Access to Capital among Young Firms, Minority-owned Firms, Women-owned Firms, and High-tech Firms

by

Alicia Robb, Marin Consulting, LLC
San Rafael, CA

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Executive Summary

This report examines access to capital by young and small businesses. The purpose of the investigation is to gain a better understanding of access to capital by young firms and how the recent economic and financial crisis has affected their access to financial capital, especially among firms owned by women and minorities and firms that are high tech in nature. In light of the key role in small business finance played by financial institutions, this study pays disproportionate attention to access to bank loans. Although these issues are important, research has traditionally been limited by a lack of appropriate data. A primary obstacle has been the absence of representative samples of small businesses that contain detailed descriptions of their access to financing. The primary source of data on this question, the Federal Reserve Survey of Small Business Finances, was discontinued in 2003, and is thus unavailable for studying the effects of the financial crisis on small businesses.

A second obstacle has been the tendency of researchers to analyze data on cross sections of small businesses of varying ages and sizes at a single point in time. While the findings from these snapshots have been valuable to scholars and policymakers, they have also been limited. Because they are static, these snapshots do not capture the ways in which small business financing unfolds over the life cycle of the firm and changes over time. This study attempts to overcome these obstacles by examining the effects of the changing financial environment generally and the economic crisis specifically, on access to capital by small businesses over the 2004 through 2010 period, controlling for business and owner characteristics. Analyses of small-firm capital access are based upon firm subsets drawn from the Kauffman Firm Survey.

Key findings of this study include the fact that firms owned by African Americans and Latinos utilize a different mix of equity and debt capital, relative to firms owned by nonminorities. Relying disproportionately upon owner equity investments and employing relatively less debt from outside sources (primarily banks), the average firm in these minority business subgroups operates

with substantially less capital overall – both at startup and in subsequent years – relative to their nonminority counterparts. Women-owned businesses exhibit some similar disparities in capital structure, relative to male-owned firms, in the sense of operating with much less capital, on average, and a somewhat different mix of debt and equity capital. Their reliance upon outside equity capital is particularly low. The initial disparities in the levels of startup capital by business owner race, ethnicity, and gender do not disappear in the subsequent years following startup.

The information asymmetry inherent with new and young firms is exacerbated in high technology industries due to the lack of tangible assets and their reliance on knowledge assets, as well as technical and market uncertainty. The information asymmetries associated with new firms in general, and high tech firms specifically, make traditional bank lenders less likely to lend to these firms. This report also examines financing patters of high tech firms.

This study will help government officials document significant racial and gender disparities in capital access, differences in lending patterns between high tech and non-high tech firms, and credit market conditions during the financial crisis. These results will help policymakers in developing policies to ensure optimal access to debt and equity capital among all small businesses, including during times of financial stress.

Background

Access to capital for small businesses is one of the biggest policy issues in the United States today. 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 creditworthy firms are able to secure adequate financial resources for growth and success. Ensuring that these firms have adequate access to financial capital enables them to continue to drive innovation, growth, and job creation in the U.S. economy.

The economics and finance literatures provide strong evidence that sufficient starting capital is a binding constraint for new firms. Entry into entrepreneurship increases with sudden increases 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, the 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 the size of their initial assets in starting a new business. So inequalities in personal wealth could translate into disparities in business creation and ownership.

We certainly see disparities in business ownership by race, ethnicity, and gender. The most recent statistics available from the Census Bureau come from the 2007 Survey of Business Owners (SBO). These data showed that women-owned firms made up 28.7 percent of the 27.1 million businesses in the United States, while minorities owned 21.3 percent of businesses. Clearly women and minorities are underrepresented in business ownership in this country, compared with white men. As the minority population continues to rise, it is more important than ever that these prospective business owners have the resources they need to launch successful firms. Financial capital is one such resource and previous research shows that much of the financial capital used to

start businesses comes from the owners themselves.

Yet estimates from the U.S. Census Bureau indicate that half of all Hispanic families have less than $13,375 in wealth, and half of all African-American families less than $8,650 (Table1). Wealth levels among non-minorities are much higher. African-American wealth levels are just 8 percent of non-minority wealth levels, and Hispanic wealth levels are just 12 percent of non-minority wealth levels. Only Asians have wealth levels similar to those of non-Hispanic Whites. Low levels of wealth and liquidity constraints can create substantial barriers to entry for would-be entrepreneurs because the owner's wealth can be invested directly in the business, used as collateral to obtain business loans, or used to acquire other businesses. Investors frequently require a substantial level of an owner's investment of his/her own capital as an incentive.

Table 1

Median Household Net Worth by Ethnicity/Race, 2004

	Median Net Worth	As a % of Non-minority
Total	$ 79,800	
Non-minority	$ 113,822	100%
Asian or Pac. Islander	$ 107,690	94.6%
Hispanic	$ 13,375	11.8%
African-American	$ 8,650	7.6%

Source: U.S. Census Bureau, Housing and Household Economic Statistics Division (2011).

Previous studies find that relatively low levels of wealth among Hispanics and African Americans contribute to these groups having lower business creation rates relative to their representation in the U.S. population. Fairlie (2006) found that differences in asset levels are the largest single factor explaining racial disparities in business creation rates. He found that lower levels of assets among African Americans account for more than 15 percent of the difference between the rates of business creation among Whites and Blacks. Fairlie (2006) also found that

differences in asset levels represented a major hindrance for business creation among Hispanics, while Fairlie and Woodruff (2009) studied the causes of low rates of business formation among Mexican-Americans in particular. An important factor that explains one-quarter of the business entry rate gap between Mexican-Americans and non-Hispanic Whites is asset levels.

Less research has focused on the related question of whether low levels of personal wealth and liquidity constraints also limit the ability of minority entrepreneurs to raise adequate levels of startup capital. Fairlie and Robb (2008) found that undercapitalized businesses had lower sales, profits, and employment, and were more likely to fail than businesses receiving optimal levels of startup capital. The common use of personal commitments to obtain business loans suggests that wealthier entrepreneurs may be able to negotiate better credit terms and obtain larger loans for their new businesses, possibly leading to more successful firms (Astebro and Berhardt (2003)). Cavalluzzo and Wolken (2005) also found that personal wealth, primarily through home ownership, decreases the probability of loan denials among existing business owners. If personal wealth is important for existing business owners in acquiring business loans then it may be even more important for entrepreneurs in acquiring startup loans.

Previous research indicates that the level of startup capital is a strong predictor of business success. (Bates (1997); Fairlie and Robb (2008)). Asian firms are found to have higher startup capital levels and resulting business outcomes (Fairlie and Robb (2008). As noted, their wealth levels are also on par with Whites. Therefore, I will focus on Blacks, Hispanics, and other non-Asians as one group, and compare them with Whites. I will also look at men and women separately.

Much of the recent research on the issue of discrimination in business lending uses data from various years of the Survey of Small Business Finances (SSBF). The main finding from this literature is that MBEs experience higher loan denial probabilities and pay higher interest rates than White-owned businesses even after controlling for differences in creditworthiness, and other

factors.[1] Cavalluzzo and Wolken (2005) found that while greater personal wealth is associated with a lower probability of denial, even after controlling for personal wealth, there remained a large difference in denial rates across demographic groups. African Americans, Hispanics, and Asians were all more likely to be denied credit, compared with Whites, even after controlling for a number of owner and firm characteristics, including credit history, credit score, and wealth. They also found that Hispanics and African Americans were more likely to pay higher interest rates on the loans they obtained. Using the 2003 SSBF, Blanchflower (2007) also found Asian-Americans, Hispanics and African Americans were more likely than Whites to be denied credit, even after controlling for creditworthiness and other factors.

Banks have historically provided new firms with crucial growth capital, and have played a substantial role in new firm formation and business expansion both in the United States and internationally (Ayyagari, Demirguc-Kunt and Maksimovic (2010); Beck, Demirgüç-Kunt and Maksimovic (2008); Kerr and Nanda (2009)); Robb and Robinson (2012)). Black and Strahan (2002) show that deregulation of interstate banking and loosening of branching restrictions fostered increased entrepreneurial activity.

In times of financial distress, however, bank lending may be curtailed, with decreased lending potentially reflecting a "flight to quality" (Caballero and Krishnamurthy, 2008). Such effects have been pronounced in the wake of events such as the failure of Lehman Brothers in 2008 (Ivashina and Scharfstein, 2010), and more generally, in response to recessions (Gertler and Gilchrist, 1994; Holmstrom and Tirole, 1997)). Moreover, the flight to quality is seen as having a

[1] Lloyd Blanchard, John Yinger and Bo Zhao,"Do Credit Market Barriers Exist for Minority and Women Entrepreneurs?," Syracuse University Working Paper (2004). Blanchflower, Levine and Zimmerman. Cavalluzzo, Cavalluzzo, and Wolken. Cavalluzzo and Wolken. Susan Coleman,"The Borrowing Experience of Black and Hispanic-Owned Small Firms: Evidence from the 1998 Survey of Small Business Finances," *The Academy of Entrepreneurship Journal 8*, (2002): 1-20. Susan Coleman, "Borrowing Patterns for Small Firms: A Comparison by Race and Ethnicity." *The Journal of Entrepreneurial Finance & Business Ventures* 7, (2003): 87-108. United States Small Business Administration, Office of Advocacy, *Availability of Financing to Small Firms using the Survey of Small Business Finances*, K. Mitchell and D.K. Pearce, (2004).

greater effect on firms more subject to agency problems and information opacity (Gertler and Gilchrist, 1994).

If banks do indeed avoid making riskier loans in times of financial crisis, then it stands to reason that firms that are *inherently* more risky—such as young firms and firms in industries characterized by greater technical or market uncertainty—might be most affected by such events. One important question that the literature has not addressed is how the lending response in a financial crisis affects the youngest firms in general, and in particular, whether there might be a disproportionate impact on the riskiest of these firms (e.g., those in high technology industries). I will investigate the financing constraints of high tech firms specifically, in addition to firms owned by women and minorities.

In previous work using the KFS data, Winston Smith (2011) 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 full population of firms, they are disproportionately likely to contribute to economic growth through employment, revenue, assets, and innovations. Hence, access to sufficient financial capital for these firms is paramount to our economic recovery.

Data and Univariate Statistics

In this study, I examine the financing patterns of young firms during their early years of existence. The data are from the Kauffman Firm Survey, a nationally representative cohort of businesses that began operations in 2004, which are followed over the 2004 to 2010 period. One item of note is that these data represent a cohort of firms that began in 2004; the data are not representative of all startups or all businesses in the United States. New businesses were defined as

having done one or more of the following activities in 2004 and not prior: (1) state unemployment insurance (UI) payments; (2) Federal Insurance Contributions Act (FICA) tax payments made for the first time in the targeted year for the classification of a new business; (3) filing for legal business status (sole proprietorship, general partnership, limited partnership, C corporation, subchapter S corporation, and limited liability company); (4) acquisition of an Employer Identification Number (EIN); and/or (5) use of an Internal Revenue Service Schedule C or C-EZ as part of the owner's income tax return. The sampling frame for the KFS was the Dun & Bradstreet (D&B) database and restricted to businesses (or enterprises) reported by D&B as having started in 2004. This database is a compilation of data from various sources, including credit bureaus and state offices that register new firms, as well as companies (e.g., credit card and shipping companies) that are likely to be used by all businesses.

The survey questionnaire covered a variety of topics, including business characteristics, strategy and innovation, business structure and benefits, financing, and demographics of the business owners. The KFS currently contains data on the baseline (calendar year 2004) and six follow up years (2005-2010). The method used for assigning owner demographics at the firm level was to define a primary owner. For firms with multiple owners (35 percent of the sample), the primary owner was designated by the largest equity share. In cases in which two or more owners had equal shares, hours worked and a series of other variables were used to create a rank ordering in order to define a primary owner. (For more information on this methodology, see Robb et al. 2009).

A public-use dataset is available for download from the Kauffman Foundation's web site and a more detailed confidential dataset is available to researchers through a secure, remote access data enclave provided by the National Opinion Research Center (NORC). For more details about how to access these data, please see www.kauffman.org/kfs. This report uses the confidential microdata.

While 2004, the year in which the KFS firms started, was pretty average in most respects, the KFS firms faced an economic crisis in their early years of operation that was anything but average. This crisis began affecting firms in 2008, but the impact of the crisis continued over the period 2008-2010. When asked to report if they applied and obtained loans or lines of credit and the reasons why these applications were not filed or were denied, access to credit seemed to be an issue for many firms. Unfortunately, the Kauffman Firm Survey only began asking questions about new loan applications, fear of denial, and loan application outcomes beginning in 2007. So there is only one year of data on these questions in the pre-crisis period. Because of this, I focus on the years 2007-2010 in the subsequent analysis. Thus, the firms analyzed are KFS businesses that began operations in 2004 and survived through 2007. I do show all seven years of data for financing patterns that are available.

As shown in Table 2, the 2007 means of various firm and owner characteristics of the sample are presented. The first column contains those owned by Whites, while the second column contains firms owned by owners that are Black/Hispanic/Other, not including Asians. The next two columns are female-owned and male-owned firms, respectively. The final column contains firms that are considered to be high tech or technology based firms.

Female-owned firms were slightly less likely to have high credit scores, compared with men. Blacks and Hispanics were much less likely than Whites to own firms with high credit scores with only 7 percent of minority-owned firms having a high credit score, compared with nearly double that for Whites (13.7 percent). High tech firms were the group with the highest proportion of firms with high credit scores (15.9 percent). This influences capital access, which will be discussed in the next section.

Table 2

Firm and Owner Characteristics of Kauffman Firm Survey Businesses					
Firm Characteristics	White	Black/ Hispanic	Female	Male	High Tech
High Credit Score	13.7%	7.2%	12.1%	13.6%	15.9%
Medium Credit Score	56.1%	52.8%	55.0%	55.2%	62.7%
Low Credit Score	30.1%	39.5%	32.6%	31.1%	21.1%
Incorporated	57.1%	51.1%	47.1%	60.9%	71.5%
Intellectual Property	19.9%	19.8%	18.7%	20.6%	37.5%
Product Offerings	51.2%	52.1%	50.7%	51.1%	52.0%
Team Ownership	31.6%	26.8%	29.4%	32.1%	37.1%
Home Based	50.9%	51.6%	51.7%	49.5%	51.6%
Owner Characteristics					
Net Wealth of $250K+ (2008)	45.4%	20.6%	41.1%	42.2%	52.4%
Ave Hours Worked (week)	42.7	43.5	40.1	44.3	44.3
Prev.Years of Industry Experience	12.8	11.6	9.5	13.7	16.1
Owner Age	45.8	42.8	45.1	45.3	44.9
Some College	36.3%	43.2%	40.8%	34.6%	22.6%
College Degree	32.7%	27.7%	29.4%	33.5%	34.5%
Graduate Degree+	18.2%	15.7%	19.7%	18.3%	36.9%
Previous Startup Experience	44.3%	38.1%	37.0%	45.8%	46.1%
Industry					
Manufacturing	5.6%	9.0%	6.1%	6.2%	10.4%
Wholesale	4.9%	6.3%	5.5%	5.0%	0.0%
Retail	14.0%	12.9%	16.8%	12.4%	0.0%
Transportation and Warehousing	2.6%	4.9%	2.3%	3.0%	0.0%
Finance, Insurance, Real Estate	14.0%	14.6%	12.5%	14.8%	13.4%
Professional Services	19.4%	17.9%	16.9%	20.2%	76.2%
Admin and Support, Health Care	12.7%	13.4%	16.8%	11.6%	0.0%
Arts, Entertain., & Recreation	4.8%	1.4%	4.5%	4.4%	0.0%
Other Services	11.2%	8.0%	13.4%	9.4%	0.0%
Sample size (surviving until atleast 2007)	2,086	326	637	1,900	357

There are quite a few differences across the race and gender groups in terms of firm and owner characteristics. Most notably, women-owned firms are less likely to be incorporated, compared with firms owned by men. Minorities follow a similar pattern, much lower, compared

with Whites. High tech firms are the most likely to be incorporated, to have intellectual property, and to have team ownership.

Women owners tend to have fewer years of industry experience, as well as startup experience, compared with men. Blacks and Hispanics have slightly lower average industry experience and education, and much less startup experience, compared with Whites. In addition, only about 20 percent of minorities have wealth levels of $250,000 or more, compared with more than 45 percent of Whites. Again, high tech firms had the highest shares of high net worth individuals, the highest education levels, and the highest levels of industry and startup experience.

Credit market experience also differs across racial and gender groups (Table 3). Women, Blacks, and Hispanics were less likely to apply for new loans than their male and White counterparts. High tech firms had the highest rate of new loan applications in 2007 (17 percent). Women were slightly more likely than men to say that they didn't apply for credit when they needed it at some point during the year because they feared their loan application would be denied. Black- and Hispanic owners were nearly three times as likely to have this fear, compared with White owners. Nearly one third of Black- and Hispanic owners stated they had this fear in 2007, and the percentage was even higher in the years of the financial crisis.

In terms of the outcomes of loan applications, we also see different patterns. Black- and Hispanic owned firms were much less likely to have their loans approved. Females had lower approval rates than men, except for 2007. We see the approval rates drop in the years of the financial crisis. High tech firms had initially much lower rates of approval for loan applications, but had higher than average rates of approval in subsequent years.

Table 3

Credit Market Experiences (2007-2010)						
2007	All	White	Black/ Hispanic	Female	Male	High Tech
New Loan Application	12.3%	12.9%	9.4%	9.9%	13.0%	17.0%
Did not Apply for Fear	15.7%	13.2%	31.3%	16.9%	15.3%	15.2%
Always Approved	70.9%	75.8%	31.5%	74.2%	70.1%	49.6%
2008	All	White	Black/ Hispanic	Female	Male	High Tech
New Loan Application	11.2%	11.0%	7.7%	8.1%	12.0%	11.1%
Did not Apply for Fear	18.9%	14.7%	39.3%	21.4%	17.0%	20.7%
Always Approved	61.9%	68.9%	29.7%	60.4%	65.2%	70.5%
2009	All	White	Black/ Hispanic	Female	Male	High Tech
New Loan Application	12.3%	12.1%	12.3%	10.6%	12.7%	16.4%
Did not Apply for Fear	21.4%	18.1%	40.0%	23.9%	20.2%	18.9%
Always Approved	60.6%	64.7%	32.7%	52.8%	62.9%	63.8%
2010	All	White	Black/ Hispanic	Female	Male	High Tech
New Loan Application	11.1%	11.0%	7.3%	8.0%	12.0%	10.5%
Did not Apply for Fear	19.2%	15.2%	38.8%	21.1%	17.8%	21.1%
Always Approved	60.7%	67.4%	28.2%	59.5%	63.2%	71.1%
Source: KFS Microdata						

Of course, these are univariate statistics and they do not control for differences in business quality, industry, managerial quality, etc. We will investigate this more fully in a multivariate framework. But first, let's take a look at the financing patterns of these businesses at startup and over time.

I follow the classification scheme from Robb and Robinson (2012) that distinguishes funding sources in terms of both their security type (debt vs. equity) and their source (personal accounts of the business owner(s) vs. friends and family vs. arm's length formal financial channels). This two-way classification scheme allows one to separate the issue of risk-bearing from that of

liquidity provision. For example, if an entrepreneur uses a home equity line of credit from a bank to finance a startup, the entrepreneur is bearing the risk of failure through a levered equity stake in the business, but the bank is providing liquidity to the business through a debt instrument to the entrepreneur. Because many startups are sole proprietorships, and many that are not are financed with personal guarantees and personal wealth as collateral, distinguishing risk-bearing from liquidity provision is important for understanding how startups are financed. The distinction between risk-bearing and liquidity provision is a direct consequence of the bank's ability to contractually sidestep limited liability through the use of the owner's personal assets as a guarantee.

Most theoretical treatments of capital structure explicitly or implicitly assume that limited liability implies that a borrower cannot claim more than the value of the business in question. However, empirical research on small business lending has shown that personal guarantees and personal collateral must often be posted to secure financing for startups (Moon 2009; Avery, Bostic, and Samalyk 1998; Mann 1998). This means that limited liability constraints can be contractually circumvented in the borrower/lender agreement with a bank by requiring the borrower to pledge personal assets that may exceed the value of the business if it fails. The fact that limited liability constraints can be circumvented in small business lending relationships implies that there is a critical distinction between liquidity provision and risk bearing in financing relationships.

The logic above suggests that a natural way to classify financing decisions is first to distinguish between type of security (i.e., equity vs. debt) and then also to distinguish capital according to its source (i.e., formal vs. informal). The justification for this stems from the fact that different providers of capital may have access to different enforcement technologies. For example, informal lenders, such as friends and family, may have little ability to seize collateral, and therefore the expected return to debt for them is low; this may lead them to prefer equity over debt.

Capital can be provided either by owners, insiders, or outsiders. The KFS is careful to distinguish owner equity from cash that a business owner obtained through, say, a home equity line, which in this classification scheme would be a source of outside debt, since it was provided through a formal contract with a lending institution. Informal financing channels include debt or equity from family members and personal affiliates of the firm, whereas formal financing channels include debt accessed through formal credit markets (banks, credit cards, and lines of credit) as well as venture capital and angel financing.

Thus, I group together personal debt on the business owner's household balance sheet with business bank loans, and I place these under the ``outside debt'' category. For much of the sample the distinction between personal and business debt is meaningless because the business is structured as a sole proprietorship. For the businesses organized as corporations and partnerships, no information is available about which firms relied on personal guarantees and the use of personal assets as collateral, but the work of Moon (2009), Avery, Bostic, and Samalyk (1998), Mann (1998), and others suggests that these channels are important. The primary distinction is not whether the debt is a claim on the business owner's household or business assets, but rather whether the debt was issued by an institution or by friends and family.

Table 4 describes the levels of financial capital invested in the startup year and for each year of observation. Just to be clear, in the years 2007-2010, these are new financial injections at each year in time. The levels of startup capital differ significantly across the groups. Blacks and Hispanics start their firms with about half the capital that Whites use. Women follow a similar pattern, starting their firms with a little over half of what men invest. These are large differences that persist over time; in fact, the disparities actually widened in some subsequent years.

High tech firms started with the highest levels of financial capital and were the most reliant on outsider equity (venture capital, angel investment, etc.). This pattern continued in the later years

as well. These firms invested the most financial capital and were the most reliant on outsider equity. They were less reliant on outsider debt, compared with firms on average, which is some evidence for banks preferring to fund less informationally opaque borrowers, especially during times of financial stress. This is consistent with findings from Robb and Seamans (2012) and Robb and Winston-Smith (2012).

Table 4

Financial Capital Investments (2004, 2007-2010)						
2004	All	White	Black/ Hispanic	Female	Male	High Tech
Owner Equity	$ 33,061	$ 33,099	$ 24,777	$24,556	$ 36,807	$ 29,667
Insider Equity	$ 2,055	$ 1,881	$ 1,049	$ 2,043	$ 1,880	$ 2,983
Outsider Equity	$ 15,509	$ 17,292	$ 1,070	$ 1,272	$ 22,293	$ 46,749
Owner Debt	$ 4,618	$ 5,131	$ 2,521	$ 3,650	$ 5,101	$ 6,367
Insider Debt	$ 6,437	$ 6,265	$ 4,362	$ 5,577	$ 6,975	$ 3,524
Outsider Debt	$ 50,031	$ 53,809	$ 24,907	$36,400	$ 57,110	$ 28,133
Total Financial Capital	$111,712	$117,477	$ 58,687	$73,500	$130,166	$ 117,424
2007						
Owner Equity	$ 10,280	$ 9,874	$ 6,758	$ 8,699	$ 10,801	$ 28,075
Insider Equity	$ 580	$ 532	$ 1,107	$ 271	$ 733	$ 2,688
Outsider Equity	$ 8,531	$ 9,814	$ 4,260	$ 2,205	$ 11,534	$ 23,575
Owner Debt	$ 4,219	$ 4,697	$ 2,314	$ 5,929	$ 3,602	$ 6,228
Insider Debt	$ 4,967	$ 6,014	$ 1,715	$ 1,294	$ 6,708	$ 3,500
Outsider Debt	$ 53,315	$ 57,411	$ 17,404	$34,695	$ 56,974	$ 36,226
Total Financial Capital	$ 81,892	$ 88,342	$ 33,557	$53,092	$ 90,352	$ 100,292
2008						
Owner Equity	$ 10,749	$ 9,683	$ 5,802	$ 6,499	$ 11,026	$ 29,307
Insider Equity	$ 549	$ 431	$ 1,519	$ 324	$ 668	$ 3,298
Outsider Equity	$ 5,591	$ 5,515	$ 5,874	$ 1,113	$ 7,592	$ 44,423
Owner Debt	$ 4,411	$ 4,180	$ 6,289	$ 4,255	$ 4,608	$ 6,934
Insider Debt	$ 3,354	$ 3,119	$ 2,851	$ 2,995	$ 3,123	$ 8,166
Outsider Debt	$ 47,525	$ 44,642	$ 19,329	$32,105	$ 46,742	$ 40,341
Total Financial Capital	$ 72,180	$ 67,571	$ 41,664	$47,291	$ 73,758	$ 132,471
2009						
Owner Equity	$ 8,416	$ 7,893	$ 6,102	$ 3,244	$ 9,908	$ 17,926
Insider Equity	$ 799	$ 358	$ 73	$ 113	$ 1,063	$ 93
Outsider Equity	$ 5,448	$ 5,681	$ 626	$ 1,690	$ 7,270	$ 37,244
Owner Debt	$ 2,850	$ 3,083	$ 1,916	$ 3,320	$ 2,705	$ 3,076
Insider Debt	$ 5,891	$ 5,447	$ 4,692	$ 2,706	$ 7,289	$ 10,466
Outsider Debt	$ 50,029	$ 50,000	$ 19,806	$14,992	$ 64,729	$ 49,293
Total Financial Capital	$ 73,432	$ 72,463	$ 33,214	$26,064	$ 92,964	$ 118,099
2010						
Owner Equity	$ 6,586	$ 6,214	$ 4,145	$ 4,855	$ 6,668	$ 5,616
Insider Equity	$ 1,467	$ 1,457	$ 155	$ 62	$ 1,696	$ 458
Outsider Equity	$ 10,338	$ 7,701	$ 2,265	$ 1,131	$ 9,382	$ 14,569
Owner Debt	$ 2,942	$ 3,068	$ 2,084	$ 3,072	$ 2,916	$ 1,380
Insider Debt	$ 5,893	$ 5,968	$ 2,878	$ 5,198	$ 6,085	$ 7,193
Outsider Debt	$ 45,633	$ 43,525	$ 20,153	$23,899	$ 46,503	$ 32,104
Total Financial Capital	$ 72,859	$ 67,934	$ 31,681	$38,217	$ 73,249	$ 61,321

In terms of the relative importance of the various sources of financing, we also see large differences by race and gender here. As shown in Table 5, Blacks and Hispanics were relatively more reliant than Whites on owner financing, and the same held true for subsequent financial injections. For women, however, the large disparity seems to be driven primarily by the lack of external equity, although women were slightly more reliant on owner financing than were men. High tech firms were most reliant on outsider equity and less reliant on the other sources, both at startup and in subsequent years.

Table 5

Distribution of Financial Capital Investments (2004, 2007-2010)						
2004	All	White	Black/ Hispanic	Female	Male	High Tech
Owner Equity	29.6%	28.2%	42.2%	33.4%	28.3%	25.3%
Insider Equity	1.8%	1.6%	1.8%	2.8%	1.4%	2.5%
Outsider Equity	13.9%	14.7%	1.8%	1.7%	17.1%	39.8%
Owner Debt	4.1%	4.4%	4.3%	5.0%	3.9%	5.4%
Insider Debt	5.8%	5.3%	7.4%	7.6%	5.4%	3.0%
Outsider Debt	44.8%	45.8%	42.4%	49.5%	43.9%	24.0%
Total Financial Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2007						
Owner Equity	12.6%	11.2%	20.1%	16.4%	12.0%	28.0%
Insider Equity	0.7%	0.6%	3.3%	0.5%	0.8%	2.7%
Outsider Equity	10.4%	11.1%	12.7%	4.2%	12.8%	23.5%
Owner Debt	5.2%	5.3%	6.9%	11.2%	4.0%	6.2%
Insider Debt	6.1%	6.8%	5.1%	2.4%	7.4%	3.5%
Outsider Debt	65.1%	65.0%	51.9%	65.3%	63.1%	36.1%
Total Financial Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2008						
Owner Equity	14.9%	14.3%	13.9%	13.7%	14.9%	22.1%
Insider Equity	0.8%	0.6%	3.6%	0.7%	0.9%	2.5%
Outsider Equity	7.7%	8.2%	14.1%	2.4%	10.3%	33.5%
Owner Debt	6.1%	6.2%	15.1%	9.0%	6.2%	5.2%
Insider Debt	4.6%	4.6%	6.8%	6.3%	4.2%	6.2%
Outsider Debt	65.8%	66.1%	46.4%	67.9%	63.4%	30.5%
Total Financial Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2009						
Owner Equity	11.5%	10.9%	18.4%	12.4%	10.7%	15.2%
Insider Equity	1.1%	0.5%	0.2%	0.4%	1.1%	0.1%
Outsider Equity	7.4%	7.8%	1.9%	6.5%	7.8%	31.5%
Owner Debt	3.9%	4.3%	5.8%	12.7%	2.9%	2.6%
Insider Debt	8.0%	7.5%	14.1%	10.4%	7.8%	8.9%
Outsider Debt	68.1%	69.0%	59.6%	57.5%	69.6%	41.7%
Total Financial Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
2010						
Owner Equity	9.0%	9.1%	13.1%	12.7%	9.1%	9.2%
Insider Equity	2.0%	2.1%	0.5%	0.2%	2.3%	0.7%
Outsider Equity	14.2%	11.3%	7.2%	3.0%	12.8%	23.8%
Owner Debt	4.0%	4.5%	6.6%	8.0%	4.0%	2.3%
Insider Debt	8.1%	8.8%	9.1%	13.6%	8.3%	11.7%
Outsider Debt	62.6%	64.1%	63.6%	62.5%	63.5%	52.4%
Total Financial Capital	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Multivariate Analysis

When looking at loan applications, application outcomes, fear of denial, and lending patterns, it is necessary to use a multivariate framework, as these actions are related to a number of factors. The models used here draw on standard assumptions in the banking literature (Gorton and Winton, 2003). The decision to apply for a bank loan in year *t* is modelled 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). The role of information asymmetry in mediating the loan application and approval process is also examined by using two 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). I use the Dun & Bradstreet credit score to define those in the top 20 percent of the credit score distribution as being highly creditworthy and then the next set of about 50 percent of firms designated as having medium creditworthiness. These are included as predictors 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.

I also follow a previous study that looks at the role of intellectual property in bank lending decisions (Winston Smith, 2011) and use a dummy variable to reflect a firm's use of intellectual property in terms of patents, trademarks, and copyrights. Finally, I include controls for firm and owner characteristics that have been shown in the previous literature to affect the likelihood of bank borrowing. Firm characteristics include credit score, a dummy for high tech, legal form of ownership, offering a product (vs. a service), and team ownership. Owner characteristics include race, ethnicity, gender, and age. I also include measures of the owner's human capital, including education, years of prior industry experience, and prior startup experience. Industry is controlled for

at the two-digit NAICS level, but not presented in the tables because of space constraints. Each year is run separately.

Loan app= $\alpha + \beta$(firm characteristics) + Ω(owner characteristics) + industry controls + ε (1)

Fear= $\alpha + \beta$(firm characteristics) + Ω(owner characteristics) + industry controls + ε (2)

Approval= $\alpha + \beta$(firm characteristics) + Ω(owner characteristics) + industry controls + ε (3)

Thus, to summarize, the empirical approach used in this report is to estimate separate maximum likelihood logistic regressions on the probability of applying for a loan, the probability of not applying for a loan when credit is needed for fear of having the loan application denied, and the probability of receiving a loan. Please see the appendix for variable definitions.

The first result that stands out is that the coefficient on the minority dummy (which includes Blacks, Hispanics, and business owners of other races (other than Asian)) is negative in all years and statistically significant in 2007 and 2008. This means that this group is less likely to apply for new loans, compared with their White counterparts. It appears that women were no more or less likely to apply for new loans than men, controlling for other factors. High tech firms were more likely to apply for loans than non-high tech firms in 2007-2009, but the difference was statistically significant only in 2007 and 2009.

In terms of important firm and owner characteristics, firms that were incorporated and firms with teams and owners with higher education levels were more likely to apply for new credit. Having intellectual property did not seem to play any role in loan applications. Being home based was associated with a lower likelihood of applying for a loan.

Table 6: New Loan Application(s)				
VARIABLES	2007	2008	2009	2010
Black/ Hispanic	-0.419*	-0.763***	-0.102	-0.482
	(0.242)	(0.281)	(0.267)	(0.315)
Asian	-0.731	-0.470	-0.585	0.431
	(0.464)	(0.498)	(0.439)	(0.400)
Female	-0.141	-0.0114	0.0866	-0.245
	(0.205)	(0.220)	(0.208)	(0.240)
High Tech	0.482*	0.327	0.507*	-0.0570
	(0.248)	(0.277)	(0.278)	(0.319)
High Credit Score	0.222	0.454*	0.320	0.870***
	(0.261)	(0.262)	(0.275)	(0.310)
Medium Credit Score	0.154	0.155	-0.0151	0.356
	(0.195)	(0.204)	(0.218)	(0.244)
Incorporated	0.580***	0.533***	0.902***	0.721***
	(0.191)	(0.204)	(0.225)	(0.243)
Intellectual Property	0.0140	0.0605	0.172	0.318
	(0.197)	(0.200)	(0.198)	(0.226)
Product Offering(s)	0.265	0.243	-0.105	-0.0108
	(0.191)	(0.187)	(0.205)	(0.219)
Home Based	-0.395**	-0.317*	-0.553***	-0.474**
	(0.164)	(0.183)	(0.191)	(0.208)
Hours Worked	0.00895***	0.00517	0.00581	0.00120
	(0.00346)	(0.00355)	(0.00405)	(0.00405)
Industry Experience	0.00721	0.0142	-0.00925	0.0120
	(0.00882)	(0.00920)	(0.00915)	(0.00969)
Age	0.0129	-0.0695	-0.0524	0.0369
	(0.0499)	(0.0522)	(0.0535)	(0.0622)
Team Ownership	0.216	0.602***	0.387**	0.100
	(0.174)	(0.173)	(0.187)	(0.204)
Age Squared	-0.000333	0.000477	0.000664	-0.000612
	(0.000520)	(0.000544)	(0.000558)	(0.000656)
Some College	0.589*	0.637**	0.242	-0.249
	(0.323)	(0.316)	(0.357)	(0.339)
College Degree	0.822**	0.700**	0.575	-0.0412
	(0.323)	(0.328)	(0.365)	(0.352)
Graduate Degree+	0.793**	0.658*	0.720*	0.162
	(0.340)	(0.359)	(0.392)	(0.381)
Startup Experience	0.0964	0.154	-0.110	-0.100
	(0.164)	(0.167)	(0.178)	(0.199)
Constant	-2.969**	-1.370	-1.781	-2.882*
	(1.227)	(1.270)	(1.316)	(1.535)
Observations	2,724	2,434	2,168	1,959
Excluded dummies: White, High School Degree or Less, Low Credit Score				
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				
2-digit NAICS industry controls included in regressions. Coefficients not shown.				

Perhaps more interesting is the next set of regressions. In this logistic model, the dependent variable is equal to one if the owner did not apply for credit at some point when he/she needed it for fear of having the loan application denied. This is the same wording of the question that was used in the various Surveys of Small Business Finances. In terms of credit constraints, we see clear evidence in the results from this model using the more recent Kauffman Firm Survey. In all four years, the coefficient on the minority dummy was positive and statistically significant, indicating that this group was more likely to fear having a loan denied than was their White counterpart group, even after controlling for other factors, such as creditworthiness, industry, legal form, etc. This is perhaps the clearest recent evidence of continued borrowing constraints for Black and Hispanic business owners in the United States. Women were also more likely than men to have this fear during the economic crisis. Although the coefficient was positive in all four years, there was no statistically significant difference in the pre-crisis year of 2007 for women. There was no difference between high tech and non-high tech firms in any of the years.

However, being creditworthy, as indicated by a high credit score, was associated with lower incidences of fearing a loan application would be denied. Interestingly, the main human capital variable that factored in was previous startup experience, which was actually positively associated with the fear. 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 and a greater fear of being denied.

Table 7: Did Not Apply for Credit When Needed for Fear of Having Loan Application Denied

VARIABLES	2007	2008	2009	2010
Black/ Hispanic	0.966***	1.101***	0.977***	1.123***
	(0.176)	(0.171)	(0.182)	(0.184)
Asian	-0.229	0.320	0.439	0.519*
	(0.366)	(0.338)	(0.310)	(0.315)
Female	0.237	0.316**	0.345**	0.346**
	(0.165)	(0.161)	(0.164)	(0.168)
High Tech	-0.163	0.240	-0.0313	0.253
	(0.254)	(0.240)	(0.239)	(0.233)
High Credit Score	-0.839***	-0.611**	-0.413	-0.295
	(0.272)	(0.257)	(0.256)	(0.261)
Medium Credit Score	-0.193	-0.123	-0.0523	-0.197
	(0.157)	(0.158)	(0.162)	(0.168)
Incorporated	0.206	0.296*	0.319*	0.390**
	(0.157)	(0.156)	(0.163)	(0.176)
Intellectual Property	-0.0275	0.0228	0.126	-0.0430
	(0.183)	(0.181)	(0.170)	(0.185)
Product Offering(s)	0.106	0.203	0.0986	-0.0263
	(0.170)	(0.162)	(0.160)	(0.168)
Home Based	-0.179	-0.0380	-0.0992	-0.182
	(0.150)	(0.149)	(0.151)	(0.159)
Hours Worked	0.0166***	0.0114***	0.0154***	0.00889***
	(0.00340)	(0.00303)	(0.00316)	(0.00317)
Industry Experience	-0.00434	-0.00245	-0.0174**	-0.0101
	(0.00808)	(0.00800)	(0.00759)	(0.00809)
Age	-0.0632	-0.0309	-0.00806	0.113**
	(0.0462)	(0.0467)	(0.0479)	(0.0560)
Team Ownership	-0.203	-0.538***	-0.229	-0.280
	(0.171)	(0.174)	(0.167)	(0.179)
Age Squared	0.000472	0.000152	1.64e-05	-0.00135**
	(0.000506)	(0.000508)	(0.000517)	(0.000616)
Some College	0.0969	0.264	-0.0138	0.264
	(0.240)	(0.242)	(0.240)	(0.253)
College Degree	-0.299	-0.101	-0.287	-0.0882
	(0.256)	(0.257)	(0.255)	(0.270)
Graduate Degree+	-0.218	0.0778	-0.224	-0.236
	(0.290)	(0.297)	(0.281)	(0.298)
Startup Experience	0.341**	0.251*	0.201	0.372**
	(0.145)	(0.146)	(0.144)	(0.150)
Constant	-0.538	-1.287	-1.456	-4.135***
	(1.099)	(1.111)	(1.129)	(1.328)
Observations	2,725	2,436	2,168	1,956

Excluded dummies: White, High School Degree or Less, Low Credit Score

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2-digit NAICS industry controls included in regressions. Coefficients not shown.

In terms of loan application outcomes, there is also strong evidence of credit constraints among Black- and Hispanic-owned businesses. Even after controlling for other factors, such as credit score, legal form, etc., the minority group made up of Black and Hispanic business owners was significantly less likely to have their loan applications approved, compared with their White counterparts. In fact, the magnitude increased dramatically over the period and through the crisis. Asians were not statistically different from Whites. Females were less likely to be approved in three of the four years, but the difference was statistically significant only in 2008. As expected, having a high credit score was positively correlated with having the loan application approved in three of the four years and was highly significant in 2008. The coefficient on high tech was negative in three of the four years, but it was never statistically significant in any of the years. The other results were mixed, but having intellectual property was negatively correlated with loan application approval in three of the four years, but was never statistically significant. Previous industry experience was positively associated with approval, but statistically significant only in one of the four years. Startup experience did factor in again in this model, being negatively associated with loan approvals in three of the four years and statistically significant in two of those three years.

Table 8: Loan Application(s) Always Approved				
VARIABLES	2007	2008	2009	2010
Black/ Hispanic	-1.403***	-1.669***	-1.923***	-2.799***
	(0.501)	(0.614)	(0.547)	(0.827)
Asian	1.063	-0.657	-0.640	-1.566**
	(0.932)	(0.820)	(0.871)	(0.689)
Female	-0.208	-1.117***	-0.253	0.0201
	(0.460)	(0.430)	(0.427)	(0.562)
High Tech	-0.895	-0.544	-0.209	0.206
	(0.591)	(0.549)	(0.598)	(0.906)
High Credit Score	0.702	1.834***	0.126	-0.209
	(0.614)	(0.611)	(0.556)	(0.656)
Medium Credit Score	-0.270	0.316	-0.550	0.635
	(0.405)	(0.431)	(0.450)	(0.544)
Incorporated	-0.429	-0.0319	0.140	-0.828
	(0.485)	(0.496)	(0.428)	(0.536)
Intellectual Property	-0.346	-0.403	-0.724*	0.0512
	(0.404)	(0.503)	(0.418)	(0.527)
Product Offering(s)	-0.0433	-0.107	-0.327	0.168
	(0.383)	(0.440)	(0.432)	(0.516)
Home Based	-0.103	0.605	-0.778*	-0.918*
	(0.427)	(0.427)	(0.401)	(0.487)
Hours Worked	-0.00893	-0.0160	0.00171	-0.00441
	(0.00865)	(0.00988)	(0.00764)	(0.00995)
Industry Experience	4.80e-05	0.0121	0.0282	0.0567**
	(0.0213)	(0.0210)	(0.0191)	(0.0276)
Age	0.0422	0.144	0.123	-0.182
	(0.149)	(0.145)	(0.149)	(0.238)
Team Ownership	-0.0356	0.148	0.0723	0.151
	(0.410)	(0.418)	(0.364)	(0.451)
Age Squared	2.45e-05	-0.000883	-0.00124	0.00240
	(0.00166)	(0.00161)	(0.00160)	(0.00285)
Some College	1.066	1.237*	0.490	0.296
	(0.683)	(0.659)	(0.712)	(0.730)
College Degree	1.089	0.650	-0.274	-0.0985
	(0.739)	(0.609)	(0.709)	(0.690)
Graduate Degree+	1.043	-0.133	0.199	0.292
	(0.859)	(0.683)	(0.685)	(0.809)
Startup Experience	-0.540	-0.793**	0.167	-1.123**
	(0.397)	(0.387)	(0.362)	(0.512)
Constant	-0.201	-3.587	-2.796	4.527
	(3.268)	(3.195)	(3.497)	(5.072)
Observations	676	568	415	208
Excluded dummies: White, High School Degree or Less, Low Credit Score				
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				
2-digit NAICS industry controls included in regressions. Coefficients not shown.				

The results from the model on not applying for credit when needed for fear of denial as well as the model on loan approval provide evidence that Black- and Hispanic-owned businesses face greater credit constraints at startup and on an ongoing basis than do their White and Asian counterparts. The last two sets of regressions look at the levels of financial capital and the ratio of outsider debt to total financing.

In terms of the levels of financial capital injected at each year, the results indicate that even when controlling for other factors, including credit score, we still generally find Blacks, Hispanics, and women using lower levels of financial capital at startup, but that these differences do not continue over time conditional on survival to that period. The coefficient on the minority dummy was negative and statistically significant in the startup year, but not in the years 2007-2010. The coefficient on female was generally negative, but statistically significant only in two of the four follow-up years. High tech firms were generally more likely to have higher levels of financial capital invested, but the difference was statistically significant only in two of the six years. Having a high credit score was positive and statistically significant at startup, but not for follow-up years. Being incorporated and having intellectual property were generally positively associated with higher levels of financial capital investments, as were average hours worked and offering a product (as compared with service offerings). Being home based was negatively associated with higher levels of financial capital.

So the evidence suggests that, after controlling for credit quality, industry, and other owner and firm characteristics, the racial and gender differences in levels of financial capital are generally not statistically significant in subsequent years with only a couple of exceptions. By the time we collected owner wealth in the dataset, it didn't appear to change our findings in terms of levels of financial capital invested.

Table 9: Log of Total Financial Capital Invested

VARIABLES	2004	2007	2008	2009	2009 w/ wealth	2010
High Wealth ($250K+)					0.0447	
					(0.297)	
Black/ Hispanic	-0.362**	0.0327	-0.182	-0.137	-0.0706	0.0779
	(0.162)	(0.341)	(0.356)	(0.388)	(0.417)	(0.373)
Asian	0.373	0.0292	0.194	0.444	0.348	0.414
	(0.265)	(0.634)	(0.656)	(0.645)	(0.691)	(0.646)
Female	-0.103	-0.520*	-0.216	-0.506*	-0.268	-0.0191
	(0.135)	(0.273)	(0.275)	(0.290)	(0.310)	(0.301)
High Tech	0.823***	0.465	0.785*	0.583	0.291	0.699
	(0.230)	(0.432)	(0.418)	(0.447)	(0.481)	(0.458)
High Credit Score	0.556***	0.216	0.0483	0.0459	-0.0729	0.145
	(0.138)	(0.264)	(0.274)	(0.290)	(0.308)	(0.296)
Medium Credit Score	-0.298	-0.161	-0.164	-0.0935	-0.0621	0.180
	(0.213)	(0.410)	(0.422)	(0.420)	(0.443)	(0.413)
Incorporated	0.753***	0.411	0.657**	1.050***	1.062***	0.866***
	(0.137)	(0.278)	(0.270)	(0.286)	(0.308)	(0.297)
Intellectual Property	0.0976	0.525*	0.502*	0.420	0.243	0.432
	(0.151)	(0.293)	(0.298)	(0.309)	(0.337)	(0.331)
Product Offering(s)	0.434***	0.990***	0.738***	0.859***	0.901***	0.597**
	(0.143)	(0.274)	(0.277)	(0.291)	(0.310)	(0.297)
Home Based	-0.820***	-0.389	-0.676**	-0.797***	-0.770***	-0.488*
	(0.137)	(0.253)	(0.265)	(0.278)	(0.298)	(0.283)
Hours Worked	0.0349***	0.0307***	0.0255***	0.0202***	0.0213***	0.0219***
	(0.00283)	(0.00520)	(0.00533)	(0.00566)	(0.00604)	(0.00571)
Industry Experience	-0.0316***	-0.00182	-0.00366	-0.00657	-0.0112	-0.00754
	(0.00670)	(0.0126)	(0.0126)	(0.0131)	(0.0140)	(0.0138)
Age	0.0550	-0.0732	-0.124*	0.0279	0.0585	0.0198
	(0.0365)	(0.0717)	(0.0736)	(0.0817)	(0.0879)	(0.0849)
Team Ownership	0.529***	0.425	0.0804	0.612**	0.411	0.487
	(0.146)	(0.299)	(0.292)	(0.311)	(0.337)	(0.323)
Age Squared	-0.000393	0.000810	0.00131*	-0.000179	-0.000469	2.83e-05
	(0.000398)	(0.000753)	(0.000775)	(0.000859)	(0.000925)	(0.000905)
Some College	-0.0136	0.207	0.151	0.771*	0.654	0.374
	(0.187)	(0.407)	(0.408)	(0.433)	(0.463)	(0.439)
College Degree	-0.111	0.135	0.0680	0.978**	0.899*	-0.122
	(0.207)	(0.427)	(0.430)	(0.448)	(0.482)	(0.463)
Graduate Degree+	0.108	0.372	-0.350	0.872*	0.761	-0.648
	(0.230)	(0.468)	(0.481)	(0.498)	(0.540)	(0.510)
Startup Experience	0.0398	0.549**	0.444*	0.0219	0.0885	0.429
	(0.125)	(0.240)	(0.246)	(0.260)	(0.277)	(0.271)
Constant	5.173***	6.297***	8.496***	2.949	2.355	2.445
	(0.884)	(1.776)	(1.816)	(2.014)	(2.163)	(2.053)
Observations	3,744	2,406	2,295	2,114	1,883	1,959
R-squared	0.173	0.088	0.074	0.087	0.074	0.065

Excluded dummies: White, High School Degree or Less, Low Credit Score

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2-digit NAICS industry controls included in regressions. Coefficients not shown.

In terms of the ratio of outsider debt to total financing, we continue to see racial and gender differences. Blacks and Hispanics have much lower ratios of outsider debt, so they are relying less on formal financing channels such as bank financing, even after controlling for other factors, most notably creditworthiness and wealth levels. There were not statistically significant differences for female ownership, compared with male ownership, although the coefficient was negative in all of the years. As we saw in the univariate statistics, women used much lower levels of financial capital, but weren't very different from men in terms of the share of the financing that came from outside debt financing. Thus, it's not too surprising that there were no significant differences after controlling for other factors.

Interestingly, high tech firms were actually more reliant on outsider debt, controlling for other factors. This was the case at startup and in subsequent years. High credit score mattered in the early years, but not so much in the latter years. Incorporated firms were more reliant on outsider debt, as were older owners that worked more hours. Home-based firms and firms with product offerings were less reliant on outsider debt. Other owner variables such as education and startup experience didn't play any role in the ratio of outsider debt to total financial capital invested. Firms with intellectual property were less reliant on outsider debt, again consistent with findings from Robb and Seamans (2012) and Robb and Winston-Smith (2012), who found that more complex and informationally opaque firms relied more on equity financing than debt financing.

These findings were also robust to including controls for growth expectations (available only in 2008) and additional controls for firm size, employment growth, and revenue growth.

Table 10: Ratio of Outsider Debt to Total Financial Capital Invested

VARIABLES	2004	2007	2008	2009	2009 w/ wealth	2010	2010 w/ wealth
High Wealth ($250K+)					0.0835***		0.137***
					(0.0309)		(0.0340)
Black/ Hispanic	-0.0622***	-0.100***	-0.117***	-0.122***	-0.127***	-0.136***	-0.110**
	(0.0151)	(0.0349)	(0.0347)	(0.0401)	(0.0426)	(0.0433)	(0.0448)
Asian	-0.00494	-0.00429	0.0832	-0.0884	-0.0823	-0.112	-0.0881
	(0.0337)	(0.0673)	(0.0703)	(0.0677)	(0.0703)	(0.0695)	(0.0696)
Female	-0.00543	-0.0331	-0.0219	-0.0453	-0.0501	-0.0376	-0.0563
	(0.0145)	(0.0307)	(0.0294)	(0.0327)	(0.0346)	(0.0351)	(0.0361)
High Tech	0.0695***	0.158***	0.109**	0.168***	0.138***	0.107**	0.117**
	(0.0233)	(0.0433)	(0.0427)	(0.0460)	(0.0498)	(0.0501)	(0.0527)
High Credit Score	0.0350***	0.0497*	0.0298	0.0382	0.0234	0.0279	0.0193
	(0.0136)	(0.0291)	(0.0291)	(0.0319)	(0.0333)	(0.0353)	(0.0370)
Medium Credit Score	-0.0550***	-0.0225	-0.0213	-0.00531	-0.00829	0.00171	0.000747
	(0.0185)	(0.0420)	(0.0422)	(0.0482)	(0.0504)	(0.0512)	(0.0546)
Incorporated	0.0452***	0.128***	0.143***	0.127***	0.113***	0.108***	0.0909**
	(0.0142)	(0.0300)	(0.0296)	(0.0317)	(0.0335)	(0.0350)	(0.0370)
Intellectual Property	-0.0198	-0.102***	-0.0597*	-0.0708**	-0.0938**	-0.0484	-0.0903**
	(0.0151)	(0.0307)	(0.0310)	(0.0340)	(0.0366)	(0.0363)	(0.0381)
Product Offering(s)	0.0239*	-0.0485*	-0.0468*	0.0207	0.00437	-0.0782**	-0.100***
	(0.0144)	(0.0293)	(0.0283)	(0.0310)	(0.0335)	(0.0332)	(0.0349)
Home Based	-0.0413***	-0.0392	-0.0442	-0.0144	-0.0298	-0.0815**	-0.0861**
	(0.0134)	(0.0269)	(0.0273)	(0.0293)	(0.0311)	(0.0337)	(0.0353)
Hours Worked	0.000593**	0.000921*	0.00115**	0.00106*	0.00165***	0.000441	0.000785
	(0.000268)	(0.000554)	(0.000553)	(0.000594)	(0.000628)	(0.000666)	(0.000701)
Industry Experience	-0.00105	-0.00256*	0.000732	-0.00103	-0.00196	0.000402	-0.000848
	(0.000684)	(0.00131)	(0.00133)	(0.00143)	(0.00147)	(0.00158)	(0.00161)
Age	0.00640*	0.0159**	0.0131*	0.0284***	0.0298***	0.0104	0.0111
	(0.00353)	(0.00720)	(0.00784)	(0.00818)	(0.00889)	(0.00959)	(0.0103)
Team Ownership	0.0167	-0.0157	0.0636**	0.0475	0.0320	0.0154	0.0152
	(0.0148)	(0.0308)	(0.0306)	(0.0319)	(0.0340)	(0.0347)	(0.0372)
Age Squared	-5.80e-05	-0.000167**	-0.000152*	-0.000338***	-0.000361***	-0.000161	-0.000181*
	(3.77e-05)	(7.41e-05)	(8.30e-05)	(8.47e-05)	(9.19e-05)	(0.000101)	(0.000109)
Some College	-0.00529	0.0585	0.0769*	-0.0182	-0.0138	-0.0231	-0.0362
	(0.0200)	(0.0396)	(0.0410)	(0.0508)	(0.0536)	(0.0543)	(0.0577)
College Degree	-0.0175	0.0338	0.0965**	-0.0316	-0.0518	0.00263	-0.0217
	(0.0215)	(0.0415)	(0.0425)	(0.0520)	(0.0552)	(0.0552)	(0.0590)
Graduate Degree+	0.00620	0.0147	0.0457	-0.0277	-0.0439	0.0220	-0.0153
	(0.0243)	(0.0459)	(0.0486)	(0.0558)	(0.0594)	(0.0598)	(0.0644)
Startup Experience	0.00681	0.00857	-0.0383	0.00995	0.0113	0.0113	0.0366
	(0.0130)	(0.0261)	(0.0261)	(0.0285)	(0.0301)	(0.0309)	(0.0321)
Constant	-0.00233	0.0943	0.0874	-0.133	-0.131	0.364	0.409
	(0.0850)	(0.181)	(0.190)	(0.202)	(0.223)	(0.242)	(0.259)
Observations	3,363	1,628	1,540	1,305	1,166	1,115	967
R-squared	0.054	0.091	0.122	0.120	0.137	0.097	0.143

Excluded dummies: White, High School Degree or Less, Low Credit Scor

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

2-digit NAICS industry controls included in regressions. Coefficients not shown.

CONCLUSION

Key findings of this study include the fact that firms owned by African Americans and Hispanics utilize a different mix of equity and debt capital, relative to firms owned by nonminorities. Relying disproportionately upon owner equity investments and employing relatively less debt from outside sources (primarily banks), the mean firm in these minority business subgroups operates with substantially less capital overall – both at startup and in subsequent years – relative to their nonminority counterparts. Women-owned businesses exhibit some similar disparities in capital structure, relative to male-owned firms, in the sense of operating with much less capital, on average, and a somewhat different mix of debt and equity capital. Their reliance upon outside equity capital is particularly low. The initial disparities in the levels of startup capital by gender do not disappear in the subsequent years following startup, but are generally explained in most years by differences in other firm characteristics.

The multivariate findings indicate that among new and young firms, women were no more or less likely to apply for new loans than men. However, minorities were less likely than their White counterparts to apply for new loans when their firms were in the early years of operation. The analysis also suggests that minority owners who did not apply for new loans were significantly more likely than their White counterparts to avoid applying for loans when needed because they were afraid that their loan applications would be declined by lenders. This is even after controlling for credit quality and a host of owner and firm characteristics. Women were also more likely than similar men not to apply for credit when it was needed for fear of having their loan application denied during the years of the economic crisis.

The analysis showed that women and minority business owners' fears of being declined for a loan were not necessarily unwarranted. In particular, in terms of loan application outcomes, even after controlling for such factors as industry, credit score, legal form, and human capital, minority

owners of young firms were significantly less likely to have their loan applications approved than were similar White business owners. Similarly, in 2008, women owners of new businesses were significantly less likely than men with similar credit profiles and legal forms of organization to be approved for loans. More generally, the results suggest that in the initial year of startup, Black- and Hispanic-owned businesses faced greater credit constraints than did their White and Asian counterparts. Similarly, women-owned businesses faced greater credit constraints than did similar startups owned by men during the years of the financial crisis.

In terms of the levels of financial capital, however, the evidence suggests that, after controlling for credit quality, industry, and other owner and firm characteristics, racial differences were generally not statistically significant, while in two of the years of observation, women used lower levels of financial capital. Finally, the results suggested that Blacks and Hispanics relied less than Whites on formal financing channels such as bank financing, even after controlling for creditworthiness and wealth levels. However, women-owned startups were not significantly different from those owned by men in terms of the share of their financing that came from outside debt financing.

As expected, high tech firms generally had higher levels of financial capital than their non-high tech counterparts. Surprisingly, however, they were actually more reliant on formal debt financing than were similar firms that were not high tech in nature. This was true both at startup and in subsequent years before and during the recent financial crisis. Having intellectual property however, was negatively associated with greater reliance on formal debt financing. This may indicate that the kinds of high tech firms that rely on patents, trademarks, and copyrights to protect their intellectual property are more informationally opaque and therefore less attractive as borrowers for bank financing, rather than just high tech firms more generally. Indeed, in three of

the four years the coefficient on intellectual property was negative in the equation for loan approvals and in two of those years the difference was statistically significant.

While this study is limited in that it is focused on one cohort of firms that began operations in 2004, it documents significant racial and gender disparities in capital access, as well as differences in financing patterns by high tech and non-high tech firms. It is hoped that these findings will help policymakers in developing policies to ensure optimal access to debt and equity capital among all small businesses, especially during tough economic times and among those that have been disadvantaged historically in financial markets.

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Appendix:Variable Definitions	
High Wealth ($250K+)	Net wealth of $250,000 or more in 2008
Minority	Primary owner is black, Hispanic, or non-Asian other race
Asian	Primary owner is Asian
Female	Primary owner is female
High Tech	Technology based firm
High Credit Score	Credit score in the 71-100th percentile
Medium Credit Score	Credit score in the 31-70th percentile
Incorporated	Firm is incorporated as a C, S, or limited liability corporation
Intellectual Property	Firm has one or more patents, trademarks, and/or copyrights
Product Offering(s)	Firm offers a product (versus a service, could offer both)
Home Based	Firm is based in the owner's home
Hours Worked	Average hours worked in a week by primary owner
Industry Experience	Previous years of industry experience
Age	Primary owner age
Team Ownership	Firm has two or more owners
Age Squared	Primary owner age squared
Some College	Primary owner has some college
College Degree	Primary owner has a college degree
Graduate Degree+	Primary owner has a graduate degree
Startup Experience	Primary owner has previous startup experience