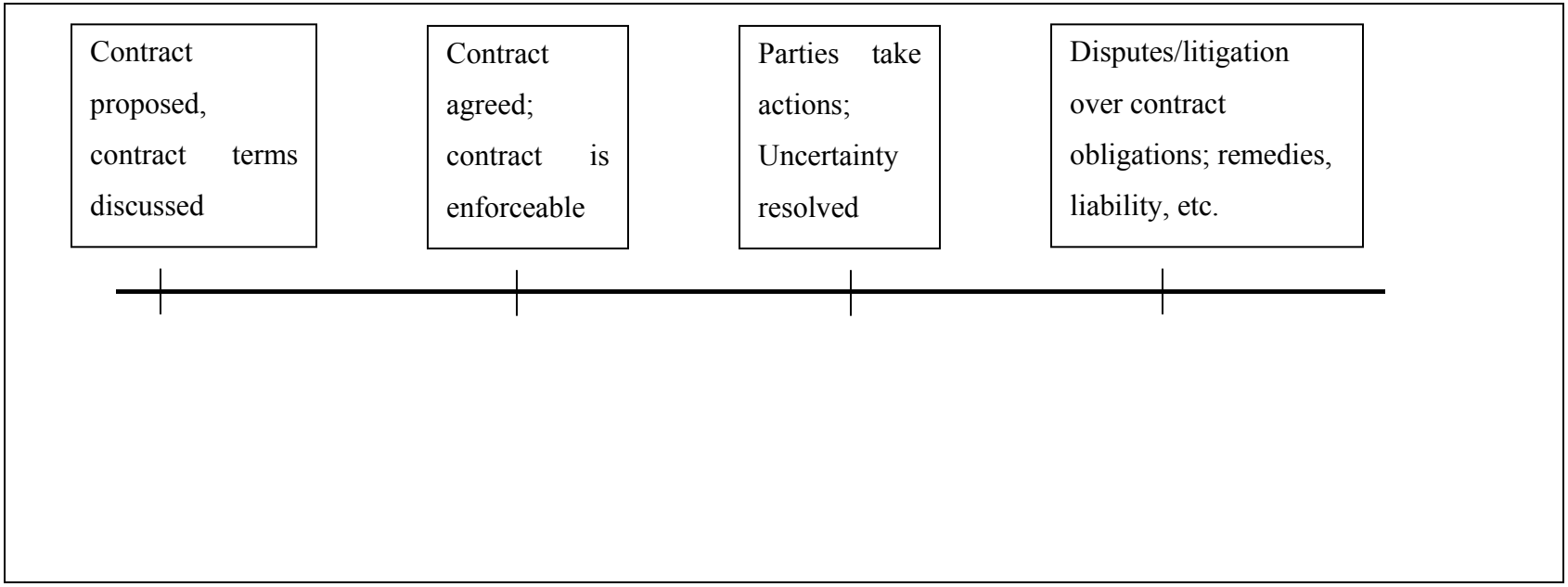


Figure 2
Share of Lawyers in Specialized Fields, Field Specialized Firms
Ex Ante Business Fields

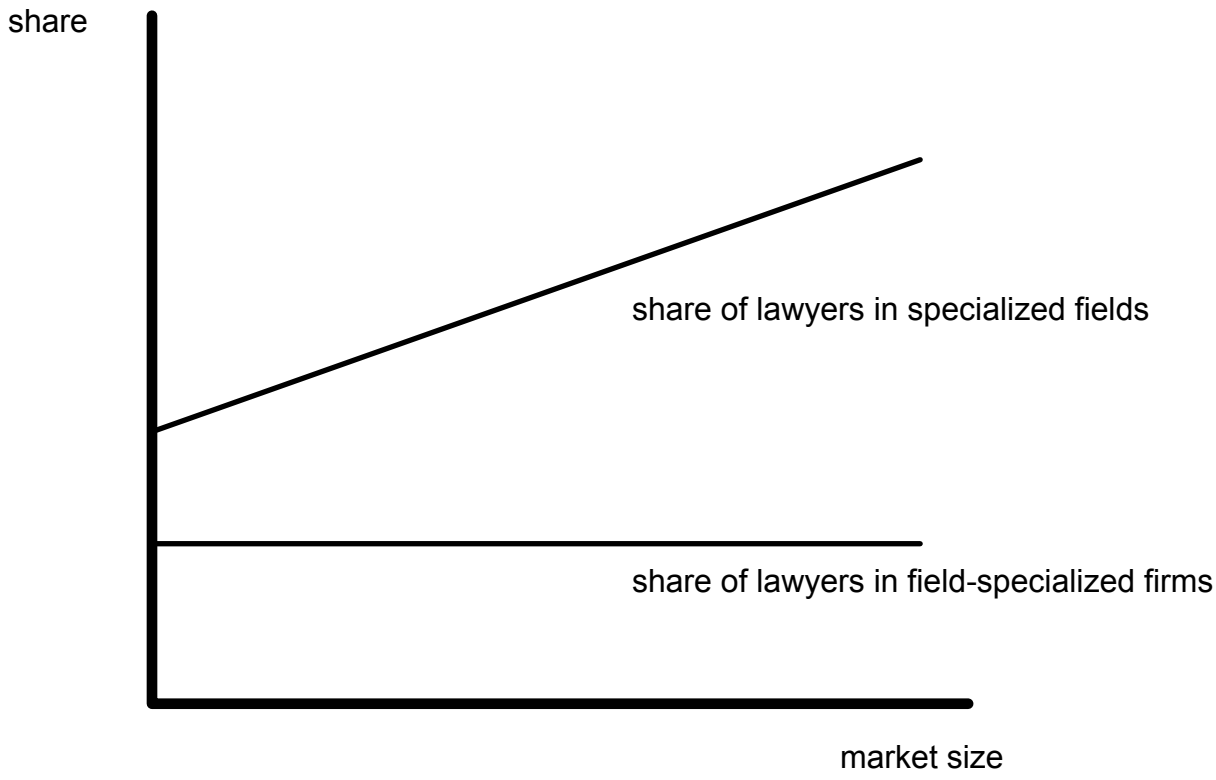
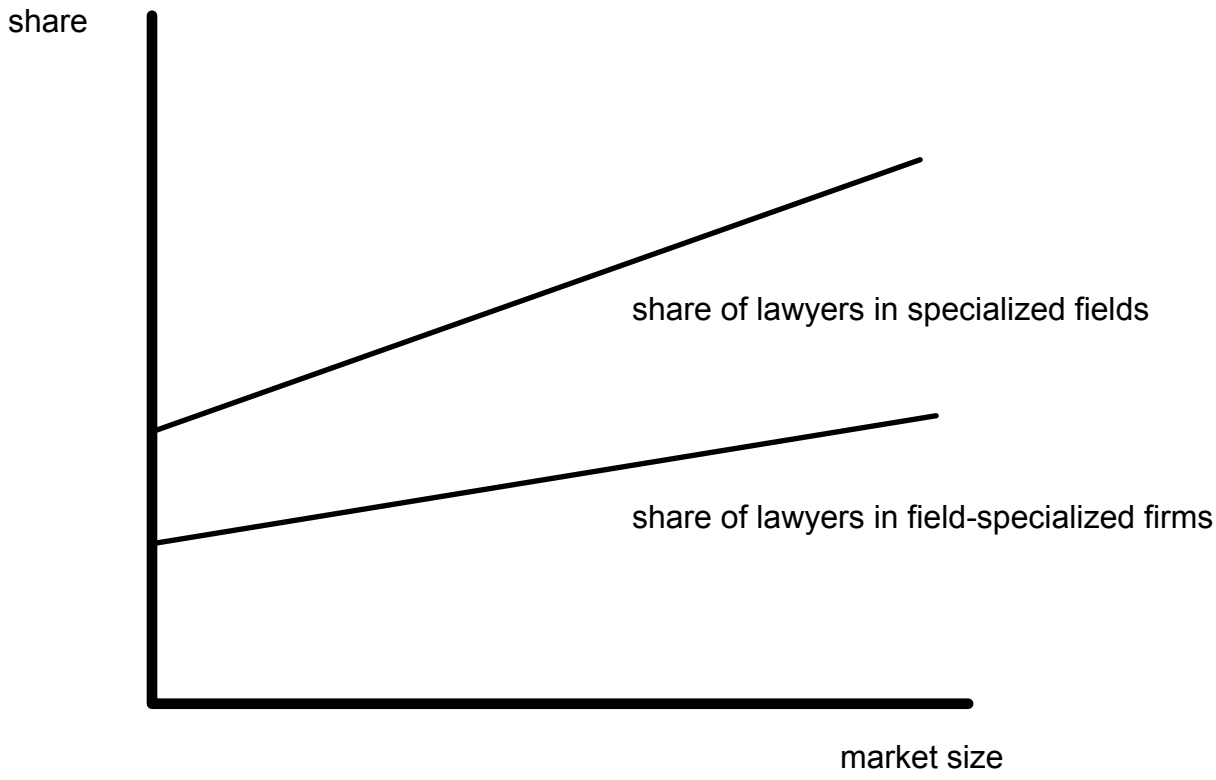


Figure 3
Share of Lawyers in Specialized Fields, Field Specialized Firms
Ex Post Business Fields



Appendix 1

LEGAL SERVICES

(Form CB-8100)

Item 10. PERSONNEL AND PAYROLL, BY OCCUPATION

Include personnel who perform a variety of functions (secretaries, etc.) on the one line which best describes the primary nature of their work.

Line a(1) – Lawyers who are members of a professional service corporation should be included here.

Line b – Only proprietors and partners **not** considered employees of the firm for Federal tax purposes should be included here.

Occupation (include proprietors and partners on line b only)	Personnel for pay period including March 12, 1992 (number)	Annual payroll Mil.	Thou.	Dol.
a. Type of employee				
(1) Associate lawyers (employees of firm)	565	570		
(2) Paraprofessionals (law clerks, legal assistants, investigators, etc.)	566	571		
(3) Managers and other nonlegal professional staff	567	572		
(4) All other (stenographers, bookkeepers, etc.)	568	573		
(5) **TOTAL** (Sum of lines a(1) through a(4) above should equal entries in items 6a and 7)	569	574		
b. Active proprietors or partners at this location (**unincorporated operations** only)	450			

For law firms operating at more than one location, report proprietors or partners at the location where they spend most of their working time. (If this establishment is a member of a group practice, include only proprietors or partners whose practice is covered by this EI Number.)

Item 11. NATURE OF LAWYERS' PRACTICE

Include each individual lawyer reported in items 10a(1) and 10b (associate lawyers plus proprietors and partners at this location) on the **one** line which best describes the lawyer's primary field of specialization. Lawyers who are not primarily engaged in a single specialized field should be included on line b.

Primary fields of practice	Number of lawyers
a. Specialized fields	
(1) Banking and commercial law	575
(2) Corporate law	576
(3) Criminal law	577
(4) Domestic relations	578
(5) Environmental law	579
(6) Governmental law	580
(7) Insurance law	581
(8) Negligence – defendant	582
(9) Negligence – plaintiff	583
(10) Patent, trademark, and copyright law	584
(11) Real estate	585
(12) Tax law	586
(13) Wills, estate planning, and probate	587
(14) Other specialized field – *Specify*	588
b. General practice	589
c. **TOTAL** (Sum of above lines should equal the sum of items 10a(1) and 10b)	590

Item 13. EXPENSES OF LEGAL AID SOCIETIES

Report total operating expenses, including payroll, interest, rent, depreciation, taxes, and other overhead. Exclude capital expenditures, funds invested, and transferred contributions.

Mil.	Thou.	Dol.
040		

Table A1
Market Size and Lawyer Specialization

Dependent Variable	Share Any Specialty	Share Ex Ante Business Specialty	Share Ex Post Business Specialty	Share Individual Speciality
ln(county employment)	**0.083**	**0.020**	**0.021**	**0.017**
	(0.003)	**(0.002)**	**(0.002)**	**(0.002)**
sh(mfg)	**-0.515**	**0.259**	**-0.526**	-0.115
	(0.115)	**(0.092)**	**(0.084)**	(0.089)
sh(trans/util)	-0.181	0.275	-0.287	0.191
	(0.229)	(0.185)	(0.168)	(0.178)
sh(wholesale)	**-1.052**	-0.326	**0.478**	**-0.688**
	(0.211)	(0.171)	**(0.155)**	**(0.164)**
sh(retail)	0.159	-0.206	0.055	**0.591**
	(0.161)	(0.130)	(0.118)	**(0.125)**
sh(FIRE)	-0.119	**1.285**	**-0.778**	**-0.702**
	(0.144)	**(0.117)**	**(0.106)**	**(0.112)**
sh(services)	0.175	**0.441**	**-0.249**	-0.165
	(0.119)	**(0.096)**	**(0.087)**	(0.093)
state capital	**0.028**	**0.042**	0.007	**-0.039**
	(0.008)	**(0.006)**	(0.005)	**(0.006)**
emp/estab -- construction	**0.007**	**0.003**	0.001	0.000
	(0.001)	**(0.001)**	(0.001)	(0.001)
emp/estab -- mfg	**0.001**	0.000	**0.001**	0.000
	(0.000)	(0.000)	**(0.000)**	(0.000)
emp/estab -- trans/util	**0.003**	0.001	**0.001**	**-0.001**
	(0.001)	(0.000)	**(0.000)**	**(0.000)**
emp/estab -- wholesale	-0.001	0.002	**-0.006**	-0.002
	(0.001)	(0.001)	**(0.001)**	(0.001)
emp/estab -- retail	-0.002	**0.007**	-0.001	**-0.005**
	(0.001)	**(0.002)**	(0.001)	**(0.002)**
emp/estab -- FIRE	**0.003**	**-0.002**	**0.003**	**0.004**
	(0.001)	**(0.001)**	**(0.001)**	**(0.001)**
emp/estab -- services	**-0.008**	**-0.003**	0.000	0.001
	(0.002)	**(0.001)**	(0.001)	(0.001)
C	**0.463**	-0.164	**0.260**	**0.197**
	(0.109)	(0.088)	**(0.080)**	**(0.085)**

N=26130