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PARTNERSHIP FRAGILITY AND CREDIT COSTS

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Partnership fragility and credit costs
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ABSTRACT

Economic teams, including the business partnership, are created to exploit gains from cooperation, but teams also fall prey to shirking and other opportunistic behaviors, which lead to their dissolution. If team production is partly financed with debt, the untimely dissolution of partnerships exposes creditors to default risks that they will price into debt contracts. This paper explores these two features of the nineteenth-century business partnership and finds: (1) partnerships were short-lived teams (two years or less, on average) and larger partnerships were shorter-lived yet; and (2) compared to proprietorship, partnerships paid higher interest rates on short-term debt, after controlling for loan size, maturity, and other observable features. Although there were potential gains from team production, potential opportunism raised the costs of partnerships.

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1. Introduction

One of the central features of economic life is that people create teams to exploit gains from cooperation (Farrell and Scotchmer 1988). Professional partnerships, industrial corporations, university departments, and sporting clubs are examples of teams assembled to take advantage of unique skills brought by each member and the synergies created through individual contributions toward a common goal, which is typically to produce more or better marketable output jointly than could be produced individually. Individuals participate in team production because they share the gains from cooperation.

A second central feature of economic life is that team production is prone to shirking, free riding and other types of opportunism (Alchian and Demsetz 1972; Holmstrom 1982). The consequence is that teams are more fragile than durable. The annual divorce rate (3.4 per 1,000) in the United States is one-half the annual marriage rate (6.8 per 1,000) (www.cdc.gov). Employee turnover is common despite returns to seniority: the average job tenure is 5.4 years for British workers and less for French workers (Mumford and Smith 2004; Dostie 2005). In the 1970s between one-third and one-half of junior associates at elite US law firms left within four years and one-tenth percent of senior partners annually resigned or retired (Nelson 1983).[1] Senior partner turnover increased in the 1980s as the competition for so-called rain makers intensified (Galanter and Palay 1990). Teams, even apparently productive teams, do not persist.

If unanticipated or untimely dissolution of a team forces the sale of a specialized or illiquid asset, opportunistic behavior may generate greater costs than those resulting from lost output alone. Some teams finance their activities with a combination of equity and debt with the consequence that unanticipated or untimely dissolution of the team exposes creditors to some risk if the team's liquidation value is less than

[1] Gilson and Mnookin (1989) argue that the "up-or-out" system within law firms protects associates from partner opportunism when the partnership decision is made.

its outstanding debts. Smart creditors will understand their potential exposure to loss and protect themselves through a combination of credit rationing and price discrimination. Observably more fragile teams will pay higher interest rates on debt, *ceteris paribus*.

Using two unique data sources, this paper investigates two features of mid-nineteenth century business partnerships. First, an analysis of published partnership announcements (formations and dissolutions) shows that business partnerships were not long-lived firms. The average partnership lasted for less than two years and teams with more partners were shorter lived yet. It was not uncommon, however, for one or more members of a dissolved partnership to quickly form another. This result is consistent with matching models in which impermanent relationships are maintained only until a more preferred match is found (Burdett and Coles 1999). Second, evidence from contemporary bank loan records reveals that partners paid more for credit. Borrower fixed-effects models are estimated where the borrower sometimes borrows as a proprietor and sometimes as a member of a business partnership. The within-borrower estimates imply a meaningful partnership interest rate premium.

Although business partnerships, like any productive team, offered the potential for team members to profit from complementarities and synergies, the internal dynamic of team production also created costs. Bad matches and bad behaviors strained team relations, which resulted in short-lived teams. The combination of specialized assets, unanticipated and untimely dissolution, protracted litigation, and costly liquidation led creditors to charge partnerships higher interest rates than proprietors on a loan of given size and maturity.

2. Partnership in nineteenth-century America

Many accounts of the firm in the nineteenth century United States focus on the rise of the limited liability corporation and emphasize its centrality to modern capitalist economies (Berle and Means 1932;

Rosenberg and Birdzell 1986; Wright 2011). The corporation provided for the lock-in of capital necessary to finance large, long-horizon investments in bridges, canals, railroads and other infrastructure, as well as large financial institutions and the modern industrial enterprise (Chandler 1977; Blair 2003). Limited liability encouraged broad participation and created large pools of capital contributed in often modest amounts (Rothenberg 1985). Strong entity shielding protected the assets of the enterprise from the creditors of the corporation's individual owners (Hansmann and Kraakman 2000a, 2000b; Hansmann, Kraakman and Squire 2006). Although the combination of lock-in, limited liability and entity shielding was essential for canals, railroads and other massive infrastructure investments, most nineteenth-century businesses did not adopt the corporate form even when it was an option (Guinnane et al 2007). Proprietorships remained the predominant small enterprise form and partnership in its various guises was the most common choice for small and medium-sized enterprises (SMEs) with multiple owners.

The advantages of partnerships over proprietorships are obvious when, through team production, partners can jointly produce at a lower marginal cost than they might working separately. Partnerships are economic when joint production yields enough output to cover the nontrivial costs of organizing and operating the partnership (Alchian and Demsetz 1972). Modern formulations of partnership reveal that successful formation is an inexact and costly process (Burdett and Coles 1999). Prospective partners sample among potential matches in which matching opportunities arrive at uncertain intervals. At each encounter with a prospective match potential partners must decide to pair off or continue searching.[2] Prospective partners pair off when the expected incremental benefits of continued search no longer exceed its expected marginal costs. But an important element of the modern literature is that search does not cease

[2] The advice offered in a nineteenth-century practical business was simply to "be cautious in the selection of a partner" (Freedley 1853, 326). "It is imprudent," the author noted, "to enter into a partnership with a *covetous man*, or a *very passionate man*, or an *obstinate man*, or a *revengeful man*, or a *familiar crony*, or a *man [otherwise] involved*" (Freedley 1853, 51 emphasis in original).

once a partnership is formed. At equilibrium, business partnerships, like other relationships, may be purposely temporary relationships that will be dissolved when a preferred match presents itself.

The apparent profits generated by well-matched partners may in fact be nothing more than the returns paid to the unobservable asset – the successful assembly of a productive team (Alchian 1984). Still, well-matched partners create quasi-rents within the firm if the excess value of partnership production over individual production of at least one of the partners depends on the actions of the other partner(s).[3] The presence of quasi-rents within the firm creates conflicting incentives among the partners. Partners cooperate to maximize firm value *and* they compete to increase their individual shares of the joint profits and the quasi-rents.[4] Because quasi-rents are appropriable, partners will include protective covenants in their contracts and partners earning quasi-rents have an abiding interest in the continuation of the firm so long as the other partners do not engage in excessive post-contractual opportunism.

Protective covenants and careful matching notwithstanding, one of the fundamental internal problems within the partnership is that some members are dependent on the firm, in the sense that separation from the firm means a decrease in wealth. If the dependence derives from a partnership-specific (sunk) investment, other partners have incentives to hold up the partner having made the investment (Alchian and Woodward 1987). Cottrell (1967, 104-106), in fact, contends that dispute, hold-up and

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[3] Nineteenth-century writers had two criteria for a good match. First, each party must bring something of value to the firm – capital, skill, talent, or business connections, among others – but each should bring complementary skills. A partnership was uncalled for when the firm would carry on a modest business with men of similar experience and abilities, especially if every transaction supervised by both. Second, a good business match had many of the same elements as a good marriage match: moral character and good temper being paramount (Freedley 1853, 51). Lazear (1999) argues that the successful multinational corporation must also tap complementary skills if it is to succeed in the face of competing national cultures within the firm.

[4] Actions to increase a team member's share of the profits and/or quasi-rents are variously labeled "shirking" (Alchian and Demsetz 1972), "opportunism" (Williamson 1985), "moral hazard" (Holmström 1982), and "agency problems" (Jensen and Meckling 1976).

intransigence are inherent to the internal dynamic of the partnership relationship. If the non-dependent partners' hold up efforts generate costs in excess of the dependent partner's share of the quasi-rent, the partnership will be dissolved. Intractable internal disputes are not the only source of untimely dissolution. Death, illness or the personal bankruptcy of any partner can force the firm into liquidation. If the modern analysis of the partnership is indicative of anything, it is that partnerships are prone to shirking, fragile, and costly to unwind.[5]

The implications of partnership fragility for credit are profound. It is well known that the equity holders of any firm that (partially) debt finances do not bear the full expected costs of their own bad decisions or bad luck, including the untimely dissolution of the partnership itself. The partnership's creditors bear some of the costs of bad outcomes. Untimely dissolution is one such bad outcome if dissolution forces the partnership to sell assets or unwind positions at unpropitious moments. Losses arising from forced sale of assets may push the partnership into default and debt financing pushes some of these losses on to creditors if the firm's net worth is insufficient to cover the reduced asset values. Clever creditors are, of course, aware of the equity holder's incentives and at equilibrium will charge higher interest rates for the risks they assume. But higher rates alone are an imperfect solution because higher rates generally encourage greater default rates. Creditors further protect themselves by rationing credit which, for a given project size, requires greater equity investment from the partners.

Proprietorships and partnerships both operate under rules of unlimited (owner) liability. And

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[5] Cottrell (1967, 104) argues that partnerships are fragile because there is not legal mechanism to resolve intractable internal disputes other than dissolving the relationship. On the economics of partnerships see Farrell and Scotchmer (1988), Gilson and Mnookin (1985), Burdett and Coles (1999), Levin and Tadelis (2005), Doornik (2006), and Goldlücke and Kranz (2012). On the problems of efficiently and equitably unwinding partnerships see Cramton, Gibbons and Klemperer (1987), Morrison and Wilhelm (2004), Morgan (2004), Charness and Dufwenberg (2006), Jehiel and Pauzner (2006), Frutos and Kittsteiner (2008), and Kittsteiner, Ockenfels and Trhal (2012).

although the common law afforded the partnership weak entity shielding, in the sense that business creditors had prior lien on business assets and personal creditors had prior lien on personal assets, weak entity shielding does not provide liquidation protection (Hansmann and Kraakman 2000b, 387). That is, at any moment any partner or any of the individual partner's personal creditors might force liquidation of the firm to meet the partner's personal debts. The possibility that any creditor of the partners or the partnership might force liquidation upon default means that personal and partnership creditors monitor both the fortunes of the partner and the fortunes of the partnership. Having both types of creditors monitor both types of creditworthiness duplicates activities and is inefficient in that it raises the cost (and the price) of credit. Although creditors of proprietorships also engage in duplicate and costly monitoring, the notable difference is that the creditors of proprietorships need not concern themselves with the risks and costs of untimely dissolution due to opportunistic activities inside the firm.

Hansmann and Kraakman (2000b, 435), in fact, argue that the fundamental difference between weak form (partnership) and strong form (corporate) entity shielding is "liquidation protection from the individual owners themselves." Corporation are dissolved only when the owners of a majority of the shares agree to the dissolution. A partnership is agreement at will, meaning that the firm can be dissolved any time any individual owner chooses to dissolve the firm. From a creditor's perspective, proprietorships and partnerships are subject to unanticipated dissolution, but it is not unreasonable to think that the probability of unanticipated and costly dissolution increases, perhaps non-linearly, in the number of owners. More owners create more opportunities for shirking, opportunism, internal dissent and, ultimately, fracture and dissolution.[6] Knowing that partnerships are, all else constant, more prone to untimely dissolution and

[6] Economic theory holds that the advantages of delegated monitoring over partnership increases in team size (Goldlüke and Kranz 2012). Experiments involving the minimum-effort game suggest that teams are subject to shirking and that shirking increases in team size (Van Huyck et al 1990). Deck and Nikiforakis (2012) show that more effective monitoring can mitigate shirking, but situations in which team

default, creditors are likely to protect themselves through a combination of credit rationing and higher interest rates. Before turning to an analysis of partnerships and credit costs in Sections 4 and 5, Section 3 establishes that partnerships were fragile and that fragility increased in the number of partners.

3. Partnership size and firm tenure

Given that partnerships are prone to opportunistic behavior in its various manifestations, questions naturally arise concerning the longevity of partnerships, as well as the connection between longevity and team size (Goldlücke and Kranz 2012). To answer these questions, information on the formations and dissolutions of partnerships were collected from the *Baltimore American and Commercial Advertiser* between 1 January 1850 and 3 March 1857. The law of partnerships held that a partnership existed whenever two or more people held themselves out to the world as partners and acted in a manner consistent with a joint, profit-seeking venture (Selwyn 1831, 307). Except in the case of limited partnerships, it was not necessary to announce or advertise the creation of a partnership (Dorsey 1840, Ch. 97 §7). Nevertheless, many partners announced the formation of their partnerships in local newspapers and gazettes. The act of advertising the creation of business partnerships was so common in fact that on most days as many as three columns of the *Baltimore American* were devoted solely to partnership announcements.[7]

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members can monitor some but not all other members converge on the low-level equilibrium as team sizes increase.

[7] A typical advertisement announcing the formation of a partnership appeared as (*Baltimore American*, 1 July 1858, 2):

CO-PARTNERSHIP --
The undersigned have this day FORMED A COPARTNERSHIP, under
the firm of DARE, SPROSTON & CO., and will continue
the FLOUR AND GENERAL COMMISSION BUSINESS
at No. 95 CHARLES STREET, corner Camden Street.
G. GEO. DARE

Upon the dissolution of a partnership, however, it was incumbent on the partners to directly notify all persons with whom the partnership had prior or current dealings (Freedley 1853, 328). Advertisement of the dissolution in a newspaper was not sufficient to protect partners from the obligations and liabilities of future contracts entered into with existing clients by a former member of the now-dissolved partnership if the clients were unaware of the partnership's dissolution. A newspaper advertisement announcing the dissolution of the partnership generally protected partners from liabilities contracted in the name of the partnership by a former partner if those obligations were contracted after publication of the dissolution notice (Selwyn 1831, 319). Thus, contemporary newspapers, like the *Baltimore American*, often carried more dissolution than formation announcements on a given day and dissolution notices were generally published for more consecutive days.[8]

Every surviving issue of the *Baltimore American* between 1850 and 1861 was read and the information contained in the partnership formation and dissolution announcements was collected and coded. Most formation announcements included the names of the partners, the date the partnership was formed, and the business to be pursued by the partnership. Dissolution announcements typically included the names of the partners, the date the partnership was dissolved, and which partners were responsible for winding up the partnership's affairs. Approximately 90 percent of dissolution notices also announced why

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GEO. S. SPROSTON
Baltimore, July 1, 1858

[8] A typical dissolution notice appeared as the following (*Baltimore American*, 1 January 1857, p. 3):
DISSOLUTION OF CO-PARTNERSHIP
The co-partnership heretofore existing between
the subscribers under the firm of JNO & CHAS McCOLGIN
& BRO, is this day DISSOLVED by mutual consent.
John McColgin
Chas. McColgin
Patrick McColgin
Baltimore, January 1, 1857

the partnership was dissolved. "Mutual consent," a relatively uninformative catch-all phrase, was the most common reason given for dissolution, but other reasons included one partner's death or illness, as well as the expiration of the original partnership agreement ("limitation").

Figure 1 provides a graphic representation of the timing of information on firm formations and dissolutions, which illustrates which types of data are useful for statistical analysis. Firms can be grouped into one of six types. Firms of types A or B are those for which no start date is observed within the observation window but a dissolution date is. The figure makes clear the problems with these observations. The firm's true lifetime is unknowable from the historical record. Moreover, even if it is clear that the firm was organized prior to the observation window, standard statistical packages are not designed to accommodate left censoring like that for firms of type A.

The second group is comprised of firms like type C or D, or those formed and dissolved within the observation window. What differentiated Firm C-types from Firm D-types is that Firm C-types are not observed. That is, the surviving historical record contains no evidence of these firms' existence; neither their organization nor dissolution is observed. The start and end dates of Firm D-types, on the other hand, appear in the records. So long as there is no systematic selection of type D firms into the sample, in that some feature related to firm lifetime influenced the likelihood of appearing in this particular historical source, the inclusion of type D firms and the exclusion of type C firms is equivalent to drawing a random sample from a population of unknown size.

The last two firm types are useful if problematic. Standard survival analysis is designed to cope with right censoring if it is known that the firm has not dissolved at the conclusion of the observation period. Some firms survive for a very long time and survival analysis can generate unbiased hazard ratios with the inclusion of type F firms. But it is possible that some firms formed in the observation window may have dissolved in the window without the dissolution being observed. If we include type-E firms with type-

F firms, firm lifetime will be overestimated. Thus, two sets of results are reported below. One set includes only type-D firms (those with observed formation and dissolution dates). A second set includes type-D firms, as well as undissolved partnerships assuming they are right-censored type F firms.

Table 1 presents summary statistics for partnerships that appear in the *Baltimore American* between 1 January 1850 and 3 March 1857. Panel A reports statistics on firms for which both start and end dates are observed (complete spells). Panel B reports statistics on complete spells (type D firms), as well as firms for which a start date is observed but an end date is not. Statistics reported in Panel B are based on the assumption that firms are either type D (complete spells) or type F firms (dissolution dates occur beyond the observation window). The mean life span for all completed spell firms is just under two years. When firms are divided by the number of partners, two- and three-partner firms lived for between 1.97 and 2.04 years. At 1.70 years, the mean life for firms with four or more partners was notably shorter. By way of comparison, Kahn (1985) estimated the life span of incorporated nineteenth-century New York banks at 21 years. Partnerships were short-lived.

Two other features of historical partnerships are noteworthy. First, unlike twentieth-century partnerships, a relatively small proportion of nineteenth-century partnership were engaged in professions or finance. The majority of mid-nineteenth-century partnerships were engaged in wholesale commerce. Second, most partnerships were dissolved by "mutual consent." Poor health or death of a partner was responsible for less than 10 percent of all dissolutions. Firms with three or more partners were also more likely than two-partner firms to include a term limit in the partnership agreement. Including firms with observed start dates but no observed end date (Panel B) does not fundamentally alter the interpretations drawn from completed-spell firms.

The nature of the data – days to dissolution – makes it possible to use survival analysis to investigate the effects of covariates on firm longevity. The covariates of principal interest are those on the

number of partners (two nonfamilial partners is the excluded category), but the regressions control for economic sector as well. Table 2 reports results of alternative accelerated failure time models.[9] Columns (1) and (2) report results only for 419 partnerships for which date of formation and date of dissolution are observed; columns (3) and (4) report results for all 1,057 observed formations, assuming that unobserved dissolutions are censored rather than unobserved. Several features of the results are consistent with conceptual treatment of partnerships discussed in Section 2 above.

First, partnerships that included two or more family members were longer lived than partnerships lacking a familial connection. The persistence of family partnerships may result from interdependent utility, from familial dispute resolution mechanisms unavailable to unrelated partners, from familial sanctions that mitigate shirking, or simply from better pre-formation information about the work ethic and ability of partners. Second, larger partnerships were shorter lived than smaller partnerships. Farrell and Scotchmer (1988) observe that two-thirds of law firms consist of two or three partners, a fact they attribute to high-ability partners not wanting their earnings diluted by sharing with lower-ability partners. It may have been that the probability of an imperfectly informed high-ability partner forming a match with a less-able partner increased in the number of partners and the poor matches more quickly dissolved. On the other hand, experimental results from minimum-effort games show that shirking increases in the number of players, and nineteenth-century partnerships with more members may have more rapidly devolved to low-effort equilibria and dissolved earlier (Van Huyck et al 1990). The relatively small number of partnerships with

[9] Proportional hazard models assume a model of the form: $h_a = \Phi h_p(t)$ in which the key assumption is proportional hazards, or that the effect of all covariates is the same at all times (Keene 2002). The natural alternative is to assume an accelerated failure time (AFT) model of the form: $h_a = \Phi h_p(\Phi t)$ in which Φ is an acceleration factor. AFT specifications assume that the effects of covariates are multiplicative on time and, unlike proportional hazards, imposes a particular parameterization based on the residual distribution. Preliminary analyses suggest the appropriateness of the AFT model over the proportional hazards model and either the Weibull (complete spells) or lognormal (censored spells) parameterization.

four or more members precludes precise estimation, but the negative parameter estimates in every specification are suggestive of incentive problems inside larger partnerships.

Third, compared to firms engaged in wholesale trade, partnerships engaged in construction or finance were shorter lived, while professional, retail and manufacturing partnerships were longer lived. Levin and Tadelis (2005) argue that the partnership form persists in the professions – law, medicine, accounting and consulting – because it is costly for customers to assess product quality and existing partners have incentives to admit new partners only when they are as productive as the least productive current partner. The fact that other informed professionals are willing to partner with an individual provides a signal about that individual's productivity. The most common professional partnership in the nineteenth century was the law firm and their relative persistence may have followed from attorneys' better abilities to observe each other's productivity prior to pairing off. Better matches from the outset meant fewer internal disagreements and later dissolutions. Any results concerning professional partnerships remain tentative, however, because few of them appear in the data.

The relative longevity of retail and manufacturing firms may reflect greater care taken in forming partnerships when the costs of untimely dissolution are higher. Among the completed spells, the average two-partner wholesale firm survived for 722 days, compared to 762 days for two-partner manufacturers and 908 days for two-partner retailers. Although liquidation did not necessarily follow dissolution, the possibility of having to sell illiquid assets was much greater for, say, a dry goods retails carrying a sizeable inventory or a brass foundry or iron mill with specialized facilities than for a tobacco factor.[10] Knowing that

[10] One measure of liquidation risk is whether the dissolution notice announced that the business would be continued by one or more members of the dissolving firms. Of the announced dissolutions among two-partner firms, approximately two-thirds of retail, wholesale and manufacturing firms announced that the business would continue in a different form; only 40 percent of financial firms included a similar notation.

a poor match was costly, potential partners in retail and manufacturing enterprise were likely to invest more in pre-partnership screening. The result was more propitious matches and longer-lived firms.

One contribution of this study is that it documents the life span of partnerships of different sizes engaged in different pursuits. The evidence suggests that partnerships were fragile, short-lived teams. Absent testimonial evidence concerning the reasons for their dissolution, we are left to speculate about the causes, but the evidence is consistent with concerns with opportunistic behavior in teams. Large teams were shorter lived while family teams and teams that were more costly to unwind were longer lived. Subsequent sections investigate the extent to which partnerships paid a price for their observed fragility.

4. Partnerships and credit costs: Data and empirical approach

The data on interest rates paid by proprietors and partners consist of a subset of the 29,600 loans extended by the Black River Bank of Watertown, New York between November 1845 and April 1859. Loveland Paddock opened the bank in late 1844 under the terms and conditions of New York's 1838 Free Banking Act. By 1844, Paddock, a dry goods merchant by trade, had considerable banking experience. He was elected to the board of directors of the Jefferson County Bank, also of Watertown, in 1828. When the nearby Sacket's Harbor Bank opened in 1834, he purchased shares and was elected to that bank's board of directors. He joined with several other men in 1840 to organize the Bank of Watertown and served as its president until 1842, when he sold his shares and resigned (*Albany Argus*, 17 June 1840). He continued in his dry goods business until 1844, when he liquidated his inventory, deposited $40,000 in mortgages and New York State bonds with the state comptroller, and established the Black River Bank (hereafter BRB) (*Albany Argus*, 19 February 1845; Emerson 1898). The BRB converted to a national charter in 1864

and operated into the 1880s when it was voluntarily liquidated by two of Loveland Paddock's sons.[11]

It is difficult to know how representative the BRB was of contemporary banks and banking practice. By several measures, the bank was typical. There were dozens of similar closely held banks and there were dozens of free banks established along the Erie Canal and Lake Ontario to finance the shipment of local staples to eastern urban markets and to finance the region's incipient industrialization (Bodenhorn 1999). Located just a few miles from the convergence of the St. Lawrence River with Lake Ontario, the BRB resembled these banks. By other measures, the BRB was atypical. It was longer lived and larger than most.[12] One important difference between the BRB's operation and that of some other contemporary banks was its owners' willingness to violate New York's usury law. New York imposed a 7 percent interest rate limit, but the BRB regularly charged rates in excess of the 7 percent ceiling (Bodenhorn 2007). At least some other banks did not (Wang 2008). The banker's willingness to risk a usury conviction reflects the perceived riskiness of some loans, a feature of the bank's lending that will be exploited in the empirical analysis.

Among the bank's extant records are two discount (loan) ledgers that provide detailed information on more than 29,000 loans granted by the bank between 1845 and 1859. Both ledgers were double-sided with pre-printed column and row dividers. On each row, a clerk recorded the borrower's name(s); the date the loan was made and the date it matured; the loan amount; and the total interest charge, or discount.

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[11] In the period studied here (1845-1859), Loveland Paddock owned 90 percent of the bank's shares. Two of his three sons owned the remaining 10 percent, but extant records do not reveal the exact allocation. Shares of the BRB never traded. The eldest son served as the bank's vice president; the second son as its cashier or chief operating officer. Local legend holds that Loveland's third son was something of a spendthrift and did not participate in the management of the bank.

[12] Kahn (1985) estimates an average life of 21 years for New York's free banks; the BRB was in business for 36. Measured by assets, the BRB was also about 50 percent larger than the average free bank in 1850. By 1860 it was about 60 percent larger (*Albany Argus*, 25 November 1850; New York State 1862).

Ledger #3 (1854-1859) also recorded the names of all endorsers or cosigners, and indicated whether the loan was paid, renewed or protested for nonpayment at maturity.[13] Partnerships were identified by the names of the borrowers. If the name was recorded in the style of Jones & Smith or Jones, Smith & Co., the borrowing entity is treated as a partnership and not one of the individual partners. When the borrower was recorded as an individual, as in E.S. Smith, the borrower is treated as the individual borrowing on his or her own account even if he or she was involved in a partnership at the time.

One shortcoming of the BRB data is that the number of partners involved in the partnerships is not specified. All that was recorded was the name of the firm, so the data records firms with a name like Jones & Smith without noting whether Jones and Smith were the only partners. While the BRB data is silent on the issue, information from the Baltimore partner sample sheds light on firm naming practices and firm size. Table 3 reports the incidence of firms by naming style and number of partners. Not surprisingly, 94.5 percent of Jones & Smith-style companies had two partners and 95.1 percent of Jones, Smith & Brown-style firms had three partners. Associations between the number of partners and firm names in the style of Jones & Co or Jones, Smith & Co are less consistent, however. Only 63.5 percent of firms in the style of Jones & Co have two partners; another 29.3 percent had three partners. Given the nature of the data and the association between the partnerships' names and the number of partners, the empirical analysis separates firms by naming style rather than assuming a number of partners from the firms' names.

Despite efforts to link borrowers to Watertown's contemporary city directories, the New York state censuses of 1845 and 1855, and the manuscript records of the 1850 and 1860 federal censuses, relatively

[13] Evidence collected from the local county court records suggests that the clerk's recording of protested notes in the discount ledger was not comprehensive. It is impossible to determine the quality of the "renewed" notations. Recorded renewals were less common than typical at other banks, but it is difficult to determine whether this followed from differences in lending practice or from inconsistent recording.

little could be learned about the ages, occupations and other characteristics of the bank's borrowers. To control for these unobservable characteristics, the empirical analysis employs fixed effects estimation on individuals of the following form:

$$y_{it} = \alpha_i + \theta_t + \delta P_{it} + \beta X_{it} + \varepsilon_{it}$$

where $\alpha_i = \alpha + (A_i$ and A_i is vector of time-invariant, unobserved individual confounders; θ_t is year and month dummies, X_{it} is a vector of observable loan characteristics, namely the loan's size, maturity, the place of payment if the loan was based on a bill of exchange, whether the loan was a renewal, and the length of the borrower's relationship. δ is the coefficient of interest and estimates the effect of partnership status on the borrower's credit terms, y_{it}. Although fixed effects estimators deal effectively with unobserved confounders, the estimated δ coefficients are susceptible to attenuation bias from mismeasurement of P_{it} (Angrist and Pischke 2009, 225) or sampling error (Aydemir and Borjas 2011). The attenuation bias will be larger the more the mismeasurement follows from misreporting or miscoding the data such that observed changes from proprietorship to partnership (or vice versa) are mostly noise.

The noise component in the BRB data should be low. When the borrower was a partnership, the ledgers identified the borrowers by the firm owner's last names and, typically, their given name or initial(s). The loan ledgers, for example, report seven loans to George Babbitt between 1846 and 1853. They also report 11 loans to F. B. Hallett & G. Babbitt between 1848 and 1853. Because there are no other borrowers in the BRB records with the Babbitt family name, we can be reasonably confident that G. Babbitt and George Babbitt are one and the same. Similarly, because the only Hallett in the loan records is F. B. Hallett, we can be confident that the partner and the proprietor are one and the same. If there was any uncertainty about a borrower's identity as individual or partner, they were not matched. Thus, despite several borrowers with the Smith surname, the only ones to appear in the sample are John B. Smith who also appears as part of John B. Smith & Co., and Timothy A. Smith who appears as part of the firm T.A.

& A.P. Smith. Because I could not positively differentiate A.P. Smith from an A. Smith, A. P. Smith is not matched in the sample.[14] Of the nearly 29,600 original loans, the matching process leaves 7,353 usable observations. Some individuals never borrowed as part of a partnership and are excluded. Similarly, some partners never borrowed on their own account and some who may have borrowed as both proprietor and partner could not be unambiguously matched and are excluded.

One concern with the estimation procedure is whether the borrower, alternatively observed as an individual and a partner, was engaged in the same or a closely related business. Partnership law, and almost assuredly partnerships agreements, prohibited partners from transacting on their own account in the same business as the partnership while participating in the partnership.[15] Opportunistic partners may not have strictly followed the letter of the law, but the loan records are consistent with: (1) general observance of the law; and (2) individuals as proprietors and individuals as partners engaged in the same or similar lines of business.

Consider, for example, the two randomly chosen cases of C. P. Adams and Frederick J. Whitney. Adams borrowed on his own account 28 times between 1848 and 1851 (with two additional loans in 1852 and one in 1854); 29 of these 31 loans were bills of exchange payable in Boston, Massachusetts; the average loan was $521 and matured in 31 days. Between 1852 and 1856, Adams received 70 loans as part of Adams & Co.; all were bills of exchange payable in Boston; and the average loan was for $562 and

[14] In a few instances, I used information reported in the Watertown city directories to match individuals to partnerships. The directories sometimes identified the members of the partnership by given names or initials when the loan records did not. If one or more of the family names were sufficiently unusual that the individuals named in the directory could be matched to the partnership in the loan records, the individual and his partnership are included in the sample. One directory, for example, identified L. Ingalls and Lorenzo M. Stowell as the individuals constituting Ingalls & Stowell, printers. Thus, L. Ingalls and L. M. Stowell are each matched with Ingalls & Stowell.

[15] "No partner has a right to engage in any business or speculation which must necessarily deprive the partnership of his time, skill, and labour, because it is the duty of each to devote himself to the interest of the firm" (*Penny Cyclopaedia* 1840, 294).

matured in 35 days. Adams was listed in the Watertown directory as a commission merchant and every loan, whether borrowed by him individually or by him as part of a firm, was consistent with wholesale trade between northern New York and Boston.

Frederick Whitney was listed as a grocer in the city directory, most likely a retail grocer. Between December 1845 and June 1846, Whitney borrowed three times on his own account; he borrowed three additional times between January 1850 and September 1851. Those six loans averaged $101. In the interim (November 1846 to July 1849), the partnership of E. D. & F. J. Whitney borrowed 18 times for an average of $80. Between December 1845 and July 1849, Whitney either as individual or as partner borrowed between $80 and $100 approximately every two months. This is consistent with a retail grocer using bank credit to finance inventory – a practice the banker Paddock would have been familiar with and willing to finance having been a dry goods retailer himself before turning to banking. The Adams and Whitney examples are typical in that individuals only rarely borrowed when they were borrowing as partners, but the basic features of the individual and partnership loans were not wildly dissimilar, though partnerships tended to borrow larger amounts at longer terms.

Table 4 reports summary statistics for all borrowers, as well as separately for proprietors and partners. Evident differences appear in the summary statistics. Partners secured loans about 25 percent larger ($p<0.001$) than proprietors for shorter maturities ($p<0.001$) on which they paid higher interest rates ($p<0.003$). They also had significantly shorter ($p<0.0001$) relationships with the BRB, which is consistent with their short life spans. Partners were also more likely than proprietors to borrow on bills of exchange payable in New York City, Boston or Albany. Partners borrowing with bills drawn on distant cities is consistent with the large fraction of partnerships engaged in wholesale trade. The wholesale firm – rather than the professional or financial partnership – was the predominant partnership in the mid-nineteenth century.

5. Partnerships and credit costs: Evidence

To control for the potential endogeneity of partnership choice, the empirical analysis takes advantage of the longitudinal nature of the data in that individuals are observed on several occasions, sometimes as proprietors and sometimes as partners. The effect of the choice to partner on credit costs is identified through variation in loan rates across time. Individual borrower specific fixed effects difference out time-invariant person characteristics over time that may have influenced the choice to form a partnership. It is important to note that individual-specific fixed effects cannot control for characteristics that change over time. If the individual as proprietor and as partner engaged in different businesses, for example, individual fixed effects will not control for this. But the previous discussion suggests that this is not a serious concern. On the other hand, if the principal difference between proprietors and partners is the scale of the business (i.e., partners may have pooled resources and talents to pursue larger transactions) the data can capture these effects because loan sizes and maturities are observed.

5.1 Partnerships and premia

Table 5 reports the full specifications of the fixed effects regressions, as well as OLS results for comparative purposes. The first two columns report the results of specifications in which all partnerships are treated for as a single type. Controlling for other observable loan features – amount, maturity, place of payment, as well as the month and year in which the loan was made – the fixed effects "within" estimate implies that individuals paid 10 basis points more for credit when they borrowed as partners than they paid when they borrowed as proprietors. Do 10 basis points represent a meaningful cost? Ten basis points represent about one-sixth of a standard deviation of the loan rate, which suggests a modest premium. But 10 basis points are more than twice the unconditional mean difference in interest rates paid by proprietors and partners. More importantly, perhaps, with an mean loan term of 75 days, a 10 basis point premium per

loan period implies an annualized 49 basis point annualized premium. Columns 3 and 4 separate partnership by naming style. When individuals borrowed as a part of a two-name, non-familial firm (Jones & Smith types) they paid about 10 basis points more than they paid when they borrowed as proprietors. Individuals borrowing as part of a non-familial partnership with three or more named partners paid more than twice the two-partner premium – 22 basis points – than when borrowing as an individual. The difference between two- and three-partner firm loans is striking, but the coefficients are not statistically different from one another (p=0.34).

Firms organized in the style of Jones & Jones, Jones & Son, or Jones & Brother are assumed to be familial two-partner firms and are included separately. Firms organized as Jones & Sons or Jones & Brothers are treated separately because the plural likely implies three or more familial members. Members of familial firms likely to have two partners paid approximately 4 basis points more than they paid as proprietors, while members of three-partner familial firms paid a much larger 52 basis point premium. The modest interest rate premium paid by two-member family firms is consistent with the survival results: family firms tended to be longer lived and thus exposed creditors to lower default risks. The half-point premium paid by three-member firms is seemingly anomalous, and should be treated cautiously because there are only 11 three-member family firm loans in the data set compared to 816 two-member family firm loans.

Firms in the style of Jones & Co represent a curious case in that they are likely partnerships, but with a single named partner. The naming convention suggests a named senior (or general) partner and one or more unnamed junior (or limited liability) partners The estimated fixed-effect coefficient on firms organized in the style of Jones & Co imply that individuals as members of firms organized under this naming convention paid a 12.6 basis point premium relative to the rate they paid as proprietors. The interest rate premium paid by these firms is consistent with the premium paid by two-named partner firms,

which suggests that a majority of firms organized under the Jones & Co rubric were two-member firms.

The conclusion to be drawn from loan records is that partnerships were unable to protect creditors from untimely dissolution risks and costs. There is tentative evidence, as well, that the risks and costs increased in the number of partners and creditors demanded compensation for the risks in the form of higher interest rates.

5.2 Partnerships and usurious and high interest rates

Although about one-third of loans in the sample paid the 7% legal ceiling rate, more than one-fifth of the loans were at rates exceeding 7.1%, which violated New York's usury law.[16] More than two percent of loans paid 8.5% or more. In this section I estimate individual fixed effects linear probability specifications with a binary dependent variable equal to 1 if the rate exceeds the legal limit (labeled *usury*) or 8.5% (labeled *high rate*), otherwise the regressions are the same as those discussed in the previous section. The coefficients of interest are those on the partner variables and are interpreted as "within" effects in that they capture the interest rate premium paid by individuals depending on the organizational form in which they are participating. Table 6 reports the results.

Columns 1 and 3 combine all partnerships into a single type. This simple categorization implies that compared to rates charged proprietors, individuals borrowing as members of a partnership were 7.1 percent more likely to pay a usurious rate and 2.5 percent more likely to pay a high rate. The results in columns (2) and (4), however, illuminate the association between firm liquidation risks increasing in firm

[16] The 7.1% rate is used to identify usurious rates due to rounding effects or small miscalculations in the discount. In 1853 A.F. Barker $57 note maturing in 92 days was discounted by $1.02, which implies an effective annualized rate of 7.1%. A $1.00 discount would have resulted in an effective annualized interest rate of 6.96%. New York law did not exempt even small violations of the usury limit, but given the absence of inexpensive computing it seems likely that this violation was miscalculation or rounding error than a deliberate violation of the legal interest ceiling.

size (as discussed in Section 2) and the compensation paid to creditors for accepting some of that risk. The parameter estimates in column 2 (usurious loans) suggest that three-partner firms were between 3 and 6 times more likely to pay a rate in excess of the legal limit. As members of firms organized in the style of Jones, Smith & Brown, for example, individuals were 28.7 percent more likely to pay a usurious rate; they were just 10.3 percent more likely to pay a usurious rate as a member of a Jones & Smith-style firm. And the coefficients are statistically different ($p=0.0009$). Individuals as members of Jones & Brothers-style firms were nearly 6 times more likely to pay a usurious rate than individuals as member of Jones & Jones-style firms. Again, the coefficients are different ($p<0.0001$).

When we repeat the exercise for high rate loans (rate>8.5%), the results are comparable. The three-partner coefficients are approximately 3 times the two-partner coefficients, though the limited number of observations in some cells means that the null hypothesis of coefficient equality cannot be rejected ($p>0.19$ in both cases). With only one Jones, Smith & Co-style firm in the analysis, we should not make any generalizations based on the coefficient on this variable. Whether interest rates enter as a continuous variable or a binary variable, the evidence is consistent with creditors insuring themselves against partnership-specific dissolution costs through higher interest rates. Team production can increase worker productivity and generate profits, but team production is also prone to opportunistic behaviors and subject to costs not borne by individual proprietors.

6. Concluding comments

Were nineteenth-century creditors concerned about liquidation risk at partnerships? Did they believe that liquidation risk increased in the number of partners and the style of the partnership? Evidence from the loan records of the Black River Bank – a not atypical nineteenth-century bank – suggest that they were. Individual fixed effects estimates imply that individuals as partners paid higher interest rates for a

given type, size and maturity of a loan than did individuals as proprietors. Partners were more likely to pay usurious or high interest rates, as well.

It is well known that creditors do not insure against default costs solely through higher rates: higher rates alone would, in fact, only serve to increase default risk. Creditors would also have credit rationed firms observably likely to breakup at an unexpected or unpropitious moment. The available data do not afford an opportunity to test for credit rationing, but a notable feature of the Black River Bank's loans is that loan (project) size did not increase in proportion with the number of partners. The unconditional partner loan amount was just 25% larger than the unconditional proprietor loan amount. Future studies should explore additional features of the partner-creditor relationship.

So little is currently known about the nineteenth-century business partnership as an organizational form that the current study barely scratches the surface, not least how partnership as an organizational form contributed to long-run economic development. Guinnane et al (2007) show that American firms faced a suboptimal menu of organizational forms – joint-stock companies, limited liability partnerships and incorporation were unavailable or unattractive – yet the United States economy was "extraordinarily successful." The absence of alternative forms and the risk of untimely dissolution may have precluded the formation of some firms that would have been profitable and long-lived under a different regime. Those entrepreneurs who took on the risks bore additional costs, but the mid-nineteenth century small business sector was vibrant and dynamic. Part of that dynamism – firm formation, dissolution, and reformation – was an artificial product of the limited menu of choices and part was due to uncertainties involved in the matching of potential partners. Although speculative, it may be that a vibrant financial sector was a critical component in the economy's nineteenth-century dynamism. Creditors priced the risk of firm dissolution and default. That, perhaps, is one lesson. Although financial risk taking has fallen into disrepute recently, New York's competitive banking system facilitated the collection and allocation of risk capital for business

purposes.

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Table 1
Summary statistics on Baltimore partnerships, 1850-1857

	All partners	Two partners	Three partners	Four+ partners
	Completed spells (observed formation and dissolution dates)			
Days to dissolution	718.85 (545.66)	719.75 (573.65)	743.96 (514.91)	619.47 (393.25)
Wholesale	0.551	0.578	0.487	0.563
Retail	0.103	0.107	0.102	0.063
Manufacturing	0.081	0.100	0.051	0.031
Professionals	0.002	0.004	0	0
Construction	0.010	0.007	0.017	0
Finance	0.053	0.037	0.077	0.094
Unreported industry	0.191	0.159	0.256	0.218
Consent	0.678	0.733	0.598	0.500
Death	0.057	0.056	0.051	0.094
Limitation	0.134	0.089	0.205	0.250
Illness	0.021	0.022	0.009	0.063
Unknown cause	0.110	0.100	0.137	0.094
	Completed and censored spells			
Days to dissolution or censoring date	961.38 (729.41)	974.03 (753.44)	969.62 (700.45)	811.43 (571.80)
Wholesale	0.497	0.519	0.449	0.453
Retail	0.099	0.108	0.075	0.107
Manufacturing	0.102	0.112	0.082	0.080
Professionals	0.008	0.011	0	0
Construction	0.010	0.010	0.015	0
Finance	0.043	0.036	0.045	0.093
Unreported industry	0.233	0.199	0.326	0.240

Source: *Baltimore American* (1850-1857).

Table 2
Covariates of time-to-dissolution

	Complete spells Weibull-AFT	Complete spells lognormal-AFT	All spells Weibull-AFT	All spells lognormal-AFT
Family partners	0.203*	0.261*	0.268*	0.381*
	(0.080)	(0.099)	(0.109)	(0.113)
Three partners	0.024	0.081	-0.206*	-0.149
	(0.078)	(0.097)	(0.105)	(0.113)
Four+ partners	-0.202	-0.027	-0.313	-0.225
	(0.120)	(0.126)	(0.180)	(0.176)
Retail	0.147	0.290*	0.122	0.261
	(0.095)	(0.129)	(0.147)	(0.155)
Manufacturing	0.020	0.012	0.324	0.335
	(0.138)	(0.171)	(0.176)	(0.180)
Professional	-0.154	0.257*	1.665	1.595*
	(0.086)	(0.106)	(0.951)	(0.803)
Construction	-0.458	-0.391	-0.187	-0.114
	(0.398)	(0.359)	(0.480)	(0.467)
Finance	-0.161	-0.084	-0.257	-0.188
	(0.150)	(0.167)	(0.209)	(0.211)
Unreported industry	-0.132	-0.129	0.381*	0.325*
	(0.098)	(0.112)	(0.130)	(0.135)
Constant	6.642*	6.173*	7.616*	7.202*
	(0.063)	(0.069)	(0.074)	(0.083)
ln(p)	0.326*	---	0.087*	--
	(0.035)		(0.032)	
ln(F)	---	-0.161*	--	0.280*
		(0.035)		(0.036)
Observations	419	419	1057	1057
Log likelihood	-517.2	-527.1	-1042.9	-1025.1
AIC	1054.3	1074.1	2107.7	2072.3

Notes: * implies $p<0.05$. The excluded categories are two partners and wholesale business.
Sources: Author's calculation from data in *Baltimore American* (1850-1857).

Table 3
Firm naming patterns and number of partners

Name style	1	2	3	4	5+	Total
Jones & Smith	0	785	39	4	2	830
Jones, Smith & Brown	0	0	78	4	0	82
Jones & Co	3	238	110	21	3	375
Jones, Smith & Co	0	60	126	44	7	237
Jones, Smith, Brown & Co	0	0	0	7	2	9
Jones & Son (Bro)	0	24	13	1	0	38
Jones & Sons (Bros)	0	23	42	8	0	73
Total	3	1,130	408	89	14	1,644

Note: includes all firm types delineated in Figure 1 as described in the text.
Source: *Baltimore American and Commercial Advertiser* (1850-1857).

Table 4
Black River Bank Summary Statistics

Variable	1 All borrowers	2 Proprietors	3 Partners
Interest rate (%)	7.04 (0.65)	7.02 (0.56)	7.06 (0.77)
Maturity (days)	74.58 (28.37)	75.78 (27.56)	72.68 (29.52)
Loan amount ($)	708.31 (1223.79)	646.58 (1229.35)	806.14 (1208.71)
Prior relationship length (months since first loan)	39.08 (35.03)	45.68 (35.92)	28.62 (30.80)
Renewal (=1 if loan was renewed at maturity)	0.02	0.03	0.02
New York City (=1 if loan payable in NYC)	0.20	0.14	0.30
Boston (=1 if loan payable in Boston)	0.05	0.03	0.07
Albany (=1 if loan payable in Albany)	0.08	0.07	0.11
Upstate (=1 if loan payable in Upstate NY)	0.01	0.01	0.01
Observations	7353	4508	2845

Notes:
Sources: Author's calculations from information in Black River Bank (1845-1859).

Table 5
Determinants of credit costs at the Black River Bank

	OLS	FE	OLS	FE
Partnership	0.044* (0.018)	0.100* (0.036)	--	--
Jones & Smith	--	--	0.023 (0.032)	0.105* (0.048)
Jones, Smith & Brown	--	--	0.087 (0.140)	0.220 (0.116)
Jones & Co	--	--	0.097* (0.026)	0.126* (0.063)
Jones, Smith & Co	--	--	0.146 (0.257)	0.005 (0.367)
Jones & Jones	--	--	-0.028 (0.027)	0.038 (0.054)
Jones & Brothers	--	--	0.153 (0.109)	0.523* (0.054)
Prime rate	-0.002 (0.004)	-0.001 (0.004)	-0.002 (0.004)	-0.001 (0.005)
ln(loan amount)	-0.002 (0.008)	-0.002 (0.011)	-0.003 (0.008)	-0.002 (0.009)
ln(loan maturity)	-0.276* (0.027)	-0.317* (0.033)	-0.280* (0.028)	-0.318* (0.033)
Renewal	0.085 (0.066)	0.064 (0.067)	0.082 (0.066)	0.061 (0.067)
Months since first loan	0.000 (0.000)	0.002* (0.000)	0.000 (0.000)	0.002* (0.000)
NYC	-0.107* (0.028)	-0.020 (0.050)	-0.131* (0.031)	-0.022 (0.043)
Boston	-0.192* (0.041)	-0.236* (0.090)	-0.234* (0.045)	-0.244* (0.091)
Albany	-0.053* (0.026)	-0.043 (0.024)	-0.065* (0.026)	-0.040 (0.025)
Upstate	1.450* (0.257)	1.372* (0.357)	1.453* (0.260)	1.382* (0.370)

Table 5
Determinants of credit costs at the Black River Bank

	OLS	FE	OLS	FE
Constant	8.249* (0.172)	8.446* (0.170)	8.269* (0.174)	8.447* (0.147)
Year dummies	Yes	Yes	Yes	Yes
Month dummies	Yes	Yes	Yes	Yes
Obs	7353	7353	7353	7353
F-stat	5.95*	8.60*		
R-square	0.086	0.076	0.089	0.079

Table 6
Partnership effects on usurious and high interest rates
Linear probability specifications

	rate>7% FE	rate>7% FE	rate>8.5% FE	rate>8.5% FE
Partnership	0.071* (0.010)	--	0.025* (0.007)	--
Jones & Smith	--	0.103* (0.049)	--	0.021* (0.010)
Jones, Smith & Brown	--	0.287* (0.052)	--	0.062 (0.054)
Jones & Co	--	0.060 (0.033)	--	0.033* (0.013)
Jones, Smith & Co	--	0.365* (0.083)	--	0.522* (0.097)
Jones & Jones	--	0.040 (0.031)	--	0.015 (0.011)
Jones & Brothers	--	0.238* (0.032)	--	0.050* (0.012)

Notes: All regressions include the additional controls reported in Table x. Columns (1) and (2): dependent variable=1 if interest rate on loan exceeded the legal limit (7%); =0 otherwise. Columns (3) and (4): dependent variable=1 if interest rate on loan exceeded 8.5%; =0 otherwise. * implies $p<0.05$.

Figure 1
Timing of partnership formation and dissolution observations