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CLIENT-BASED ENTREPRENEURSHIP

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ABSTRACT

Client relationships create value, which employees may try to wrest from their employers by setting up their own firms. If when an employer and worker establish a relationship they cannot contract on the output and profits of the worker's prospective new firm, the employer counters by inducing the worker to sign a contract that prohibits him from competing or soliciting the current client in the event of termination of employment. The socially optimal level of entrepreneurship will nevertheless be achieved if clients, employers, and workers can renegotiate these restrictive employment contracts and make compensating transfers. If workers cannot finance transfers to employers, however, employers and workers will sign contracts that are too restrictive and produce too little entrepreneurship, and governments can increase welfare by limiting enforcement of these contracts. With or without liquidity constraints, locations where non-compete contracts are less enforced will attract more clients and have higher employment and output.

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1. Introduction

Initially motivated by famous examples in the high-tech sector, the study of employee spinoffs has now broadened as their importance for entrepreneurship across all economic sectors has become recognized. Hvide (2006) studies employee entrepreneurs among Stanford MBAs concentrated in professional services, and Cabral and Wang (2008) analyze the determinants of the performance of employee spinoff firms in the automobile industry. Klepper and Sleeper (2005) and Franco and Filson (2006) argue that even in high-tech industries (lasers and disk drives, respectively), employees may simply exploit knowledge they learned during their employment rather than their own technological innovations to become competitors with their former employers.

Part of the knowledge that entrepreneurs acquire when employed, especially in services, is knowledge of potential clients for their future businesses. Rauch and Watson (2002, Table 1) find that, when international trade intermediaries handling differentiated products started their firms, clients outside of the United States with whom they had experience from previous employment accounted for over half of their international business. Ruef (2002) reports that 52 percent of the MBA entrepreneurs he surveyed used discussions with customers or suppliers to develop their business ideas. Muendler and Rauch (2010) find that exporting spinoffs from exporting parents sell mainly to the same destinations as the parents at the time of spinoff, and continue to sell to those destinations even when the parents' export destinations change.[1]

[1]Development of data sets that would allow us to track client-based entrepreneurship is still in its infancy. Phillips (2002, p. 500) regrets that "data on law firm clientele are sporadically and unreliably available. An ideal study of the parent-progeny transfer using law firms would follow the movement of the clients from the parents to the progeny."

"Theft" of clients from employers by employees is a sufficiently common issue that the former often include non-solicitation covenants in the employment contracts of the latter. These covenants are one of a number of restrictive clauses that an employer can include in an employee's contract in an attempt to restrict him from competing against the employer in the event of separation. The enforcement of such "non-competes" is controversial and varies widely from state to state within the United States and has even changed within states over time (Garmaise 2009, Marx et al. 2009).[2] In deciding whether non-compete covenants are enforceable, Carnevale and Doran (2001) write that "courts generally consider whether the covenant protects 'trade secrets' to which an employee may have had access or whether the employee's services are 'unique or extraordinary'....With regard to customer relationships courts have found that employers have a legitimate interest in protecting the 'unique' relationship that an employee develops with the employer's clients or an interest in protecting 'customer relations'."

Client-based entrepreneurship can thus be seen as part of a struggle between employers and employees over the value created by client relationships. Our objectives in this paper are to explore theoretically the efficiency consequences of this struggle and identify the relationship between the form of employment contracts, legal rules governing restrictive covenants, and the incidence of client-based entrepreneurship. We also extend our analysis to the impact on the allocation of clients across jurisdictions of differences in legal rules and in local government facilitation of startups.

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[2]Marx et al. find that an inadvertent change in Michigan state law from non-enforcement to enforcement of non-competes reduced the mobility of inventors as traced through their patent addresses.

In section 2 we model the relationship between one employer ("firm"), one employee ("worker"), and one client. Key assumptions are that the firm and worker sign a contract before meeting the client, and that the output and profits of the worker's prospective new firm are not verifiable. The latter assumption leads to a need for monetary transfers between the parties when negotiating a possible separation of the worker and client from the firm (client-based entrepreneurship), and also to an unwillingness of banks to lend to the worker to make a transfer to the firm (to buy out his contract) if the worker does not have the cash on hand. One might think that the "deep pockets" of the client would avoid inefficiently low separation because of the worker's liquidity constraint. However, we show in section 3 that the prospect of extracting wealth from the client actually induces the firm and worker to sign a more restrictive non-compete contract, and that the client insists on participation of the worker in buying out the latter's contract. Only a government decision not to enforce these contracts, therefore, averts inefficiently low separation. Our model thus suggests that welfare rises when courts emphasize the rights of clients to choose whom they will employ over the rights of employers to restrict competition from their former workers.[3] We also show that as the government weakens enforcement, the firm must pay the worker more to retain her (and her client) when the three parties find it efficient to remain together.

In section 4 we extend our model to allow for many locations, each of which is endowed with many firms. Each firm in turn can employ many workers, each serving one client. We show that differences across locations in willingness to enforce non-competes become an

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[3]In the legal services industry, a strong bias towards the rights of clients to choose who will represent them is reflected by the fact that, in general, courts will not enforce restrictive covenants on lawyers (Hillman 1990 §2.3.2 and §2.3.3).

element of regional competitive advantage, leading to differences in numbers of clients and rates of entrepreneurship across locations. Gilson (1999) has argued that covenants not to compete are much less enforceable in California than in Massachusetts. Examining potential causes of the success of Silicon Valley in California relative to Route 128 in Massachusetts, McMillan (2002, p. 114) claims, citing the work of Gilson, "The post employment covenant lies at the root of the differences between Silicon Valley and Route 128." McMillan is concerned with the ability of restrictive covenants to prevent departing employees from taking with them technological innovations rather than client relationships, but we conjecture that far more entrepreneurs start their businesses on the basis of the latter than the former.

In section 5 we compare our model and results to those in the literature on employee spinoffs and non-competes, and discuss the robustness of our results to changes in assumptions about the economic environment in which clients, firms, and workers operate. Section 6 concludes.

2. A Model of Client-Firm-Worker Interaction

We develop a model that most naturally fits providers of professional and business services and their clients. We focus on these services for two reasons. First, they are growing even more rapidly than overall services as a share of total output. Professional and business services increased from 8.7% of U.S. value added in 1987 to 12.7% of U.S. value added in 2008, raising their share of overall services from 20.8% to 24.7%.[4] Second, the clients of professional

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[4]The overall service share of U.S. value added, which includes NAICS 51-81, increased from 42.0% in 1987 to 51.2% in 2008. The U.S. Department of Commerce defines "Professional and business services" as NAICS 54-56, which includes "Professional, scientific, and technical

and business service providers are mainly businesses themselves, making professional and business service quality a key to the ability of locations to attract and retain business in general. For example, corporate headquarters locate where there is easy access to high quality accounting, advertising, consulting, financial, legal, and other related services. Klier and Testa (2002) find that the growth of large company headquarters between 1990 and 2000 across U.S. metropolitan areas is significantly associated only with the growth of metro area population and the 1990 share of metro area nonfarm earnings in professional and business services.[5]

We assume that each location is endowed with a mass of professional and business service providers ("firms") that have established reputations by successfully serving clients in the past.[6] New clients only approach firms with reputations, so professionals who have completed their schooling must affiliate with firms in order to get work, thereby becoming "workers." In any location the mass of firms is small relative to the mass of potential workers, so the former have all the bargaining power in initial contracting. In this section we model the

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services" (NAICS 54), "Management of companies and enterprises" (NAICS 55), and "Administrative and waste management services" (NAICS 56). All figures are from U.S. Department of Commerce, Bureau of Economic Analysis, Industry Economic Accounts, http://www.bea.gov/industry/gdpbyind_data.htm.

[5]When explaining their results, Klier and Testa supply a quotation from Lichtenberg (1960) that underscores why relationships with outside professional and business service providers are so important for corporate clients: "Like producers of unstandardized products, the central office executives 'produce' answers to unstandardized problems, problems that change frequently, radically, and unpredictably.... These problems are solved quickly only by consultation with a succession of experts. But ... most central offices would find it inefficient if not impossible to staff themselves internally with all of the specialized personnel and services that they must call on from time to time to solve their problems.... All of these considerations dictate a concentration of central offices ... near their 'suppliers'."

[6]Our model is static. We leave evolution of the numbers of firms and their reputations to future research.

interaction between one firm, one worker, and one client in a given location. We assume that a worker can only serve one client at a time. A firm can hire multiple workers, but negotiates separately with each worker and worker-client pair as described below. In section 4, we expand the analysis to consider multiple locations, each with many firms and workers serving clients.

Our model of client-firm-worker interaction focuses on times when the parties negotiate over contractual terms. We analyze the negotiation using standard cooperative bargaining theory, which has the usual non-cooperative foundations.[7] Here is the basic structure of the model in the form of a time line:

Date 0: The firm forms a contract with a single worker selected from a population of workers. Their contract specifies a "non-restrictiveness" parameter $p \in [0, 1]$ that characterizes how likely the worker would be able to serve a client of the firm if the worker separates from the firm and becomes an entrepreneur. The value $p = 0$ represents a very restrictive covenant, whereas $p = 1$ is a completely non-restrictive one. Let p^0 denote the value of p that the worker and firm select.

Date 1: A single client arrives and the firm and worker provide a standard service for this client, which leads the worker to acquire knowledge for a specialized service opportunity. A random draw and location-specific parameters determine the worker's cost of becoming an entrepreneur (that is, starting his own firm), at which point he would be able to serve the client independently from the existing firm. Let $k \in [0, 1]$ denote the realization of the random draw and let μ be its distribution (c.d.f.). The cost of becoming an entrepreneur is increasing in k, so $k = 0$ means that the worker can easily become an entrepreneur (low cost) whereas $k = 1$ means that it would be very difficult for the worker to do so. The client, firm, and worker commonly observe k.

Date 2: The client, firm, and worker together negotiate over whether the firm and worker will stay together to provide the specialized service to the client and, if not, whether to renegotiate the firm and worker's initial contract in order to change p^0 to some new value p'. The disagreement point is separation of the worker from the firm (which the parties can each unilaterally compel) and $p' = p^0$.[8]

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[7]We calculate the model's *contractual equilibrium*. See Watson (2004) for notes on the relation between cooperative and noncooperative approaches to modeling negotiation in a dynamic strategic setting.

[8]The assumed disagreement point represents the idea that exogenous events would, with some probability, cause the separation of the worker and firm if they fail to reach an agreement in a

Date 3: If the firm and worker stayed together at Date 2, then they work together to provide the specialized service to the client. If the firm and worker had separated at Date 2 then the worker becomes an entrepreneur. Then, after some set-up period, the entrepreneur and the client arrange for the entrepreneur to provide the specialized service. Further, the firm takes legal action against the entrepreneur and, in the event that the entrepreneur is barred from providing the specialized service, the firm provides some generic version of the specialized service for the client.

Rather than model the details of the interaction and legal intervention at Date 3, we simply describe the resulting payoffs. We assume that if the firm and worker stay together to provide the specialized service, then this work is contractible and it creates a surplus of 1 unit. This surplus can be verified and arbitrarily divided between the parties as specified by their agreement at Date 2.[9]

On the other hand, if the firm and worker separate then the joint payoff of the client, firm, and worker is given by the function $X(p, k)$. The key assumption we make is that productive interaction occurring after the worker separates from the firm is *not* contractible prior to the separation. There may be various reasons for this lack of contractibility, including problems involving unverifiable investment and/or contracting costs. Rather than include the details in the model here, however, we refer to the conclusions of the well developed literature on specific investment and contracting costs.[10] Thus, we assume that the parties' continuation payoffs

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given period of time when negotiation occurs. An alternative specification, in which separation occurs only if the parties actively choose it (some call this the outside option principle), leads to a slightly different outcome of the bargaining at Date 2 but does not alter our general results.

[9]It does not matter whether the initial contract between the firm and worker covers aspects of this productive activity, given the renegotiation opportunity and disagreement point described above.

[10]Unverifiability is a particular problem in settings of cross (cooperative) investment and unified investment and trade actions (Buzard and Watson 2010, building on Che and Hausch 1999), or when trade involves "complexity/ambivalence" as described by Segal (1999), Hart and Moore (1999), and Reiche (2006). On costly contracting, see Dye (1985) and the literature that followed, including Anderlini and Felli (1994), Battigalli and Maggi (2002), and Schwartz and

following separation are a function of p and k only, and the division of X cannot be determined earlier. Let $x_E(p, k)$, $x_C(p, k)$, and $x_F(p, k)$ denote the individual separation values for the entrepreneur, client, and firm, respectively. These are assumed to be twice continuously differentiable. We have

$$X(p, k) = x_E(p, k) + x_C(p, k) + x_F(p, k).$$

Importantly, note that if at Date 2 the client, firm, and worker want to split the joint value of separation in an arbitrary way, they would have to do so by agreeing to make lump-sum monetary transfers either at Date 2 or in the future.

To summarize, the model has explicit strategic elements at Dates 0 and 2, where negotiation takes place. We shall analyze the negotiation at these dates using standard bargaining theory. We assume that the mass of workers is large compared to the mass of firms, so the firm has all of the bargaining power at Date 0. The worker's outside option at Date 0 is normalized to 0, and so negotiation at Date 0 is resolved by maximizing the firm's payoff subject to the worker obtaining at least 0. We assume that negotiation at Date 2 is resolved according to the standard Nash bargaining solution, which maximizes the product of each player's payoff in excess of his/her disagreement value.[11]

We also incorporate a legal restriction on p by requiring that $p \geq \underline{p}$, where $\underline{p}$ represents a legal lower bound on the probability that the worker will be able to serve the client in the event of separation. If non-compete clauses are unenforceable in the given location, then $\underline{p}$ is close to

Watson (2004).

[11]The assumption of equal bargaining weights is not essential to the results but keeps the analysis simple.

one. We shall later consider the implications of variations in <u>p</u> across jurisdictions.

We make the following basic assumptions.

Assumption 1:

(a) $X(p, k)$, $x_E(p, k)$, and $x_C(p, k)$ are all strictly increasing in p and strictly decreasing in k. That is, as the worker and firm's contract becomes less restrictive, the joint value of separation increases. Furthermore, as the cost of becoming an entrepreneur increases, the joint value of separation declines. Also, $x_F(p, k)$ is decreasing in p and increasing in k. Thus, the firm's separation value rises with the restrictiveness of the covenant with the worker and with the worker's cost of becoming an entrepreneur, because this lowers the ability of the client and entrepreneur to work together (forcing the client to sometimes work with the firm).

(b) $X(1, 1) < 1$, and $X(1, 0) > 1$. In words, when the entrepreneur's cost is maximal then separation is inefficient, even under the least restrictive contract. On the other hand, if the contract does not restrict the entrepreneur at all and the start-up cost is minimal, then separation is efficient.

Note that Assumption 1(b) implies that it is sometimes more efficient for the worker to provide the customized service to the client as an entrepreneur (in a new firm of his own) rather than in the context of his employer (the current firm). There are many reasons for this. The worker may have developed a client-specific innovation that is disruptive of the firm's way of doing business (Tushman and Anderson 1986, Henderson and Clark 1990), or the firm's project-management system or staff may be poorly suited for the client's needs. The firm cannot reconfigure itself to incorporate the innovation or change its personnel because that lowers the value it creates with all its other clients. The firm can start a free-standing unit to serve the client, but it may operate at a higher cost than the worker's own new firm, because of the need to retain compatibility with the incumbent firm's "headquarters services" (Ono 2003) —

accounting and reporting, marketing, R&D, etc.[12]

Our final assumption is that the worker is liquidity constrained, in particular at Date 2, when the parties are negotiating over whether to stay together and/or to revise the firm-worker contract. In reality, there are several barriers that limit the ability of the worker to make a monetary transfer to the firm. First, workers generally do not have the resources to internally (out of pocket) finance a large payment. Second, external financing generally is limited due to informational asymmetries between the worker and outside lending institutions. If future returns from the client are unverifiable, the entrepreneur/worker can hide his income and declare that his new firm has failed. Furthermore, if banks cannot easily distinguish between the workers in our model and other, high-risk agents, then the banks will not be willing to lend the worker the money required to buy out his non-compete agreement.[13] The liquidity-constraint assumption is also consistent with the stories that workers tell.[14]

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[12]In a previous version of this paper (Rauch and Watson 2005), we noted that the quality of the effort or investment that an employee makes on behalf of the client may not be verifiable and therefore not contractible, and that the value of the customized service itself may not be verifiable. Working on his own account, the employee has a greater incentive to exert effort and provides a more valuable service. However, the non-contractibility greatly complicates the model without adding insight.

[13]Similar problems arise in loan arrangements with the client and firm. A loan from the client is subject to hold-up, whereby, after the effort decision, the worker refuses to consummate trade unless the loan is renegotiated. This implies that the entrepreneur's and client's continuation payoffs from the time that they contract are independent of the sunk loan amount, meaning that the client is merely making an immediate transfer to the firm through the worker. A loan from the firm requires the same verification of returns as would a loan from a bank; the worker could hide his returns from the firm and, anticipating that it cannot compel the worker to repay, the firm will not issue the loan.

[14]Workers we have interviewed do not consider borrowing to buy out their non-compete contracts to be a viable option. Several workers with a major international market research firm, disgruntled with a change in management following a merger, told us they thought they could better serve their clients by setting up their own firms but felt "trapped" by their non-competes

Rather than adopt a single motivating story for the worker's liquidity constraint, we simply assume that there is an upper bound on the amount of money that the worker can transfer to the other parties at Date 2 and, for simplicity, we suppose that the bound is zero at Date 0.

Assumption 2 [Liquidity Constraint]: At Date 2 the worker can transfer at most m to the other players, where $m \geq 0$ is a fixed number. Promises to transfer money later cannot be enforced. At Date 0, the worker can transfer nothing to the firm.[15]

We can think of m as determined by the collateral against which the entrepreneur could borrow. For a professional and business service enterprise, there is little in the way of tangible assets to seize, so m should be small.

The liquidity constraint comes into play only in the event of separation, because when the parties stay together they form a contract that commits them to an arbitrary division of the surplus of 1 that is generated at Date 3. If at Date 2 the parties choose to revise the terms of the firm-worker contract (picking $p' \neq p^0$) and separate, then their continuation values are $x_E(p, k)$, $x_C(p, k)$, and $x_F(p, k)$, plus any transfers made at Date 2 (subject to the worker's liquidity constraint).

3. Analysis and Results

We begin by characterizing the outcome of bargaining at Date 2, for a given p^0 selected at Date 0 and k realized at Date 1. We suppose that negotiation is resolved according to the Nash

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and "lacked the cash" to buy them out.

[15]The assumption of no liquidity at Date 0 simplifies the analysis of negotiation at Date 0 and does not drive the basic results. In the case of m large, for instance, if we assume that the worker's liquidity at Date 0 is also unconstrained, our results are unchanged.

bargaining solution, where the parties have equal bargaining weights and the bargaining set incorporates the worker's liquidity constraint. That is, the parties negotiate to achieve continuation payoffs of (v_W, v_C,, v_F) with the objective of solving:

$$\max\ (v_W - x_E(p^0, k))(v_C - x_C(p^0, k))(v_F - x_F(p^0, k))$$

subject to: $v_W + v_C + v_F = 1$ (stay together) or $v_W + v_C + v_F = X(p', k)$ (separate);
p' is between 0 and 1; and
in the event of separation, $v_W \geq x_E(p', k) - m$.

Because of the liquidity constraint, the bargaining set is not generally convex, but the Nash solution still exists. Let $v_W^*(p^0, k)$, $v_C^*(p^0, k)$, and $v_F^*(p^0, k)$ be the values that solve this maximization problem. These are the continuation payoffs of the players from Date 2, given the terms of the contract between the firm and worker and given the realization k.

Next we provide a simplified expression of the bargaining solution. Because the client and firm can freely make transfers to each other, the solution of the bargaining problem will equate their surplus shares, meaning that

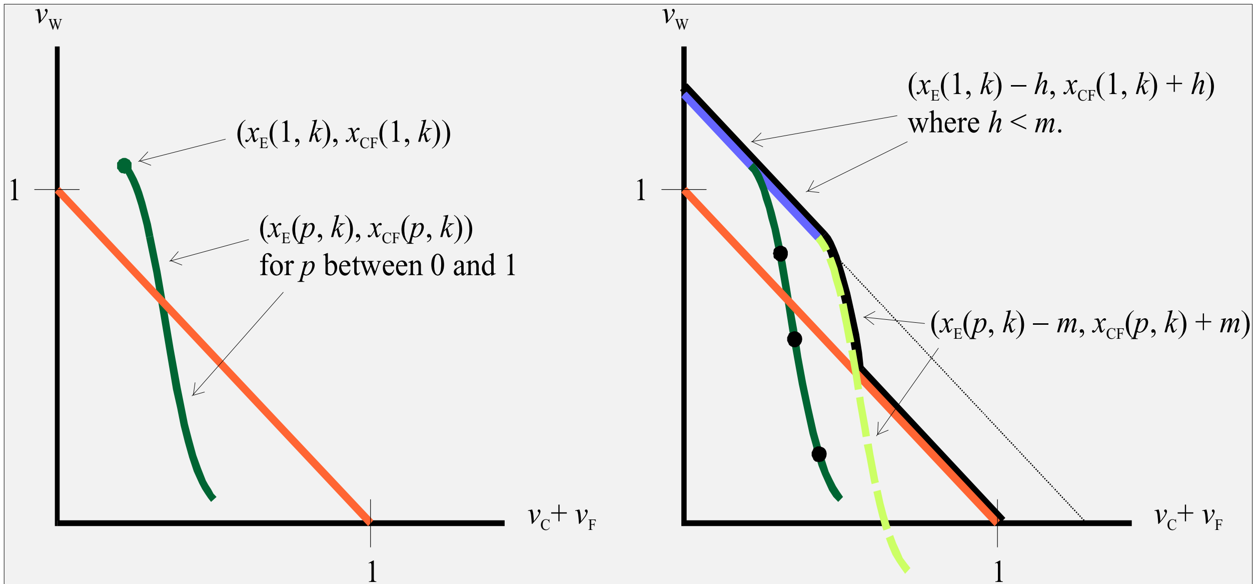
$$v_C^*(p^0, k) - x_C(p^0, k) = v_F^*(p^0, k) - x_F(p^0, k).$$

Thus, we can add the condition $v_C - x_C(p^0, k) = v_F - x_F(p^0, k)$ to the maximization problem, allowing us to express the bargaining problem as one with two parties: the worker and (as a unit) the client and firm. This problem is:

$$\max\ (v_W - x_E(p^0, k))(1/4)(v_C + v_F - x_C(p^0, k) - x_F(p^0, k))^2$$

subject to: $v_C - x_C(p^0, k) = v_F - x_F(p^0, k)$
$v_W + v_C + v_F = 1$ (stay together) or $v_W + v_C + v_F = X(p', k)$ (separate),
p' is between 0 and 1, and
in the event of separation, $v_W \geq x_E(p', k) - m$.

Note that it will not be optimal to choose $p' < p^0$, so the third constraint is really $p' \in [p^0, 1]$. The components of the bargaining set are depicted in Figure 1. In the figure, we simplify the



Building blocks of the bargaining set. Note that $X(p, k) = x_E(p, k) + x_{CF}(p, k))$ is increasing in p.

The frontier of the bargaining set is the solid black line (upper envelope). Possible disagreement points (indicated by filled circles) are given by $(x_E(p^0, k), x_{CF}(p^0, k))$ for p^0 between 0 and 1.

Figure 1: The bargaining set at Date 2, given p^0 and k.

notation by defining $x_{CF}(p, k) \equiv x_C(p, k) + x_F(p, k)$. The figure illustrates the setting in which $x_C(p, k) + x_F(p, k)$ is decreasing in p, which is an assumption we make for several results below. This assumption implies that the firm loses more than the client gains by weakening its control over the worker in the event of separation.[16]

The left panel of Figure 1 shows the ways of dividing the joint value of staying together (the line of slope – 1) as well as the separation payoffs for different values of p and no additional monetary transfers. The right panel of Figure 1 depicts also the feasible payoffs when monetary transfers are made. Note that points $(x_E(1, k) - h, x_{CF}(1, k) + h)$ are enforceable for all $h \leq m$

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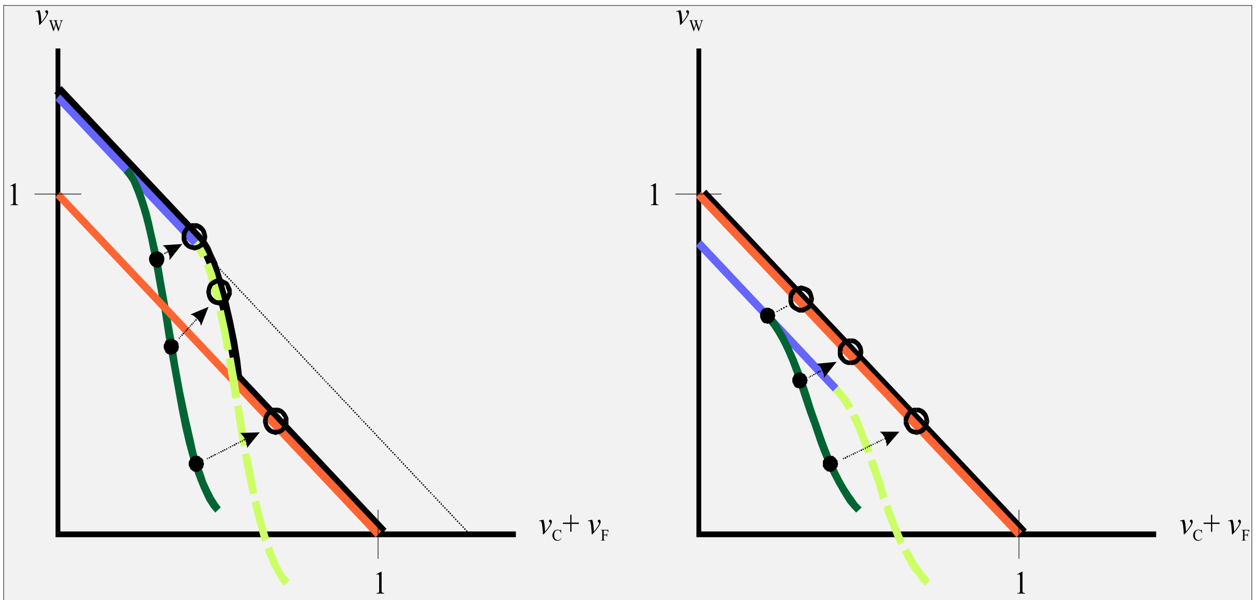
[16]With $p = 0$, the client loses the difference between the quality of service provided by the worker-turned-entrepreneur and that provided by the firm without the worker, whereas with $p = 1$ the firm loses all (expected) revenue from the client.



Bargaining outcomes (open circles) relative to various disagreement points (filled circles).

A case in which $X(1, k) < 1$.

Figure 2: Illustration of the solution to negotiation at Date 2.

(including $h < 0$). These represent continuation payoffs achieved if the parties set $p' = 1$ and where the worker transfers h to the other parties. At $h = m$ the worker's liquidity constraint is met. For $h > m$, a payoff vector $(x_E(1, k) - h, x_{CF}(1, k) + h)$ is physically possible, and hence feasible in the economic environment, but it is not feasible in the bargaining problem because it requires a promise for the worker to transfer money in the future (which is not enforceable). Points on the curve $(x_E(p, k) - m, x_{CF}(p, k) + m)$ are feasible in the bargaining problem but they are inefficient outcomes. Points on the "stay together" line are also inefficient if $X(1, k) > 1$, as is depicted in Figure 1. The frontier of the bargaining set is given by the black line.

Figure 2 gives examples of disagreement points and their corresponding bargaining outcomes (agreement points). Note that, as shown in the right panel, if $X(1, k) < 1$ then the parties stay together and realize an efficient outcome. As the left panel makes clear, in some cases the bargaining solution leads to an inefficient outcome, where the parties fail to set $p' = 1$. In such cases, they would have been better off by setting $p' = 1$ and having the entrepreneur make a voluntary transfer to the other parties after he directly provides the specialized service to the client (yielding an arbitrary point on the faint black line in the figure). But a promise by the worker to transfer money later is unenforceable, so the liquidity constraint here leads to the inefficiency. If the worker is not liquidity constrained (so m is sufficiently large), then Date 2 renegotiation always leads to the efficient outcome:

Result 1: If m is sufficiently large then negotiation achieves the efficient outcome given k. That is, in the case of $X(1, k) < 1$, the parties stay together. In the event of $X(1, k) > 1$, the parties renegotiate to select $p' = 1$, there are some lump-sum transfers, and the worker and firm separate.

Proof: In this case, the frontier of the bargaining set is the set of all continuation payoff vectors that sum to the maximum of $X(1, k)$ and 1, so the result is obvious. ■

More generally, the extent of inefficiency falls as the liquidity constraint is relaxed.

Result 2: The set of pairs (p^0, k) under which separation occurs is increasing in m. In other words, if $m' > m$ and if separation would occur for a given (p^0, k) and m, then separation also would occur in the case of (p^0, k) and m'. Under the additional assumption that $x_E(p, k) - [x_C(p, k) + x_F(p, k)]$ is increasing in p, then, conditional on separation, the renegotiated p' is (weakly) increasing in m. Under the assumption that $x_C(p, k) + x_F(p, k)$ is decreasing in p, if $m = 0$ then p is not renegotiated, so $p' = p^0$.

Proof: The first part of this result is proved by noticing that increasing m relaxes the constraints of the maximization problem that characterizes the solution to the negotiation at Date 2, and it does so only for the separation choice. On the claim about p', one can easily show by comparing Nash products that if p'' is selected with m' whereas p' is selected with m, then it must be that $x_E(p'', k) - x_{CF}(p'', k) \geq x_E(p', k) - x_{CF}(p', k)$. The additional assumption in the statement of the result then implies that $p'' \geq p'$. On the final claim, if $x_C(p, k) + x_F(p, k)$ is decreasing in p and if $m = 0$, then the firm and client (jointly) strictly lose by raising p, so they will not allow p^0 to be renegotiated upward. Note, by the way, that the assumption of $x_C(p, k) + x_F(p, k)$ decreasing in p implies that $x_E(p, k) - [x_C(p, k) + x_F(p, k)]$ is increasing in p, given Assumption 1. ■

Next we establish how the firm's payoff from Date 2, $v^*_{\mathrm{F}}(p^0, k)$, depends on p^0. Let $\underline{k}$ be the unique value of k that satisfies $X(1, \underline{k}) = 1$. Assumption 1 guarantees that $\underline{k}$ is well defined.

Result 3: Take any number $\varepsilon > 0$. There exists a number $\hat{p} < 1$ such that $v^*_{\mathrm{F}}(\hat{p}, k) > v^*_{\mathrm{F}}(1, k)$ for all $k \notin (\underline{k} - \varepsilon, \underline{k})$. Furthermore, if $x_{\mathrm{C}}(p, k) + x_{\mathrm{F}}(p, k)$ is decreasing in p, then $v^*_{\mathrm{F}}(p^0, k)$ is everywhere strictly decreasing in p^0, for all k.

Proof: To prove the first statement, consider any $k \geq \underline{k}$. In this case, the frontier of the bargaining set is the unit simplex; it is efficient for the parties to stay together and so, regardless of p^0, they will stay together and split the benefit of 1. Lowering p^0 has the effect of strictly decreasing X and increasing x_{F}. Thus, the firm's disagreement point increases and the bargaining surplus strictly increases, which implies that v^*_{F} strictly rises.

Next consider values $k < \underline{k}$. Think of the bargaining problem in the form with the client and firm as one player. We shall use the following lemma, which is obvious for cases of transferrable utility but also easy to prove for general nonconvex bargaining sets:

Lemma 1: Consider any two-player bargaining set S that has a closed Pareto frontier but is not necessarily convex. Let the bargaining solution be the generalized Nash solution (which maximizes the Nash product), with positive bargaining weights α_1 and α_2 for players 1 and 2. Take two different disagreement points $d, d' \in S$ such that $d_1' \geq d_1$ and $d_2' \leq d_2$. Let b be the bargaining outcome under disagreement point d, and let b' be the bargaining outcome under disagreement point d'. Then $b_1' \geq b_1$ and $b_2' \leq b_2$. That is, each player's payoff is increasing in his own disagreement value and decreasing in the other player's disagreement value.

For p^0 sufficiently close to 1, the disagreement point $(x_{\mathrm{E}}(p^0, k), x_{\mathrm{CF}}(p^0, k))$ lies above the unit simplex (that is, $x_{\mathrm{E}}(p^0, k) + x_{\mathrm{CF}}(p^0, k) > 1$) and so all of the relevant points on the frontier of the bargaining set involve separation. By continuity of x_{E} and x_{CF}, for any given $\varepsilon > 0$ we can find a number $\hat{p} < 1$ such that $x_{\mathrm{E}}(\hat{p}, k) + x_{\mathrm{CF}}(\hat{p}, k) > 1$ for every $k < \underline{k} - \varepsilon$. It is not difficult to verify that $v^*_{\mathrm{F}}(\hat{p}, k) > v^*_{\mathrm{F}}(1, k)$ for every $k < \underline{k} - \varepsilon$. To see this, note that $x_{\mathrm{E}}(\hat{p}, k) < x_{\mathrm{E}}(1, k)$. If $x_{\mathrm{CF}}(\hat{p}, k) \geq x_{\mathrm{CF}}(1, k)$ then clearly $v^*_{\mathrm{F}}(\hat{p}, k) > v^*_{\mathrm{F}}(1, k)$ because the disagreement point shifts in favor of the client and firm jointly, so they fare better jointly (by the Lemma), and furthermore the firm's disagreement point rises whereas the client's falls.

In fact, the result also holds if $x_{\mathrm{CF}}(\hat{p}, k) < x_{\mathrm{CF}}(1, k)$. To see this, note that $v^*_{\mathrm{F}}(1, k) = x_{\mathrm{F}}(1, k)$ and $v^*_{\mathrm{C}}(1, k) = x_{\mathrm{C}}(1, k)$. Then observe that

$$v^*_{\mathrm{F}}(\hat{p}, k) + v^*_{\mathrm{C}}(\hat{p}, k) \geq x_{\mathrm{CF}}(\hat{p}, k),$$

which, implies that

$$[v^*_{\mathrm{F}}(1, k) + v^*_{\mathrm{C}}(1, k)] - [v^*_{\mathrm{F}}(\hat{p}, k) + v^*_{\mathrm{C}}(\hat{p}, k)] \leq x_{\mathrm{CF}}(1, k) - x_{\mathrm{CF}}(\hat{p}, k),$$

and so

$$[v^*_{\mathrm{F}}(1, k) + v^*_{\mathrm{C}}(1, k)] - x_{\mathrm{CF}}(1, k) \leq [v^*_{\mathrm{F}}(\hat{p}, k) + v^*_{\mathrm{C}}(\hat{p}, k)] - x_{\mathrm{CF}}(\hat{p}, k).$$

That is, the surplus shared by the client and firm is smaller when $p^0 = 1$ that it is when $p^0 = \hat{p}$. Using the fact that the client and firm equally divide this surplus and that $x_{\mathrm{C}}(\hat{p}, k) < x_{\mathrm{C}}(1, k)$ and $x_{\mathrm{F}}(\hat{p}, k) \geq x_{\mathrm{F}}(1, k)$, we conclude that $v^*_{\mathrm{F}}(\hat{p}, k) > v^*_{\mathrm{F}}(1, k)$.

Under the assumption that $x_C(p, k) + x_F(p, k)$ is decreasing in p, we can apply the Lemma above to establish that $v^*_C(p^0, k) + v^*_F(p^0, k)$ is decreasing in p^0. This conclusion also uses the assumption that $x_E(p, k)$ is increasing in p. That is, considering the client and firm as a single player with twice the bargaining power of the worker, the disagreement point $(x_E(p^0, k), x_{CF}(p^0, k))$ shifts in favor of the worker as p^0 increases, and thus (from the Lemma) $v^*_C(p^0, k) + v^*_F(p^0, k)$ decreases.

Note that, from the bargaining solution, the firm's payoff can be written:

$$v^*_F(p^0, k) = x_F(p^0, k) + (1/2)[v^*_C(p^0, k) + v^*_F(p^0, k) - x_C(p^0, k) - x_F(p^0, k)].$$

Combining terms, we get:

$$v^*_F(p^0, k) = (1/2)x_F(p^0, k) - (1/2)x_C(p^0, k) + (1/2)[v^*_C(p^0, k) + v^*_F(p^0, k)].$$

We have established that the third term on the right of this equation is decreasing in p^0. The first two terms also are decreasing in p^0 from Assumption 1 (the second term strictly so). Therefore, we have that $v^*_F(p^0, k)$ is strictly decreasing in p^0. ■

Next we can establish properties of the contract made between the firm and worker at Date 0. Let y_W, y_C, and y_F denote the expected payoffs of the worker, client, and firm from the start of Date 1. Note that these are expectations over k and are functions of the choice of p^0 made earlier:

$$y_W(p^0) = E[v^*_W(p^0, k) \mid \mu],\ \ y_C(p^0) = E[v^*_C(p^0, k) \mid \mu], \text{ and } y_F(p^0) = E[v^*_F(p^0, k) \mid \mu].$$

Since the worker cannot make a monetary transfer to the firm at Date 0, and since the firm has all of the bargaining power at this time, contract negotiation is resolved by the selection of p^0 that maximizes $y_F(p^0)$. Because $v^*_F(p^0, k)$ is decreasing in p^0 for all k (at least for p^0 close to 1 in the general case, and for all p^0 with the added assumption on $x_C + x_F$), we know that $y_F(p^0)$ is also decreasing. This proves the following result.

Result 4: At Date 0, in the initial contract between the firm and worker, the parties form a restrictive covenant by setting $p^0 < 1$. Under the assumption that $x_C(p, k) + x_F(p, k)$ is decreasing in p, the parties optimally set $p^0 = \underline{p}$. That is, they use the most restrictive covenant allowed by law. In general, as $\underline{p}$ rises, the chosen value of p^0 also (weakly) rises.

The next result, which follows from Results 2 and 4 above, describes the outcome in more detail for a particularly simple class of environments.

Corollary 1: Suppose that $x_C(p, k) + x_F(p, k)$ is decreasing in p, and $m = 0$. Then the firm and worker set $p^0 = \underline{p}$ and this restrictive covenant is never renegotiated. At Date 2, the parties separate if and only if $X(\underline{p}, k) > 1$ for the realized k. When they separate, it is done on inefficient terms (since $p' = p^0$). For some values of k (in particular, where $X(\underline{p}, k) < 1 < X(1, k)$) the parties stay together when it would be efficient to separate.

An implication of Corollary 1 is that a policy setting $\underline{p} = 1$ eliminates the possibility that the worker's liquidity constraint will lead to an inefficient outcome. It is perhaps surprising that, in the presence of a distortion induced by a liquidity constraint, a second-best policy (non-enforcement of non-competes) is able to fully restore the social optimum. This result is explained by the fact that the distortion only comes into play when it is efficient for the worker and client to separate from the firm.

The next issue to consider is how the client's payoff depends on p^0. Intuition suggests that the client would fare better as p^0 increases, because (a) this may decrease the likelihood that the worker fails to separate from the firm when it would be more efficient for the client and entrepreneur to work together, and also (b) it increases the client's disagreement payoff for negotiation at Date 2. The latter point interacts with the fact that the worker's disagreement payoff also increases as p^0 rises, and it is theoretically possible for the worker's disagreement payoff to increase much more than does the client's, such that the resulting decrease in bargaining surplus leads the client to be worse off. Also, because the bargaining set is the not convex, the intuition suggested above does not generally hold at the margin for all values of p^0. However, we can establish that the client's payoff from Date 0 unambiguously increases in p^0 for some large classes of settings.

Result 5: Assume that $2x_C(p, k) - x_E(p, k) - x_F(p, k)$ is increasing in p, meaning that for all k the client's separation payoff is increasing in p at least as much as is the average of the entrepreneur's and firm's separation payoffs. Assume also that $x_C(p, k) + x_F(p, k)$ is decreasing in p. If $m = 0$ or if m is sufficiently large, then $v_C^*(p^0, k)$ is increasing in p^0 for all k. Furthermore, $y_C(p^0)$ is increasing in p^0.

Proof: Consider first a value of p^0 where the bargaining solution is at a point on the frontier with slope – 1 (that is, either where the parties stay together and $v_W + v_C + v_F = 1$ or where they separate with $p' = 1$). Suppose p^0 is increased by a small amount. By the first assumption in the statement of the result, this change in p^0 has the effect of moving the disagreement point in a direction that favors the client relative to the other two parties. Because the total value that they achieve does not change, we conclude that the client's share increases. Thus, $v_C^*(p^0, k)$ rises.

In the case in which m is large, the liquidity constraint never binds and, regardless of k, the bargaining solution is always at a point on the frontier with slope – 1. This proves the result for the case of m large. In the case in which $m = 0$, the conclusion continues to hold for values of k in which the parties stay together and so $v_W + v_C + v_F = 1$. For other values of k, at Date 2 the parties will separate with $p' = p^0$ because, under the assumption that $x_C(p, k) + x_F(p, k)$ is decreasing in p, the firm and client refuse to renegotiate. In this case, we have

$$v_C^*(p^0, k) = x_C(p^0, k),$$

and result follows from the fact that $x_C(p, k)$ is increasing in p. ■

Remark on the liquidity-constrained case: In Corollary 1 and Result 5, we singled out the extreme case of constrained liquidity, where $m = 0$, because the analysis is particularly clean in this case. In fact, these results continue to hold with only minor modifications for values of m that are close to zero. To see this, note that the frontier of the bargaining set varies continuously in m. (As m increases, the point $(x_E(p^0, k) - m, x_{CF}(p^0, k) + m)$ shifts in the direction (-1, 1).) Thus, for m close to zero, and except for a small set of k, the renegotiated point p' is close to its counterpart with $m = 0$. The main technical issue is that this conclusion may not hold for all k, due to non-convexity of the bargaining set, but the set of k values for which the conclusion does not hold must be small as m converges to zero. Also, we have to modify Corollary 1's statement that, with $m = 0$, p^0 is never renegotiated. When m is close to zero, the parties will renegotiate any $p^0 < 1$ but, for most k, p' will be close to p^0. With these notes in mind, when we speak of the liquidity constrained case hereinafter, we shall focus on $m = 0$.

In summarizing and discussing our results, it is useful to distinguish between those results that hold regardless of whether workers are liquidity constrained and those that do not. In the following discussion we maintain the assumptions of Result 5, which are restated here:

Assumption 3: For all k, $x_C(p, k) + x_F(p, k)$ is decreasing in p and $2x_C(p, k) - x_E(p, k) - x_F(p, k)$ is increasing in p.

Whether or not the worker is liquidity constrained, in their initial contract the firm and the worker agree to the most restrictive covenant the courts will enforce ($p^0 = \underline{p}$, Result 4). This puts the firm and worker in a strong bargaining position with the client when the latter enters the picture.[17] Not surprisingly, then, the payoff to the client increases as the covenant weakens ($v^*_C(p^0, k)$ is increasing in p^0, Result 5). Combining these two results, we see that client payoffs increase with $\underline{p}$, which will be important in the next section of this paper when we consider the allocation of clients across jurisdictions.

When the worker is not liquidity constrained, the client, firm, and worker stay together or the client and worker separate from the firm when it is efficient to do so (Result 1). Moreover, in the latter case the firm agrees to give up its right to pursue the worker in court to force him not to serve the client.[18] Note that separation (entrepreneurship) is not affected by the initial contract

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[17]We conjecture that this logic would also apply to the choice of initial contract by the firm and worker when the third party is another firm attempting to "poach" the worker rather than a client the worker may serve as an entrepreneur.

[18]In an influential law review article favoring enforcement of restrictive covenants, Sterk (1993, p. 406) argues that, "nothing prevents the employee from bargaining with his employer for release from the covenant. If either the employee himself or other prospective employers value the employee's services more than his current employer does, the employee should be willing to

between the firm and worker and therefore not affected by jurisdictional policy regarding enforcement of non-competes. We can interpret this result in terms of Coase (1960). Think of $\underline{p} = 0$ as assigning property rights in the client relationship to the firm and $\underline{p} = 1$ as assigning property rights in the client relationship to the worker. It follows from Result 1 that the same, efficient economic outcome is obtained regardless of this assignment of property rights.

On the other hand, when the worker is liquidity constrained the firm and worker never renegotiate their initial contract (Corollary 1): the worker is unable to buy property rights in the client relationship from the firm. Consequently, unless $\underline{p} = 1$, the parties sometimes stay together when it would be efficient to separate. There is an inefficiently low level of entrepreneurship. Moreover, when clients and workers do separate from firms, it is on inefficient terms: there are disputes that are handled by the courts. Both forms of inefficiency decrease as the liquidity constraint is relaxed (Result 2).

As $\underline{p}$ increases, jurisdictions increasingly neutralize the "stick" employers can use to discourage their employees from taking away clients. We can then expect employers to rely more heavily on the "carrot" of bribing employees to stay with their firms. We conclude the discussion of our results with the following lemma, which confirms this intuition:

Lemma 2: Regardless of the liquidity constraint, conditional on values of k for which the parties elect to stay together at Date 2, the compensation paid to the worker is increasing in $p^0 = \underline{p}$.

Proof: Consider a value of k for which the parties decide to stay together at Date 2. From the bargaining solution, the worker obtains a payoff of $x_E(p^0, k) + (1/3)[1 - X(p^0, k)]$, which equals $(1/3)[2x_E(p^0, k) - x_C(p^0, k) - x_F(p^0, k) + 1]$. This expression is increasing in p^0, given Assumptions 1 and 3. ■

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pay the employer to release him from the contract."

4. Choice of Jurisdictions by Clients

In this section we consider multiple locations indexed by i. These locations can have different policies $\underline{p}_i$ regarding enforcement of non-competes, so we refer to them as jurisdictions. They can also vary by the distribution μ_i of the cost of becoming an entrepreneur. We think of this variation as arising from differences in bureaucratic efficiency rather than differences in out-of-pocket costs to entrepreneurs.[19] We maintain Assumption 3 throughout this section.

We assume that at the beginning of the period of interaction that we analyze, a fixed measure (quantity) of clients Q is allocated over a fixed number n of jurisdictions. Clients may differ in terms of needs and preferences, but they do not differ in productivity. Each client inelastically demands one unit of commercial space. Commercial rent in a given jurisdiction is increasing in the quantity of clients Q_i located there:

$$r_i = r(Q_i),\ r' > 0.$$

The producer surplus associated with this upward-sloping supply curve is part of local income. After the clients have arrived, the N identical firms in each jurisdiction hire workers in anticipation of serving clients. To maintain the simplicity of the bargaining problem between any firm and worker, we assume that each firm correctly anticipates serving $q_i \equiv Q_i/N$ clients and interviews q_i workers, without either firms or workers having a second chance to match.[20]

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[19]Djankov et al. (2002) find that the monetary cost of satisfying government regulatory requirements to establish a new business in the United States is less than one-half of one percent of per capita GDP.

[20]We assume away integer problems.

As before, the firm negotiates a contract with each worker that specifies $p^0 = \underline{p}_i$.[21] After completing its hiring, each firm accepts q_i clients. Every client-firm-worker relationship then unfolds as before.

Each client chooses the jurisdiction that maximizes her expected net income $y_{Ci} - r_i$, where y_{Ci} is the expectation of $v^*_C(\underline{p}_i, k)$ taken over the distribution μ_i of k. In equilibrium, therefore, it must be that

$$y_{Cj} - r(Q_j) = y_{Ci} - r(Q_i),\ j \neq i;\ \sum_{i=1}^{n} Q_i = Q.$$

Using this equilibrium condition, we see that $y_{Ci} > y_{Cj}$, implies $Q_i > Q_j$. From Result 5, we also see that if $\underline{p}_i > \underline{p}_j$, then $y_{Ci} > y_{Cj}$ for a given μ. This yields

Result 6: Comparing jurisdictions that differ only in their enforcement of non-competes, the number of clients will be higher where these agreements are less enforced (that is, where $\underline{p}_i$ is higher).

It follows that jurisdictions with higher $\underline{p}_i$ will have greater employment in professional and business services and greater total output of professional and business services. The next result implies that greater efficiency in processing business startups brings about the same outcome:

Result 7: Assume that $2x_E(p, k) - x_C(p, k) - x_F(p, k)$ is decreasing in k. Suppose that, for two

[21]Here we have simply applied Result 4. In doing so, we have not allowed for the possibility that firms might compete for clients by raising p^0 above $\underline{p}_i$. Recall, however, that by Result 3 we have $v^*_F(p^0, k)$ everywhere strictly decreasing in p^0, for all k. If the elasticity of the number of firm clients with respect to p^0 is low, the firm is worse off for any $p^0 > \underline{p}_i$ even though it attracts more clients. A low elasticity could be justified in a richer model in which services are differentiated across firms and clients have heterogeneous preferences over services.

otherwise identical jurisdictions i and j, μ_j favors higher values of k than does μ_i, by first-order stochastic dominance. Then $y_{Ci} \geq y_{Cj}$.

Proof: To prove this result, it is sufficient to show that $v^*_C(p^0, k)$ is decreasing in k. This is demonstrated using essentially the same steps described in the proof of Result 5, but considering k instead of p^0. ■

If workers are liquidity constrained, variation in $\underline{p}_i$ leads to additional differences between jurisdictions. In particular, the following Corollary can be derived directly from Corollary 1:

Corollary 2: Suppose that $m = 0$. Then the expected number of entrepreneurs per client and the expected value of output per client increases with $\underline{p}_i$:

Since employment in professional and business services equals the number of clients, the rate of client-based entrepreneurship (ratio of entrepreneurs to workers) in professional and business services is higher in jurisdictions with weaker enforcement of non-competes. Similarly, productivity (output per worker) in professional and business services is also higher in these jurisdictions. Note that greater efficiency in processing business startups also produces these differences across jurisdictions, whether or not workers are liquidity constrained.

We conclude this section with the implications of our analysis for government policy. Denote the sum of expected payoffs to the three parties to a client-firm-worker relationship in jurisdiction i by y_i. We have seen that the efficient level of y_i (and the efficient rate of entrepreneurship) is achieved for any $\underline{p}_i$ if workers are not liquidity constrained, and for $\underline{p}_i = 1$ when workers are liquidity constrained. We can now also consider the efficient allocation of clients across jurisdictions. Consider in particular the simple case where μ_i is the same across jurisdictions, so that the efficient level of y_i is equal across jurisdictions. It is then easily shown that, when this efficient level of y_i prevails, total expected income from all client-firm-worker relationships plus total producer surplus of all landlords that rent to clients is maximized when clients are allocated equally across all jurisdictions (hence $Q_i = Q/n$) . This in turn only happens when $\underline{p}_i$ is equal across all jurisdictions:

Result 7: Let $\mu_i = \mu$ for all i. The necessary and sufficient condition to maximize total expected income from all client-firm-worker relationships plus total producer surplus of all landlords that rent to clients is $\underline{p}_j = \underline{p}_i$, for all $j \neq i$, when workers are not liquidity constrained, and $\underline{p}_i = 1$ for all i when workers are liquidity constrained.

To achieve efficiency, policies regarding enforcement of non-competes must be harmonized across jurisdictions even when workers are not liquidity constrained, because these policies affect the location decisions of clients through their effects on the distribution of expected payoffs from client-firm-worker relationships. Clients do not internalize all of the benefits of the decision to locate in a particular jurisdiction, because this includes benefits to firms and workers who, in our model, do not contract with clients until location choices are made.

5. Discussion

Our conclusion that less enforcement of restrictive employment covenants positively affects regional output is in partial agreement with Fallick, Fleishman, and Rebitzer (2003). They emphasize the positive impact on local high-tech industrial output of diffusion of ideas through interfirm worker mobility, following Gilson (1999). They are not concerned with entrepreneurial activity or with endogenizing the choice of restrictiveness of employment contracts by employers and workers, and do not see their mechanism as relevant for determination of regional output outside of high-tech industry.

Franco and Mitchell (2008) consider enforcement of non-compete agreements in an environment in which a firm and worker contract under asymmetric information without liquidity constraints. In contrast to our results, there is too much separation when non-competes cannot be enforced, reflecting the inefficiency that typifies bargaining subject to asymmetric information, whereas when non-competes can be enforced the efficient outcome is always achieved. The key to the latter result is that enforcement of non-competes is perfect ($p = 0$ in our model) so that workers have identical outside options (zero) regardless of the realization of their private information. If enforcement of non-competes was incomplete or less than perfectly certain then efficiency would not obtain because the different realizations are no longer equivalent.

The kind of liquidity constraint that we posit is present in the work of Lewis and Yao (2001), who look at restrictions on the "openness" of a workplace as a substitute for monetary transfers from a worker to a firm.[22] Lewis and Yao focus on the working environment within a firm and how the liquidity constraint causes a distortion in the initial contracting between workers and firms. In contrast, we analyze contractual restrictions that bind entrepreneurial activity by workers after they have departed from firms, and we analyze the renegotiation of

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[22]Lewis and Yao use the term "openness" to refer to the ability of engineers to freely communicate with peers in other firms, as they participate in research and development. In Lewis and Yao's model, engineers value openness because it allows them to identify profitable opportunities to put their knowledge to work in other firms. Firms dislike openness because it implies higher worker turnover and discontinued projects internally. Lewis and Yao argue that, although openness is efficient, it is actively reduced by firms as a way of compensating the firms when engineers cannot make up front transfers due to liquidity constraints. Firms offer more open environments when engineers have a great deal of bargaining power.

restrictive covenants by workers, firms, and clients. We demonstrate how the worker's liquidity constraint distorts the outcome of renegotiation.

The insights we provide go beyond those associated with the problem of firms making investments in general human capital (Becker 1964; Mincer 1974). In the familiar story, a restrictive covenant may enhance the firm's incentive to make a general-human-capital investment in a worker, because otherwise part of the return of its investment will accrue to other firms to which the worker may be joined in the future. One concludes that courts should enforce restrictive covenants unless they distort the socially-desirable interaction between the worker and outside firms. We contribute by analyzing such a distortion, namely frictions (caused by the worker's liquidity constraint) that constrict the parties' ability to renegotiate effectively. Our analysis shows that this distortion has economic significance even without an investment decision of the firm, because of the firm and worker's interest in arranging their contract to extract value from their subsequent clients.[23] Distortions may also arise in some settings if the worker and firm cannot write sophisticated contracts that effectively manage the renegotiation process to align ex ante incentives.[24]

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[23]Note that, if the firm's investment decision is verifiable, then it can be directly specified in the parties' contract and enforced. Renegotiation between the firm and the client over this investment will ensure financing from the client when the parties choose to separate. This incentive for investment in workers is analogous to that given to firms by monopsony power over workers in the model of Acemoglu and Pischke (1998).

[24]Posner, Triantis, and Triantis (2003) examine a model of employment in which the firm makes a general-human-capital investment in the worker. They study a class of contractual forms for which there is a tension between (a) the firm and worker's incentive to expropriate value from outside firms that may employ the worker in the future, and (b) the firm's incentive to invest. They show that the firm and worker may optimally pick a contract that leads to inefficient investment. However, it is not clear whether the tension between (a) and (b), and their results, would disappear if all feasible contracts were considered.

In contrast to the general-human-capital story, Kräkel and Sliwka (2009) argue that it benefits the firm not to impose a non-compete agreement on its employee because the latter then has better incentives to innovate, or more generally to make investments of his own (see also Baccara and Razin 2009 and Garmaise 2009). Thus one cannot presume that the addition of an investment or effort decision to our model would change our conclusions regarding the merits of enforcing non-compete covenants in any particular direction. In our model, the worker's innovation is a byproduct of his interaction with the client, and the firm can neither encourage nor discourage the worker's innovative activity short of preventing him from serving the client. We feel that this is, to a first approximation, an accurate depiction of the situation that exists in most professional and business service activities.

Our sanguine conclusions regarding lack of enforcement of non-competes are perhaps more open to challenge with respect to the impact on regional competitive advantage. By taking the number of firms in each jurisdiction as given, we abstract from any potential negative impact resulting from the fact that the expected payoffs to firms are decreasing in $\underline{p}_i$. Glaeser et al. (2009) find that metro area employment growth is strongly predicted by smaller average establishment size, and in our model establishment size (clients/workers per firm) would rise if higher $\underline{p}_i$ drove firms away. In the presence of worker liquidity constraints, however, higher $\underline{p}_i$ increases the rate of entrepreneurship and therefore reduces establishment size. The conclusion of Glaeser et al. (2009) that variation in local costs of becoming entrepreneurs is more important than variation in local returns to becoming entrepreneurs in determining establishment size suggests that the latter effect might be stronger, but they do not directly examine regional variation in enforcement of non-competes. Clearly there is a need for additional empirical work in this area.

6. Conclusions

We analyzed a model of professional and business service provision in which clients can choose between locations that differ in enforcement of restrictive employment covenants between firms and workers and in the efficiency with which they process business startups. In this context we focused on the relationship between one firm, one worker, and one client. The worker would like to wrest the value of the client relationship from his employer by setting up his own firm. If when an employer and worker establish a relationship they cannot contract on the output and profits of the worker's prospective new firm, the employer counters by inducing the worker to sign a contract that prohibits him from competing or soliciting the current client in the event of termination of employment. The socially optimal level of entrepreneurship will nevertheless be achieved if clients, employers, and workers can renegotiate these restrictive employment contracts and make compensating transfers. If workers cannot finance transfers to employers, however, employers and workers will sign contracts that are too restrictive and produce too little entrepreneurship, and governments can increase welfare by limiting enforcement of these contracts.

Many of our results turn out to be robust to whether or not workers are liquidity-constrained. First, firms and workers will agree to make non-compete or non-solicitation covenants as strict as they can. Second, weaker enforcement of these covenants leads firms to pay workers more when the parties stay together. Third, weaker enforcement also attracts clients to locations, generating greater employment and output in their professional and business service sectors. Fourth, locations that more efficiently process business startups not only attract more clients but also have higher rates of entrepreneurship and higher productivity in professional and business services.

There are, however, two important differences between our results with and without liquidity constraints. Without liquidity constraints, the decision by a worker and a client to separate from a firm was always accompanied by renegotiation of the worker's contract to assign property rights in the client to him, whereas when the worker is liquidity-constrained renegotiation often fails, leading to (i) the parties staying together when separation would have been efficient, or (ii) the firm taking the worker to court to try to stop him from serving the client as an entrepreneur. The failure of renegotiation leads to the second important difference, which is that by limiting enforcement of restrictive employment covenants, local governments can generate more entrepreneurship and increase the total value generated by each client-firm-worker relationship.

A broader aim of this paper is to integrate the value created by client relationships into economists' thinking regarding determination of income and social welfare. This will only become more important as the service share of GDP continues to grow. Because of conflicting claims to the value created by client relationships that may interact with market failures, (1) the market outcome may not be optimal; (2) the government cannot avoid intervention through the legal system (because of its role in resolving disputes); therefore (3) we need to seek guidelines for that intervention.

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