Who Seeks and Who Receives:
Access to Capital by Young Firms in a Changing Economic Environment

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Abstract:

In the aftermath of the latest financial crisis, policy-makers at all levels are concerned about the impact of the crisis on access to financial resources by young firms, particularly as major changes occur in bank-lending practices and uncertainties surround the implementation of financial reform legislation. In this paper we examine the use of bank loans in firms during their early years of operations, and how these are altered in the wake of the financial shocks of 2008. We address two crucial questions: 1) what characteristics of startups—and their founders—are related to seeking and receiving bank credit and 2) how did the financial crisis alter or amplify this dynamic. We explore the factors that mitigate the decision to apply for a loan and the subsequent outcomes of firm survival and growth. Our work provides insights into the relative importance of supply and demand for financing both prior to and subsequent to the financial shocks. We leverage various measures and perceptions to disentangle the decision to seek bank loans from the likelihood of receiving a loan based on credit scores and other objective measures.

Keywords: Entrepreneurial finance, bank loans, financial crisis, access to credit, credit constraints

Introduction

The lack of sufficient starting capital—a crucial resource at startup--is a binding constraint for new firms. The finance literature shows that entry into entrepreneurship increases with sudden increase in personal wealth, e.g. via bequest (Cagetti and De Nardi (2006)) or external change in taxation rate (Nanda (2008)), and with increased access to bank financing through deregulation and loosening of branching restrictions (Black and Strahan (2002)). Likewise, absence of funds inhibits entry. For example, Evans and Jovanovic (1989) find that borrowing capacity limits entrepreneurial entry; using the National Longitudinal Survey they estimate that new entrepreneurs are limited by 1.5 times the size of their initial assets in starting a new business. In this paper, we analyze the use of bank loans in young firms during their early years of existence, and how these are altered in the wake of the financial shocks of 2008. We address two crucial questions: 1) what characteristics of startups—and their founders—are related to seeking and receiving bank credit and 2) how did the financial crisis alter or amplify this dynamic.

This paper exploits rich information regarding the types and sources of financing used in new firms over the first six years of operations in the confidential Kauffman Firm Survey (KFS) microdata, a longitudinal panel study of 4,928 businesses that started in 2004. The baseline survey of new businesses has been followed up with five subsequent annual surveys in an ongoing effort to track the new business trajectories (Ballou, Barton, Desroches, Potter, Reedy, Robb, Shane and Zhao (2008); Reedy and Robb (2009)). Importantly, the survey spans the financial shocks of 2008 and 2009, which occurred in the fifth and sixth year of operations for the KFS firms. We probe both material and behavioral drivers of the entrepreneur's decision to apply for bank credit, the decision to not apply when credit is needed for fear of having their loan application denied, the bank's decision to reject or approve the entrepreneur's loan application.

We then account for the selection bias in the first stage decision to apply in our analysis of the ultimate decision for the credit application. The roles of tangible and intangible assets and financial performance prior to the crisis are explored.

Moreover, we explore the particular relevance of these questions with regard to new high-technology firms. In previous work using the KFS data, Winston Smith (2010) provided evidence that banks increase lending to high-technology firms as information asymmetry and inherent uncertainty surrounding the firm are lessened. While high-tech firms account for a relatively small percent of the sample, they are disproportionately likely to contribute to economic growth through employment, revenue, assets, and innovations. In this paper, we specifically address the impact on high-tech firms relative to firms more generally.

The findings in this paper provide important insights for the growing policy debate concerning the constrained credit and lending for small businesses, as well as assessing the relative significance of constrained supply and dampened demand. The paper concludes with a discussion of the factors that contribute to young firm survival and growth, including the relative importance of intangible assets, such as intellectual property, and its role in in mitigating the consequences of the financial crisis and facilitating economic growth, which have important implications for economic recovery.

From the perspective of the management literature, this paper provides needed detail and insight into the relationship between the resources possessed by the founder at startup and the characteristics that enable and sustain dynamic growth of innovative new ventures. By examining new firms in their crucial early years of operation, we contribute to the literature on the resource-based view of the firm, with a focus on the interaction of the financial and behavioral endowments of the firms and their founders.

Theoretical Framework

Banks and New Firm Finance

In practice, entrepreneurs rely on a mixture of financing options for new companies, often employing both informal and formal sources of capital for early financing, including bank loans and venture capital (Bhide (2000); Parker (2009); Shane (2008)). In the aggregate, the financing of small businesses in the United States has been a roughly equal mixture debt and equity (Berger and Udell (1998); Haynes and Brown (2009); Robb and Robinson (2010)).

Banks are the largest source of external debt, while insiders are the largest source of equity for small firms in the United States (Haynes and Brown (2009); Robb, Reedy, Ballou, DesRoches, Potter and Zhao (2010); Robb and Robinson (2010)). Similar patterns hold in the United Kingdom (Parker (2009)). Banks play a substantial role in new firm formation and growth (Ayyagari, Demirguc-Kunt and Maksimovic (2010); Beck, Demirgüç-Kunt and Maksimovic (2008); Kerr and Nanda (2009); Robb and Robinson (2010)). Black and Strahan (2002) show that deregulation of interstate banking and loosening of branching restrictions fostered increased entrepreneurial activity. In a sample of Italian firms, Benfratello, Schiantarelli, and Sembenelli (2008) find that bank loans facilitate innovation. In a sample of French firms, (Landier and Thesmar (2009)) find that banks provide entrepreneurs with short-term and long-term debt.

Importantly, debt financing places the risk associated with the new firm squarely with the entrepreneur, who must repay regardless of outcome; equity financing spreads the risk between the entrepreneur and the investor, but also dilutes the owners' control (Jensen and Meckling (1976)). Equity financing smooths the financial cost of potential failure, while debt financing amplifies it. However, the entrepreneur may be averse to giving up an equity stake and control, preferring instead to obtain non-dilutive debt financing. For example, recent evidence suggests a

growing use of external debt by very young firms, with significant differences among firms in high-technology industries compared with other industries (Coleman and Robb (2009); Robb and Robinson (2010)). Chemmanur, He, and Nandy (2009) find that having outside financing prior to IPO increases the likelihood of going public, and that this result holds for both venture capital and bank financing.

Information asymmetry and uncertainty in new firm financing

Significant principal-agent conundrums arise in financing new ventures due to information asymmetry, adverse selection, and moral hazard. The literature on entrepreneurial finance identifies specific features of contracting and allocation of rights as a crucial mechanism for aligning interests under circumstances of information asymmetry and uncertainty. Adverse selection arises when the entrepreneur knows her own ability while the outside investor does not. Amit, Glosten, and Muller (1990) model the relationship between information asymmetry and outside financing. Their model suggests that under conditions of information asymmetry outside investors are more likely to be presented with lower quality entrepreneurs, as higher quality entrepreneurs will choose to proceed alone. Analyzing contracts between venture capitalists and portfolio companies, Kaplan and Stromberg (2003) find that cash flow rights and control rights are allocated separately, and are made contingent upon observable performance measures. Contingencies are included for financial performance, non-financial performance, and milestones. Allocation of different types of rights and specification of contingencies are used as complements. They also find a strong preference for convertible preferred stock among the contracts studied. In a separate paper, the same authors further associated specific risks with particular contractual terms (Kaplan and Stromberg (2004)). Specifically, they find that venture capitalists are given greater control rights under conditions of greatest information uncertainty between the entrepreneur and the investor.

Moral hazard is introduced both when the entrepreneur's effort cannot be monitored and when the investor's commitment cannot be assured. Schmidt (2003) finds that such double moral hazard situations are ameliorated through the use of convertible securities in venture capital contracts. Casamatta (2003) likewise models the use of convertible bonds and preferred equity in aligning interests in VC contracts. She models an entrepreneur who seeks money and advice and a VC who can provide both, compared to "consultants" able to provide advice but not funding. In this circumstance, both entrepreneur and VC must exert effort, which is unobservable, and incentives are aligned through commensurate allocation of cash flow rights. Hellman (2006) models the role of convertible preferred securities in allocating cash flow rights contingent upon exit strategy, i.e. acquisition or IPO.

One key strand within the literature on entrepreneurial finance addresses the preference for debt versus equity financing. In broad terms, the entrepreneur prefers to maintain control rights but generally faces capital constraints, while the investor seeks the highest return for a given level of risk. Importantly, debt financing and equity financing (bank loans compared to venture capital) have different implications for entrepreneurs (Schmidt (2003); Ueda (2004)). Plausible theoretical arguments can be made in favor of the entrepreneur preferring debt financing in order to secure adequate funds while retaining full control rights (Berger and Udell (1998)). However, economic theory also suggests the entrepreneur will prefer to smooth risk by avoiding the necessity to make fixed payments if the firm does not do well, suggesting preference of equity over debt financing.

Inherent information asymmetry makes it difficult for banks to evaluate young firms, particularly in high-technology industries due to the lack of tangible assets and concurrent reliance on knowledge assets, as well as technical and market uncertainty. Banks face greater liquidity constraints than VC firm, leading to preference for collateral, transparent valuation, and

other lower risk sectors (Berger and Udell (1998); Ueda (2004); Winton and Yerramilli (2008)).

The information asymmetries associated with new, high tech firms make traditional bank lenders

less likely to lend to these firms. Empirical studies support this finding broadly (Cole (2008);

Cosh, Cumming and Hughes (2009)). Hellman, Lindsey, and Puri (2008) find that banks use

strategic equity investing, i.e. venture capital, to build subsequent banking relationships. Banks

use relationship building and the gathering of "soft" information to mitigate information

asymmetry.

At the same time that young firms may be hit hardest by financial crisis, these firms may

also have the highest resource needs. Bradley et al. (Bradley, Aldrich, Shepherd and Wiklund

(2011)) find that environmental jolts require greater resource seeking in young firms, as they

lack financial slack. Morevoer, if the lack of reputation or perception of lack of

creditiworthiness is internalized, the founder becomes underconfident (Hayward, Rindova and

Pollock (2004)). Taken together, the arguments above lead us to develop our first hypothesis:

> *Hypothesis 1: In times of financial crisis, founders of young firms will be more*
> *discouraged about applying for needed financial capital.*

The effects of information asymmetry will be heightened in times of crisis. The lack of

reputation particularly harms young firms in debt markets (Diamond (1989)). Negative

macroeconomic events at founding or in the early years of firm life disproportionately increase

the failure rate of young firms (Geroski, Mata and Portugal (2010)). Moreover, Geroski *et al.*

find support for the ideas that initial resources have a lasting effect on new firm survival and that

firms are essentially imprinted by their founding conditions; thus early negative events have a

persistent impact.

Financial crises can also precipitate a flight to quality by lenders (Caballero and

Krishnamurthy (2008); Naes, Skjeltorp and Odegaard (2011)). Taken together, these arguments

lead us to develop our second set of hypotheses:

> *Hypothesis 2a: In times of financial crisis banks will rely more heavily on hard information in their lending decisions.*

> *Hypothesis 2b: In times of financial crisis, banks will be less likely to lend to more informationally opaque firms.*

Data description and summary statistics

Kauffman Firm Survey

We use the Kauffman Firm Survey (KFS), a six-year panel dataset on firms that began operations in 2004, to explore the types and sources of financing used in their early years of operations. The panel structure of the data provides critical insights into how firms are financed in their early years of operation, including during a financial crisis, as well as the relationship between financing and subsequent firm performance. Detailed data are gleaned on the nature of new business formation activity including internal and external sources of financing, firm size and focus, and information related to the characteristics, experience and human capital of the entrepreneur (Ballou, Barton, Desroches, Potter, Reedy, Robb, Shane and Zhao (2008); Reedy and Robb (2009)). Data were collected on new businesses in a baseline survey, which was followed by subsequent annual surveys. The businesses in this sample all came into existence in 2004, with business start defined in terms of state unemployment insurance paid, FICA, Schedule C income reported on personal income tax, EIN, or the presence of legal status.

The KFS data are based on a large sample of a wide spectrum of industries, oversampled on high-technology to insure the inclusion of sufficient numbers of these types of firms in the final sample. Firms were oversampled with known weights, allowing econometric approaches to account for clustered errors arising from stratified sampling (Wooldridge (2002)). The breadth of industry inclusion and flexibility in measuring high-technology industries enable us to gather insights into the dynamic relationship between financing and innovation in industries where

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innovation is most likely.

These data offer additional advantages for examining new firm financing and testing the relationship between capital structure and the subsequent innovation trajectory of the firm. First, the inclusion of a range of industries facilitates comparison between and among distinct types of sectors. Multiple levels of sensitivity to industry differences are considered here. The U.S. Bureau of Labor Statistics and the National Science Foundation provide guidelines for categorizing technology-generating and technology-employing industries (Hecker (2005)). Additionally, many studies of new firms are innately subject to survivor bias when studies are limited to firms that receive particular forms of financing, such as venture capital or even angel financing, in which not all firms survive long enough to reach that point, or studies of firms that go public, which must by necessity have survived long enough to issue public securities. In the KFS data, firms all began operations in 2004, and thus the sample does not suffer from inherent survivor bias. However, some of our variables of interest are only available from 2007 onwards, so we are necessarily restricting our analysis to those firms that survived until at least 2007.

Summary statistics

Many of the variables of interest, such as loan application outcomes and fear of having a loan application denied are only available beginning in 2007. In the appendix, we compare the sample characteristics of all firms in 2004, and then broken out by whether or not they survived until at least 2007, in terms of owner characteristics, firm characteristics, and financial capital investments. While there are some differences, we note that the two groups are remarkably similar.

Summary statistics for the full sample we analyze in the multivariate models are presented in Table 1, as well as for non-high-tech and high-tech only firms. Key outcome

variables are summarized in Panel A. About 12% of firms in the sample applied for a new loan in each of the three years under observation; the percent was higher for young high-tech firms (15-16%). In the full sample, between 60 and 70% of loan applicants were always approved; the approval rate was lower for high-tech firms (52-60%), especially in the first two years. Interestingly, the percentage always approved rose nearly 10 percentage points over the three year period for high tech firms, while the percentage declined more than 10 percentage points for non-high tech firms.

The variables describing behavioral characteristics are of particular interest in this study, as these may be important determinants of demand for and access to credit. These variables are summarized in Panel B. The variable *fear of denial* takes a value of 1 when firm owners decided not to seek a new loan at some point when they needed credit for fear of having their loan application turned down. (However, this doesn't mean that they never applied; many of these firms have had or currently have successful loan applications. This means only that they needed (additional) credit at some point and didn't apply for it because they feared they'd be turned down). High-tech firms have a slightly lower average for this variable, but the percentage rose over the three years for both high-tech firms and for firms overall. While about one quarter of all firms had high credit scores, more than one third of all high tech firms had high credit scores.

Owner and firm characteristics are summarized in Panel C and Panel D, respectively. Comparing high-tech firms with non-high-tech firms, the table shows that high-tech firms have a lower representation of female owners and have more educated owners with greater industry and startup experience. Relative to to other firms, high-tech firms are more often organized as corporations, and are more likely to be located in metropolitan areas rather than rural areas. Not surprisingly, high tech firms also are more likely to have intellectual property (patents, trademarks, or copyrights) and to have a larger share of employees working in R&D. They also

have slightly lower shares of tangible assets, as shown by the PPE ratio (plants, property, and equipment to total assets).

Empirical Approach

Our model draws on standard assumptions in the banking literature (Gorton and Winton (2003)). We model the decision to apply for a bank loan in year t as a function of growth prospects and degree of credit/liquidity constraint as well as control variables for industry, firm size, and owner characteristics ((Chava and Purnanandam, 2011); (Edelstein, 1975)). We are further interested in the role of information asymmetry in mediating the loan application and approval process. We provide several proxies for information asymmetry. Particularly for a new firm, having a credit rating inherently reduces the information asymmetry between loan applicant and lender (Gorton and Winton (2003)). We use the Dun & Bradstreet credit score to define those in the top 20 percent of the credit score distribution as being highly creditworthy and include this as a predictor of applying for a loan as well as the loan application outcome. The credit score provides significant information to the lender about the creditworthiness of the applicant, thereby reducing the information asymmetry.

Asset tangibility also plays a role in bank lending decisions. We calculate the ratio of tangible assets to total assets using plants, property, and equipment. Additionally, we follow a growing interest in the role of intellectual property in bank lending decisions (Winston Smith (2010)) and also use a dummy variable to reflect a firm's use of intellectual property in terms of patents, trademarks, and copyrights. Finally, we include controls for firm and owner characteristics that have been shown to affect likelihood of bank borrowing in the previous literature. Firm characteristics include industry, legal form of ownership, and team ownership. Owner characteristics include race, ethnicity, gender, and age. We also include measures of the owner's human capital, including education, years of prior industry experience, and prior startup

experience.

Finally, we are interested in trying to dissect financial and behavioral aspects of the loan process. To this purpose we characterize *loan demand* as a function of observable financial and performance measures (extent of credit constraint primarily, profit in the prior year) as well as and a function of behavioral characteristics (risk, fear of denial). We first estimate an equation for the likelihood of not applying for credit when needed, because of the fear of having the loan application denied. We then estimate the following equation for the likelihood of applying for a loan:

$$apply = \alpha + \beta(financial\ need) + \gamma(behavioral) + \delta(controls) + \varepsilon_i$$

Particularly during financial crises, entrepreneurs may need additional funding, but choose to not apply at all or to apply for less than the full amount needed, because they fear having their loan application turned down. Such fear may or may not be justified. We include this as a regressor in the loan application model.

Next, we estimate an equation for the likelihood of the bank approving an entrepreneur's loan:

$$approval = \eta + \theta(apply) + \vartheta(information) + \lambda(controls) + \mu_i$$

Finally, we address the issue of endogeneity in our loan approval model. Because the factors that influence the decision to apply for a loan may also bear upon the likelihood of loan approval, we estimate a two-stage Heckman model with selection correction. We use the presence of team ownership and previous year's revenue to identify the decision to apply for a loan. The logic is that larger firms and growing firms are more likely to need additional financial resources in subsequent years. These factors are not necessarily going to influence the likelihood of loan approval. The likelihood of loan approval is then estimated in our second stage equation.

To summarize, in our empirical approach we first estimate separate maximum likelihood

probit regressions on the probability of not applying for a loan when credit is needed for fear of having the loan application denied, the probability of applying for a loan, and the probability of receiving a loan. We then carry out two-stage analysis taking into account that individuals first decide whether or not to apply for a loan and then estimate the likelihood of approval, conditional on the decision to apply. Finally, we bring in additional behavioral variables available only in 2008 and reestimate the first three models using just 2008 data. Results are described below and summarized in Tables 2 through 6.

Empirical Results

Probit analyses

Table 2 presents the results from a similar set of analyses looking at whether the entrepreneur needed credit but applied for less than needed or didn't apply at all, out of fear of being turned down. The results suggest that entrepreneurs feared denial of loan applications. Entrepreneurs with a credit score in the top 20% were significantly less afraid of denial. As well, entrepreneurs with intellectual property were significantly less afraid. On the other hand, entrepreneurs with higher R&D employee ratios and greater insider financing ratios were significantly more likely to fear denial. Taken together these results suggest that factors which increase information transparency—such as a high credit score and having intellectual property-- decrease the fear of denial, while those associated with greater information opacity—such as more focus on R&D and greater reliance on insider financing—increase the fear of denial. Both the 2008 and 2009 year dummies were significant, pointing to a heightened fear of denial associated with the onset of the financial crisis.

Table 3 presents the results of a probit model estimating the determinants of the choice to apply for a new loan. The first column presents the results for the three years of pooled data (2007, 2008, and 2009) for all industries, while column 2 is for high tech firms only. Column 3

includes interactions of select independent variables with high tech status. Across the board, firms that had negative expectations of receiving a loan were more likely to apply for a new loan. There was no difference between high tech firms and firms overall.

The demographic characteristics that had the largest impact of the choice to apply for a new loan are whether the owner had a college degree (for all firms) and previous startup experience (for high tech firms). Previous access to financing through trade credit is also a significant determinant of loan demand. Having a business credit line was also important, while having a business credit card was important for just high tech firms. Interestingly, credit score does not seem to play a role in the likelihood of applying for a new loan for firms overall. In terms of firm size, overall employment had a positive relationship in loan applications for high tech firms, while the share of R&D employment had a negative relationship. Assets were positively associated with loan applications for firms overall.

Intellectual property may moderate information asymmetries for young, high tech firms as s signal of quality and as an indicator of potential market value. Having intellectual property was negatively associated with loan applications, but it was not statistically significant. However, when the presence was interacted with being in a high tech industry, the coefficient on the interaction term was negative and statistically significant, indicating that high tech firms with intellectual property were less likely to apply for loans controlling for other factors. There were no differences between years in the likelihood of applying for a new loan, controlling for other factors.

Table 4 presents the results from probit analyses addressing ultimate loan application approval. Across all specifications we see that fear of being rejected is a strong predictor of being denied a loan. Firms in high tech industries were also more likely to have their loan applications denied. One unexpected resulted is the negative coefficient on *startup experience*

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(p<.01). A possible interpretation of this result is that previous startup experience may have resulted in business closure or failure, which is not captured in the survey but is likely known to banks. Logically, having started a business that failed in the past might lead to lower likelihood of new loan approvals. Interestingly, the coefficient on *high credit score* is not statistically significant alone, but is positive and highly significant when interacted with the dummy variable for high tech industries, suggesting that the information revealed through verified creditworthiness is particularly valuable in the context of informationally opaque firms, which is often inherent in high-tech industries. Having intellectual property was negatively associated with loan approvals, but the effect was no longer statistically significant when allowed to vary by high tech status. The ratio of R&D employment to total employment and the ratio of insider financing to total financing were also negatively associated with loan approvals. That latter finding might indicate firms are tapping internal resources as well as friends and family to meet their financing needs.

Using a business credit card as a source of borrowing is associated with lower likelihood of approval, while borrowing through a business line of credit is positively related to the likelihood of approval. Taken together, these several variables suggest a nuanced relationship between degree of credit constraint and the types of alternative credit available to a new firm.

We gain additional insights from comparing the trends from 2007 (i.e., just prior to the onset of the financial crisis) through 2009. One notable trend is relationship between the alternative sources of credit borrowing available to firms over time. In Columns 4-6 in Table 3, we see that business credit card borrowing does not appear to influence the likelihood of *applying* for a loan in any of the years individually; however, the importance of business line of credit borrowing becomes increasingly large in magnitude from 2007 to 2009. In Columns 4-6 in Table 2 we see the opposite relationship with respect to the likelihood of *not applying for the*

full amount of credit needed. Specifically, we see that the coefficient on business credit card borrowing is not statistically significant before the crisis, but becomes statistically significant and inceasingly large from 2008 to 2009, suggesting that entrepreneurs relying on business credit cards were more afraid of being turned down for new loans. Conversely, the coefficient on business credit line borrowing has no significant effect on not applying for the full amount of credit needed in any of the years.

Two-stage analysis

In the two-stage analysis we predict the likelihood of loans being approved, conditional on selection into applying for a loan. We estimate a maximum likelihood probit model with a Heckman sample selection correction in the first stage. Both *team ownership* and *previous year revenue* are positive and statistically significant in the first stage selection equation, indicating the appropriateness of these choices.

Controlling for this selection bias reveals additional nuances in our results along several dimensions. Our findings on credit score continue to suggest that the information revealed through verified creditworthiness is particularly valuable for firms in high-tech industries. Entrepreneurs who applied for less than the full amount of credit needed out of fear of denial indeed were less likely to have their loans approved. Interestingly, firms with a higher PPE ratio were less likely to have their loans approved. Firms with higher R&D employment ratio and heavier reliance on insider financing were also less likely to get loan approval. On the other hand, firms with a business credit line were more likely to have their loans approved. This latter finding may indicate that banks may use business credit lines to develop relationships withtheir clients, which may allow them to overcome information asymmetries.

Firms in the high tech industries appeared to fare worse than non-high tech firms, except in the case of high tech firms that had high credit scores. Firms with higher levels of R&D

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spending, at least in terms of employment, also tended to fare worse during this period. The coefficients on the year dummies for 2008 and 2009 were negative and statistically significant in column 3, indicating that tightened credit markets continued to persist.

Finally, results for regressions incorporating additional behaviorial variables are presented in Table 6. As these variables were only available for the year 2008, we restrict our regressions to this one year period. In Column 1, we see that fear of denial decreased the likelihood of applying for a new loan for firms in high tech industries.   Conversely, having business credit line borrowing increased the likelihood of applyhing for a loan. Reporting a significant negative impact of the financial crisiss was associated with greater likelihood of applying for a loan, whereas being optimistic had no significant effect. In Column 2, we see that having intellectual property decreased the likelihood of not applying for needed credit due to fear of denial. Reporting a significant negative impact of the financial crisis increased the likelihood of not applying out of fear of denial. However, having reported a significant effect of the crisis does not have a significant impact on the likelihood of loan approval.

Discussion and Policy Implications

We also see evidence for the contraction of credit markets in the overall financing patterns of these young firms. In Appendix 2, we can see that the ratio of formal debt financing as a share of financial injections is rising each year to a peak of 70% in 2007. This drops dramatically in 2008, as owners end up contributing more of their own funds into the business. The overall level of financial injections also shows a dramatic drop in 2008, but it appears formal debt financing and levels of new financial injections rebound somewhat in 2009.

Our results indicate that a nuanced relationship exists between the young firms' access to financial resources and key characteristics of the entrepreneur, the firm, and capital constraints

within the context of a turbulent economy. This work has important implications for policy and policymakers at all levels. In particular, given the role of young firms and entrepreneurs in job creation and economic growth, policymakers need to ensure that entrepreneurs and credit worthy firms are able to secure adequate financial resources for growth and success. Securing funding for new technology-based firms is particularly problematic, however, since many such firms are built upon intellectual capital rather than on physical assets, so it is difficult to determine the value and prospects of the firm. Ensuring these firms have adequate access to financial capital will enable them to continue to drive innovation, growth, and job creation in the U.S. economy.

Conclusion

The timing and the panel structure of the KFS data enable us to provide critical insights into how firms are financed in their early years of operation, including during a financial crisis, as well as the relationship between financing and subsequent firm performance. We also provide additionalinsight into the experiences of young technology-based firms, which are important contributors to the U.S. economy.

Add 2010 data and effects on performance over 2007-2010.

Table 1: Sample Characteristics									
2007, 2008, 2009									
	All			High-Tech			Non-High Tech		
Panel A: Outcomes	2007	2008	2009	2007	2008	2009	2007	2008	2009
Applied for New Loan	12.0%	12.5%	12.1%	15.7%	15.1%	15.8%	11.8%	12.4%	11.8%
Always Approved for Loan	70.7%	66.4%	60.9%	51.6%	58.4%	60.5%	72.3%	67.1%	60.9%
Revenue (millions)	0.48	0.55	0.57	0.46	0.65	0.70	0.48	0.54	0.56
Profit (millions)	0.02	0.05	0.02	-0.26	-0.04	0.01	0.04	0.05	0.02
Panel B: Behavioral Characteristics									
Did not apply out of Fear	15.6%	18.5%	21.0%	13.6%	17.9%	18.2%	15.7%	18.6%	21.2%
High Credit Score	24.7%	26.7%	26.9%	35.2%	35.4%	35.6%	24.1%	26.2%	26.5%
Panel C: Owner Characteristics									
Black		8.7%			8.2%			8.6%	
Female		30.6%			14.9%			32.0%	
Hours Worked by Owner		42.5			42.3			42.4	
Owner Age		44.9			44.9			44.9	
College Degree or Higher		48.6%			69.2%			47.0%	
Work Experience		43.8%			59.5%			43.0%	
Previous Startup		42.4%			48.4%			42.0%	
	All			High-Tech			Non-High Tech		
Panel D: Firm Characteristics	2007	2008	2009	2007	2008	2009	2007	2008	2009
Multiple Owners	52.3%	57.9%	60.7%	52.6%	57.9%	59.8%	52.3%	57.9%	60.7%
Incorporated	21.4%	18.7%	16.9%	28.7%	27.6%	25.8%	21.0%	18.2%	16.4%
Outside Help	0.0%	65.0%	0.0%	0.0%	67.5%	0.0%	0.0%	64.8%	0.0%
PPE/Asset Ratio	34.5%	35.1%	34.9%	27.2%	25.3%	23.9%	34.9%	35.8%	35.7%
RD Emp/Emp Ratio	11.1%	9.1%	8.2%	13.4%	14.3%	14.2%	11.0%	8.8%	7.9%
Trade Credit	54.1%	57.3%	57.4%	48.8%	52.4%	49.5%	54.4%	57.6%	57.9%
Log(Emp)	0.841	0.824	0.797	0.938	1.052	0.947	0.834	0.809	0.787
Log(Assets)	0.115	0.105	0.099	0.109	0.108	0.117	0.115	0.104	0.098
Insider Financing/Total Financing Ratio	6.4%	5.8%	6.5%	4.8%	3.2%	7.1%	6.5%	5.9%	6.4%
Borrows through use of Business Credit Card	14.8%	15.0%	13.2%	11.4%	12.7%	14.2%	14.9%	15.1%	13.1%
Borrows through use of Business Credit Line	6.2%	7.0%	6.0%	8.6%	9.0%	8.4%	6.1%	6.9%	5.9%
Has Intellectual Property	14.6%	11.6%	10.7%	23.9%	22.6%	22.8%	14.1%	10.9%	10.0%
Obs		4122			540			3582	
Source: Kauffman Firm Survey Microdata									

Table 2. Did Not Apply when Credit Needed for Fear of Having Loan Application Denied

This table reports coefficient estimates from multinomial probit regressions. The dependent variable in all columns is a dummy variable equal to 1 if the entrepreneur did not apply when credit was needed for fear the loan application would be denied and 0 if this was not the case. Column 1 is for all firms, while Column 2 includes high-tech firms only for 2007, 2008, and 2009. Column 3 includes interactions with *high-technology industry*. Columns 4,5 and 6 are for each year separately. All columns include entrepreneur, firm, and industry controls. Standard errors (in parentheses) are survey-weighted and heteroskedasticity robust. Significance is denoted as: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	All	High tech only	All w/interact.	2007	2008	2009
High Credit Score	-0.219***	-0.496**	-0.187**	-0.184	-0.154	-0.193
	(0.0719)	(0.202)	(0.0760)	(0.131)	(0.133)	(0.137)
Prev. Year Revenue	-0.0518**	-0.0313	-0.0336	-0.121	-0.00814	0.00290
	(0.0252)	(0.0475)	(0.0311)	(0.0745)	(0.0651)	(0.0472)
Prev Year Net Profit	-0.00434	0.00329	-1.038***	-0.284	-1.980***	-1.370***
	(0.00403)	(0.00213)	(0.317)	(0.438)	(0.601)	(0.417)
Prev Year IP	0.177**	0.106	0.176**	0.109	0.257*	0.233
	(0.0731)	(0.168)	(0.0791)	(0.134)	(0.136)	(0.144)
Hours worked	0.00702***	0.0112***	0.00721***	0.00609**	0.00819***	0.00805***
	(0.00146)	(0.00351)	(0.00147)	(0.00263)	(0.00246)	(0.00260)
Age	0.0122	0.147**	0.0102	-0.0143	0.0462	0.00177
	(0.0214)	(0.0742)	(0.0215)	(0.0334)	(0.0402)	(0.0389)
Age squared	-0.000189	-0.00167**	-0.000172	3.05e-05	-0.000554	-1.44e-05
	(0.000231)	(0.000807)	(0.000232)	(0.000358)	(0.000440)	(0.000422)
College Degree+	-0.135**	0.187	-0.146**	-0.210*	-0.161	-0.0602
	(0.0638)	(0.202)	(0.0641)	(0.109)	(0.113)	(0.112)
High Industry Experience	-0.181***	-0.0508	-0.162**	-0.256**	-0.100	-0.103
	(0.0653)	(0.185)	(0.0656)	(0.112)	(0.115)	(0.116)
Prev startup Experience	0.110*	0.387**	0.0913	0.0995	0.153	0.0206
	(0.0624)	(0.172)	(0.0630)	(0.109)	(0.110)	(0.110)
Homebased	-0.0705	-0.0741	-0.0671	-0.128	-0.0314	-0.00912
	(0.0670)	(0.186)	(0.0670)	(0.115)	(0.117)	(0.119)
High Tech	0.0148		0.0475	0.124	0.0212	-0.0265
	(0.102)		(0.145)	(0.252)	(0.234)	(0.268)
Team Ownership	-0.0698	-0.0989	-0.0640	0.0558	-0.161	-0.114
	(0.0664)	(0.173)	(0.0668)	(0.113)	(0.121)	(0.116)
Incorporated	0.173**	-0.0602	0.172**	0.141	0.1000	0.250**
	(0.0679)	(0.165)	(0.0688)	(0.117)	(0.122)	(0.119)
Rural	-0.258***	0.0187	-0.275***	-0.182	-0.424***	-0.210
	(0.0822)	(0.309)	(0.0823)	(0.142)	(0.148)	(0.141)
PPE Ratio	0.171*	-0.389	0.171*	-0.0717	0.308*	0.277*
	(0.0941)	(0.310)	(0.0952)	(0.169)	(0.165)	(0.166)
R&D Emp Ratio	0.192**	0.327*	0.205***	0.0889	0.393***	0.0921
	(0.0788)	(0.186)	(0.0789)	(0.137)	(0.128)	(0.153)
Prev Year insider financing ratio	0.857***	1.200**	0.811***	0.710***	0.980***	0.821***
	(0.147)	(0.483)	(0.146)	(0.240)	(0.261)	(0.268)
Have business CC borrowing	0.248***	0.366**	0.253***	0.0627	0.292***	0.457***
	(0.0629)	(0.173)	(0.0635)	(0.110)	(0.112)	(0.109)
Have business credit line borrowing	0.0342	0.410*	0.0178	0.0733	0.0206	0.0730
	(0.0827)	(0.212)	(0.0839)	(0.157)	(0.149)	(0.139)
High Tech X High Credit Score			-0.248	-1.112***	-0.0948	0.101
			(0.198)	(0.306)	(0.348)	(0.337)
High Tech X Prev Rev			0.0329	0.151	0.0353	-0.0287
			(0.0508)	(0.116)	(0.0877)	(0.0941)
High Tech X Prev Prof			1.042***	0.291	2.044***	0.796
			(0.317)	(0.438)	(0.633)	(0.623)
High Tech X IP			-0.0645	-0.186	0.0726	-0.140
			(0.190)	(0.348)	(0.308)	(0.347)
2008 Year Dummy	0.149**	0.343*	0.141*			
	(0.0731)	(0.200)	(0.0736)			
2009 Year Dummy	0.223***	0.171	0.214***			
	(0.0737)	(0.201)	(0.0743)			
Constant	-1.372***	-5.002***	-1.315***	-0.268	-2.265**	-1.291
	(0.498)	(1.684)	(0.501)	(0.780)	(0.927)	(0.894)
Observations	3,276	470	3,276	1,169	1,087	1,020

Table 3. New Loan Applications

This table reports coefficient estimates from multinomial probit regressions. The dependent variable in all columns is a dummy variable equal to 1 if the entrepreneur applied for a new loan in the specified calendar year and 0 otherwise. Column 1 includes 2007, 2008, and 2009, Column 2 is for high tech firms only, Columns 3 includes interactions with high tech, and columns 4,5, and 6 are each year individually. 2 and 3 are firms from all industries. Column 3 includes interactions with *high-technology industry*. All columns include entrepreneur, firm, and industry controls. Standard errors (in parentheses) are survey-weighted and heteroskedasticity robust. Significance is denoted as: *** p<0.01, ** p<0.05, * p<0.10

VARIABLES	(1) All firms	(2) High tech only	(3) All w/interact.	(4) 2007	(5) 2008	(6) 2009
Did not apply for fear	0.335***	0.594***	0.310***	0.225	0.209	0.517***
	(0.0779)	(0.200)	(0.0821)	(0.143)	(0.144)	(0.140)
High Credit Score	0.0612	0.382**	0.0668	-0.0314	0.234*	-0.0175
	(0.0765)	(0.189)	(0.0807)	(0.135)	(0.136)	(0.153)
Prev. Year Revenue	0.114***	0.171***	0.121***	0.0828*	0.111***	0.176***
	(0.0222)	(0.0573)	(0.0257)	(0.0462)	(0.0419)	(0.0518)
Prev Year Net Profit	0.00639*	0.0294	-0.106	-0.0629	-0.134	-0.118
	(0.00329)	(0.149)	(0.128)	(0.199)	(0.216)	(0.185)
Prev Year IP	-0.0421	-0.181	-0.0105	-0.160	0.220	-0.0573
	(0.0803)	(0.173)	(0.0855)	(0.147)	(0.144)	(0.161)
Hours worked	0.00202	0.00470	0.00201	0.00425	0.00142	0.000943
	(0.00154)	(0.00346)	(0.00154)	(0.00278)	(0.00257)	(0.00287)
Age	-0.0150	0.113*	-0.0164	0.00354	-0.0332	-0.0307
	(0.0210)	(0.0680)	(0.0210)	(0.0359)	(0.0361)	(0.0407)
Age squared	0.000102	-0.00113	0.000117	-0.000159	0.000216	0.000409
	(0.000222)	(0.000715)	(0.000223)	(0.000382)	(0.000381)	(0.000437)
College Degree+	0.178**	0.00627	0.174**	0.324***	0.0657	0.107
	(0.0721)	(0.194)	(0.0718)	(0.118)	(0.131)	(0.130)
High Industry Experience	-0.0446	-0.200	-0.0382	-0.0590	0.0147	-0.0320
	(0.0725)	(0.191)	(0.0724)	(0.123)	(0.128)	(0.128)
Prev startup Experience	0.0824	0.641***	0.0764	0.125	0.135	-0.0189
	(0.0669)	(0.168)	(0.0670)	(0.112)	(0.118)	(0.123)
Homebased	-0.0198	-0.344**	-0.0237	-0.0480	0.0346	-0.0907
	(0.0716)	(0.171)	(0.0718)	(0.117)	(0.127)	(0.135)
High Tech	0.227*		0.279	-0.238	0.241	0.646*
	(0.121)		(0.213)	(0.281)	(0.444)	(0.351)
Team Ownership	0.189***	-0.206	0.190***	0.261**	0.221*	0.131
	(0.0695)	(0.175)	(0.0694)	(0.117)	(0.123)	(0.128)
Incorporated	0.169**	0.0881	0.172**	-0.0153	0.307**	0.244*
	(0.0709)	(0.172)	(0.0712)	(0.120)	(0.123)	(0.128)
Rural	0.243***	0.0618	0.237***	0.0656	0.467***	0.225
	(0.0824)	(0.267)	(0.0820)	(0.141)	(0.149)	(0.146)
PPE Ratio	0.153	0.00175	0.159	0.243	0.351**	-0.0486
	(0.0995)	(0.275)	(0.0995)	(0.178)	(0.175)	(0.173)
R&D Emp Ratio	0.0574	-0.517**	0.0634	-0.00283	0.172	0.0391
	(0.0901)	(0.230)	(0.0903)	(0.139)	(0.172)	(0.155)
Prev Year insider financing ratio	0.292*	-0.269	0.289*	0.101	0.665**	0.0541
	(0.164)	(0.535)	(0.165)	(0.260)	(0.294)	(0.316)
Have business CC borrowing	0.0797	0.523***	0.0781	0.123	-0.00437	0.0827
	(0.0689)	(0.184)	(0.0689)	(0.117)	(0.121)	(0.126)
Have business credit line borrowing	0.794***	0.151	0.787***	0.796***	0.785***	0.925***
	(0.0783)	(0.211)	(0.0784)	(0.138)	(0.140)	(0.138)
High TechX Did not apply for fear			0.292	0.333	0.830**	-0.310
			(0.235)	(0.409)	(0.398)	(0.406)
High Tech X High Credit Score			-0.00628	0.193	-0.133	-0.0137
			(0.216)	(0.352)	(0.396)	(0.370)
High Tech X Prev Rev			0.0127	0.586**	-0.117	-0.0302
			(0.0646)	(0.271)	(0.0772)	(0.106)
High Tech X Prev Prof			0.177	0.0884	0.252	0.526
			(0.217)	(0.199)	(0.364)	(0.363)
High Tech X IP			-0.363*	-0.000931	-0.268	-0.963**
			(0.213)	(0.342)	(0.381)	(0.388)
Constant	-1.206**	-4.316***	-1.166**	-1.478*	-0.963	-1.072
	(0.497)	(1.637)	(0.498)	(0.856)	(0.855)	(0.918)
Observations	3,272	470	3,272	1,168	1,085	1,019

Table 4. Loan Application Always Approved

This table reports coefficient estimates from multinomial probit regressions. The dependent variable in all columns is a dummy variable equal to 1 if the entrepreneur's loan applications were always approved and 0 if any applications were denied. Column 1 includes all firms and Column 2 includes high-tech firms only for 2007, 2008, and 2009. Column 3 includes interactions with *high-technology industry*. Columns 4,5, and 6 are for each year separately. All columns include entrepreneur, firm, and industry controls. Standard errors (in parentheses) are survey-weighted and heteroskedasticity robust. Significance is denoted as: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Variables	(1) All firms	(2) High tech only	(3) All w/interact.	(4) 2007	(5) 2008	(6) 2009
High Credit Score	0.158	0.814**	0.0875	-0.330	-0.0384	0.472
	(0.151)	(0.327)	(0.161)	(0.306)	(0.308)	(0.311)
Prev. Year Revenue	-0.0372	0.0156	-0.0362	-0.0393	-0.00745	-0.0489
	(0.0450)	(0.0889)	(0.0497)	(0.101)	(0.0874)	(0.0817)
Prev Year Net Profit	0.619**	0.405	0.668*	2.907*	0.432	0.604
	(0.251)	(0.335)	(0.345)	(1.659)	(0.507)	(0.674)
Prev Year IP	-0.383**	-0.353	-0.334*	-1.006***	-0.550	0.0905
	(0.170)	(0.386)	(0.185)	(0.357)	(0.336)	(0.346)
Hours worked	-0.00352	-0.00512	-0.00381	-0.00378	-0.0144**	-0.000843
	(0.00316)	(0.00922)	(0.00320)	(0.00534)	(0.00592)	(0.00539)
Age	0.00304	-0.427**	0.00107	-0.0180	-0.264**	0.0679
	(0.0569)	(0.167)	(0.0573)	(0.103)	(0.125)	(0.0932)
Age squared	9.60e-05	0.00463***	0.000119	0.000450	0.00326**	-0.000680
	(0.000630)	(0.00171)	(0.000635)	(0.00117)	(0.00143)	(0.000997)
College Degree+	-0.0447	-1.033*	-0.0404	0.180	-0.0814	-0.144
	(0.153)	(0.597)	(0.154)	(0.277)	(0.298)	(0.267)
High Industry Experience	0.139	0.0203	0.139	0.211	0.663**	-0.243
	(0.153)	(0.345)	(0.154)	(0.260)	(0.295)	(0.309)
Prev startup Experience	-0.266*	-0.148	-0.274*	-0.343	-0.698**	0.0458
	(0.143)	(0.415)	(0.143)	(0.271)	(0.275)	(0.261)
Homebased	0.0163	0.00190	-0.0173	0.0254	0.0821	-0.155
	(0.155)	(0.478)	(0.157)	(0.309)	(0.280)	(0.293)
High Tech	-0.130		-0.137	-1.040	0.268	0.148
	(0.239)		(0.383)	(0.683)	(0.680)	(0.771)
Team Ownership	-0.214	0.375	-0.218	0.0226	-0.241	-0.718***
	(0.148)	(0.369)	(0.148)	(0.264)	(0.291)	(0.269)
Incorporated	0.225	-0.0900	0.242	0.288	0.674**	0.189
	(0.153)	(0.319)	(0.155)	(0.294)	(0.280)	(0.260)
Rural	0.674***	-0.867*	0.681***	0.190	0.696**	1.456***
	(0.179)	(0.449)	(0.180)	(0.307)	(0.319)	(0.382)
PPE Ratio	-0.0785	0.671	-0.0796	0.694*	0.0359	-0.504
	(0.228)	(0.492)	(0.229)	(0.369)	(0.447)	(0.470)
R&D Emp Ratio	-0.495***	-0.315	-0.499***	-0.336	-1.038***	0.112
	(0.174)	(0.588)	(0.175)	(0.376)	(0.320)	(0.438)
Prev Year insider financing ratio	-0.952***	-2.750*	-0.957***	-1.086*	-0.579	-1.493**
	(0.335)	(1.448)	(0.336)	(0.566)	(0.743)	(0.693)
Have business CC borrowing	-0.400***	-0.169	-0.400***	-0.285	-0.572**	-0.561**
	(0.142)	(0.358)	(0.143)	(0.261)	(0.278)	(0.257)
Have business credit line borrowing	0.538***	-0.553	0.544***	0.701**	0.280	0.864***
	(0.147)	(0.341)	(0.148)	(0.329)	(0.275)	(0.252)
High Tech X High Credit Score			0.735*	1.795**	0.676	0.218
			(0.402)	(0.744)	(0.830)	(0.812)
High Tech X Prev Rev			0.00492	0.199	-0.625	-0.219
			(0.0987)	(0.154)	(0.461)	(0.177)
High Tech X Prev Prof			-0.0748	-2.798*	8.097	1.049
			(0.502)	(1.681)	(5.160)	(0.828)
High Tech X IP			-0.546	-0.0474	0.246	-1.483*
			(0.420)	(0.804)	(0.856)	(0.813)
2008 Year Dummy	-0.333*	-0.0982	-0.342**			
	(0.172)	(0.391)	(0.174)			
2009 Year Dummy	-0.496***	0.0111	-0.512***			
	(0.173)	(0.376)	(0.175)			
Constant	0.884	10.82**	0.984	1.039	7.125***	-1.339
	(1.267)	(4.218)	(1.275)	(2.183)	(2.555)	(2.130)
Observations	603	101	603	202	193	196

Table 5. Loan Application Approval (2 stage)

This table reports coefficient estimates from two-stage Heckprobit regressions with selection correction. The dependent variable in in the first stage is a dummy variable equal to 1 if the entrepreneur applied for a new loan and 0 otherwise. The dependent variable in second stage regression is a dummy variable equal to 1 if the loan was approved. Column 1 is all firms for years 2007, 2008, and 2009. Column 2 includes interactions with *high-technology industry*. All columns include entrepreneur, firm, and industry controls. Standard errors (in parentheses) are survey-weighted and heteroskedasticity robust. Significance is denoted as: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Heckman 2-Stage selection model		
	All Firms	All Firms
VARIABLES		with interactions
First Stage		
Team Ownership	0.294***	0.294***
	(0.0563)	(0.0566)
Prev. year's revenue	0.135***	0.135***
	(0.0167)	(0.0168)
Second Stage		
Did not apply for fear of denial	**-0.620***	**-0.632***
	(0.0433)	**(0.0458)**
High Credit Score	-0.0114	-0.0307
	(0.0392)	(0.0414)
High Credit X Did not apply		0.127
		(0.118)
High Tech	-0.0107	-0.100
	(0.0620)	(0.108)
High Tech X High Credit		**0.232**
		(0.111)
Startup experience	**-0.0806**	**-0.0830**
	(0.0349)	**(0.0347)**
Net Profit(Loss)	0.0806*	0.0378
	(0.0478)	(0.0561)
High Tech X profit		0.156
		(0.117)
IP	-0.0679	-0.0635
	(0.0416)	(0.0439)
High Tech X IP		-0.0445
		(0.114)
PPE ratio	**-0.0937*	**-0.0948*
	(0.0558)	**(0.0561)**
R&D Employment ratio	**-0.0901**	**-0.0899**
	(0.0410)	**(0.0408)**
Insider financing ratio	**-0.163**	**-0.168**
	(0.0817)	**(0.0818)**
Has business card	-0.0577	-0.0562
	(0.0355)	(0.0354)
Has business credit line	**0.0731**	**0.0678*
	(0.0361)	**(0.0367)**
2008 Year Dummy	-0.0562	-0.0565
	(0.0393)	(0.0393)
2009 Year Dummy	-0.0496	-0.0494
	(0.0428)	(0.0430)
Constant	0.547*	0.630*
	(0.328)	(0.332)
Observations	5,199	5,199

Table 6. Regressions for 2008 only

This table reports coefficient estimates from three probit regressions. All columns include entrepreneur, firm, and industry controls. Standard errors (in parentheses) are survey-weighted and heteroskedasticity robust. Significance is denoted as: *** $p<0.01$, ** $p<0.05$, * $p<0.10$

VARIABLES	New Loan Applications	Did not apply for fear of Denial	Loan(s) always approved
Did not apply for fear	0.144		
	(0.151)		
High TechX Did not apply for fear	0.871**		
	(0.400)		
High Credit Score	0.224	-0.189	-0.0388
	(0.139)	(0.135)	(0.313)
Prev. Year Revenue	**0.106****	0.000809	-0.0146
	(0.0427)	(0.0562)	(0.0870)
Prev Year Net Profit	-0.121	**-1.423***	0.601
	(0.226)	**(0.453)**	(0.537)
Prev Year IP	0.184	**0.255***	**-0.656***
	(0.146)	**(0.142)**	**(0.340)**
High Industry Experience	0.0318	-0.0864	**0.651****
	(0.130)	(0.122)	**(0.294)**
Prev startup Experience	0.138	0.133	**-0.731***
	(0.120)	(0.114)	**(0.280)**
High Tech	0.256	0.106	0.292
	(0.434)	(0.241)	(0.724)
PPE Ratio	**0.356****	**0.289***	-0.0286
	(0.177)	**(0.172)**	(0.454)
R&D Emp Ratio	0.140	**0.338***	**-1.046***
	(0.179)	**(0.130)**	**(0.315)**
Prev Year insider financing ratio	**0.751****	**1.140***	-0.759
	(0.303)	**(0.266)**	(0.742)
Have business CC borrowing	-0.0230	**0.225***	**-0.544***
	(0.124)	**(0.115)**	**(0.286)**
Have business credit line borrowing	**0.772***	0.00151	0.269
	(0.142)	(0.153)	(0.279)
Didn't mean growth expectations	-0.163	0.145	0.00176
	(0.131)	(0.123)	(0.265)
High Future Growth	-0.0971	-0.106	-0.257
	(0.129)	(0.119)	(0.305)
Sig. Neg. Effect from Crisis	**0.244***	**0.686***	-0.209
	(0.129)	**(0.118)**	(0.272)
Optimistic	0.152	-0.0374	0.224
	(0.156)	(0.142)	(0.345)
Sought out Assistance	**0.260****	0.0284	0.192
	(0.119)	(0.115)	(0.286)
High Tech X High Credit Score	-0.186	-0.0637	0.578
	(0.403)	(0.352)	(0.811)
High Tech X Prev Rev	-0.111	0.0564	-0.788
	(0.0756)	(0.0790)	(0.534)
High Tech X Prev Prof	0.168	1.555***	8.629*
	(0.331)	(0.487)	(4.891)
High Tech X IP	-0.265	0.0222	0.441
	(0.380)	(0.310)	(0.846)
Constant	-1.245	-2.253**	6.919**
	(0.863)	(0.966)	(2.712)
	1,075	1,077	192

Appendix 1: Sample (All Firms, Analysis Sample (those that survived until at least 2007), Closed by 2007)				
Baseline Data (2004)				
Owner Characteristics	All Firms	Survivors	Closures	
Average Hours Worked (week)	42.4	43.0	41.1	
Previous Industry Work Experience	11.8	12.6	10.4	
Previous Startup Experience	42.5%	43.1%	41.5%	
Number of Previous Startups	1.0	1.0	1.1	
Owner Age	44.9	45.3	44.4	
Black	8.8%	7.9%	11.1%	
Asian	4.2%	4.3%	3.4%	
Hispanic	5.2%	4.8%	6.2%	
Other	2.3%	1.8%	2.9%	
White	79.7%	81.2%	76.2%	
Female	30.5%	29.5%	32.5%	
High School Graduate or Less	13.5%	12.1%	16.4%	
Some College	36.4%	35.0%	37.6%	
College Degree	30.2%	31.6%	29.7%	
Post-Grad Education	17.5%	18.4%	14.7%	
Firm Characteristics				
Incoporated	58.4%	57.8%	61.4%	
Home Based	49.4%	50.3%	47.6%	
Comparative Advantage	62.6%	64.1%	60.9%	
Intellectual Property	19.3%	20.4%	16.9%	
Employer Firm	38.3%	37.5%	39.9%	
Employment	1.858	1.772	2.105	
High Credit Score	12.0%	13.3%	8.9%	
Multi-Owner Firm	34.8%	33.6%	37.8%	
Startup Financing				
Owner Equity	28.2%	26.2%	32.8%	
Insider Equity	1.7%	1.3%	3.1%	
Outsider Equity	15.7%	18.0%	8.0%	
Owner Debt	4.2%	3.9%	5.3%	
Insider Debt	5.8%	5.1%	7.7%	
Outsider Debt	44.4%	45.4%	43.1%	
Total Startup Capital	$ 115,835	$ 122,983	$ 101,184	
Source: Kauffman Firm Survey Microdata				

	2004	2005	2006	2007	2008	2009
Appendix 2: Startup Capital and Subsequent New Financial Injections (2004-2009)						
Owner Equity	$ 32,612	$ 16,728	$ 12,858	$ 10,304	$ 10,218	$ 8,676
Insider Equity	$ 1,929	$ 1,539	$ 846	$ 577	$ 551	$ 833
Outsider Equity	$ 18,232	$ 20,097	$ 16,308	$ 11,522	$ 5,477	$ 10,371
Owner Debt	$ 4,884	$ 4,595	$ 4,058	$ 4,173	$ 4,675	$ 3,034
Insider Debt	$ 6,704	$ 5,847	$ 5,346	$ 4,815	$ 3,386	$ 10,118
Outsider Debt	$ 51,474	$ 47,430	$ 54,405	$ 73,480	$ 47,435	$ 75,605
Total Financial	$ 115,835	$ 96,235	$ 93,821	$ 104,870	$ 71,741	$ 108,636
Owner Equity	28.2%	17.4%	13.7%	9.8%	14.2%	8.0%
Insider Equity	1.7%	1.6%	0.9%	0.5%	0.8%	0.8%
Outsider Equity	15.7%	20.9%	17.4%	11.0%	7.6%	9.5%
Owner Debt	4.2%	4.8%	4.3%	4.0%	6.5%	2.8%
Insider Debt	5.8%	6.1%	5.7%	4.6%	4.7%	9.3%
Outsider Debt	44.4%	49.3%	58.0%	70.1%	66.1%	69.6%
Total Financial	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Source: KFS microdata						

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