

Financing High-Growth Women-Owned Enterprises: Evidence from the United States*

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Abstract

Prior research suggests that access to financial capital, a key resource input for growth-oriented firms, may be more of a challenge for women-owned firms than for men. In this study we use data from the Kauffman Firm Survey to examine gender differences in firm growth as well as financing patterns and credit market experiences for a large sample of U.S. firms that began operations in 2004 and were tracked from 2004 through 2011. Our findings revealed significant gender gaps in the amount of capital raised for both growth-oriented and non-growth firms, even controlling for credit risk, industry, and other firm and owner characteristics. In terms of source, women consistently used significantly lower levels of outsider equity as well as significantly lower levels of outside debt in some of the years surveyed. Women were also significantly less likely to apply for outside debt due to a fear of denial suggesting a higher unmet need for external capital on their part. Although high growth potential women-owned firms raised larger amounts of capital and more external equity than firms overall, they still raised lower levels than their male counterparts.

* All errors are the authors' responsibility. Certain data included herein are derived from the *Kauffman Firm Survey* release 4.0. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Women's Business Council, the U.S. Small Business Administration, or the Ewing Marion Kauffman Foundation. The authors would like to thank the National Women's Business Council for sponsoring this research (Contract # *SBAHQ-13-M-0213*).

Introduction

We examine factors affecting access to capital for high growth women-owned or women-led firms. Prior research suggests that significant gender differences in firm employment, size, and growth rates persist (Bitler et al., 2001; Fairlie & Robb, 2009; Coleman & Robb, 2009). Data from the United States Census Bureau indicate that less than 30% of businesses are owned by women and only 12% of those firms employ anyone other than the business owner are herself. Only 2 percent have 10 or more employees. Census data indicate that women-owned employer firms make up just 16% of employer firms and that only 2 percent of women-owned firms in the United States have revenues in excess of \$1 million. (*2007 Survey of Business*).

Some researchers attribute women's lower levels of participation in growth-oriented entrepreneurship to gender differences in key resource inputs in the areas of human, social, and financial capital (Carter et al., 1997; Coleman, 2007; Fairlie & Robb, 2009; Menzies et al., 2004; Orser et al., 2006; Robb & Wolken, 2002). Recent studies indicate that women-owned entrepreneurs raise smaller amounts of capital to finance their firms and are more reliant on personal rather than external sources of financing (Coleman & Robb, 2009; Coleman & Robb, 2010). Within the context of growth-oriented entrepreneurship, this distinction is important, because growth-oriented firms typically require substantial amounts of external capital in the form of both debt and equity. If women entrepreneurs do not seek, or if they are not able to obtain, external capital, their prospects for growing their firms are diminished considerably.

We examine issues relating to access to capital for women-owned firms with a particular focus on growth-oriented firms. To date, comparatively few studies have examined the financing issues and strategies of growth-oriented women-owned firms due to a lack of data. More recently, however, the Kauffman Firm Survey (KFS) has furnished a large data set on more than 4,000 U.S. firms launched in 2004. Data on these firms are collected annually to create a panel data set covering the years 2004-2011. This data set allows us to examine the financing behavior and patterns of growth-oriented women-owned firms over an eight-year timeframe. The KFS provides data on both owner and firm characteristics in addition to motivations, attitudes, perceived barriers, and sources of financing. This level of detail allows us to overcome some of the data limitations of earlier studies that have attempted to explore the theme of access to capital in women-owned firms. This study expands upon our understanding of this topic and should help in the development of policies directed toward supporting women entrepreneurs in their efforts to grow their firms.

Background

Women-owned firms represent an important segment of the business sector. According to estimates using the latest available data from the U.S. Census Bureau, there were nearly 9 million privately-held women-owned firms in the United States in 2012 (U.S. Census Bureau 2012). As shown in Table 1, these firms generated an estimated \$1.4 trillion in sales and employed 7.8 million people. Women-owned firms continue to comprise a minority of all firms (30%) and they continue to generate much smaller shares of revenues (3.8%), employment (6.2%), and payroll (4.3%). While their share in terms of the number of businesses continues to grow over time, their shares of employer firms, revenues, employment, and payroll have stagnated or even declined over the last two decades.

Table 1: Women-Owned Businesses

Women	1997	2002	2007	2012
Firms (Number)	5,417,034	6,489,483	7,793,425	8,943,038
Receipts (Millions of dollars)	\$818,669	\$940,775	\$1,192,781	\$1,358,187

Employer Firms (number)	846,780	916,768	911,285	956,116
Receipts (millions of dollars)	\$717,764	\$804,097	\$1,010,470	\$1,136,816
Employees (number)	7,076,081	7,146,229	7,587,020	7,780,716
Annual payroll (millions of dollars)	\$149,116	\$173,709	\$218,136	\$249,340

All

Firms (Number)	20,821,934	22,974,685	27,110,362	29,924,088
Receipts (Millions of dollars)	\$18,553,243	\$22,627,167	\$30,181,461	\$35,415,508
Employer Firms (number)	5,295,151	5,524,813	5,752,975	5,982,137
Receipts (millions of dollars)	\$17,907,940	\$21,859,758	\$29,208,766	\$34,292,981
Employees (number)	103,359,815	110,786,416	118,668,699	126,247,194
Annual payroll (millions of dollars)	\$2,936,493	\$3,813,488	\$4,886,977	\$5,829,470

Women as a Percentage of All

Firms	26.0%	28.2%	28.7%	29.9%
Receipts	4.4%	4.2%	4.0%	3.8%
Employer Firms	16.0%	16.6%	15.8%	16.0%
Receipts of Employer Firms	4.0%	3.7%	3.5%	3.3%
Employees	6.8%	6.5%	6.4%	6.2%
Annual Payroll	5.1%	4.6%	4.5%	4.3%

Source: 1997, 2002, and 2007 Surveys of Business Owners and Author Calculations.

An increasing number of studies have examined access to capital as a possible impediment to the growth of women-owned firms (Brush et al., 2001; Brush et al., 2004; Coleman & Robb, 2009). This study seeks to extend this line of inquiry by using data from the Kauffman Firm Survey. To our knowledge, this is the first study to explore issues relating to access to capital with a specific focus on growth-oriented women-owned firms using a large, longitudinal data set of U.S. firms.

Previous Research

Prior research has fairly consistently indicated that women-owned small businesses underperform businesses owned by men in measures of size and growth. Coleman (1999) used data on U.S. firms from the 1993 National Survey of Small Business Finances to find that women-owned firms were smaller than men-owned firms, were more likely to be organized as sole proprietorships, and were more likely to be in service lines of business. Bitler et al. (2001) had similar findings using data from the 1998 Survey of Small Business Finances. Coleman (2007) also used data from the 1998 SSBF to find that financial capital was a significant predictor of growth in women-owned firms.

Using data from the Census Bureau's Characteristics of Business Owners Survey, Fairlie and Robb (2009) found that women-owned firms were substantially smaller and less likely to hire employees than those owned by men. Coleman and Robb (2009) had similar findings using four years of data from the Kauffman Firm Survey. A relatively small percentage of women-owned firms are in rapid growth or high technology lines of business (Menzies et al., 2004; Morris et al., 2006). Recent studies suggest that women entrepreneurs are making gains in fields previously dominated by men (*National Women's Business Council 2012 Annual Report*), but there is still a significant gap in fields such as information technology, manufacturing, construction, and transportation (Hackler et al., 2008; *Developments in Women-owned Business, 1997-2007*, 2011). These gaps are important to understand because these industries provide fertile ground for both revenue generation and employment opportunities.

Qualities typically associated with innovation and high growth entrepreneurship include self-confidence and a willingness to assume risks that may accompany failure. Prior research attests to gender differences in both of these dimensions (Koellinger et al., 2008; Minniti, 2010). In terms of self-confidence, women are often seen, or even describe themselves, as less confident in their own abilities

than men (Allen et al., 2008; Catalyst, 2000). Similarly, prior research has often found that women lag men in the area of *self efficacy* or “the self-confidence that one has the necessary skills to succeed in creating a business” (Wilson et. al, 2007: 388). From the standpoint of risk aversion, a number of studies have similarly identified the fear of failure as a major impediment to the launch and growth of women-owned firms (Allen et al., 2008; Canizares & Garcia, 2010; Cliff, 1998; Sexton & Bowman-Upton, 1990; Watson & Newby, 2005).

A 2010 innovation survey in the United States sponsored by UNCTAD focused on gender differences. One interesting finding from the data was that women business owners had fewer failure experiences than men, which may suggest, women are more likely to take *calculated risks* and develop contingency plans if events do not transpire as anticipated (Coleman & Robb, 2012; Coleman & Robb 2014). Women and men business owners in the sample also exhibited different responses to failure experiences. Whereas both women and men responded that their own hard work was the major factor in recovering from a failure (43.9 per cent and 37.9 per cent), men were much more likely to attribute their recovery to self-confidence than women (33.3 per cent vs. 17.5 per cent). Consistent with prior research, women appear to rely more heavily on family support than men (7.9 per cent vs. 1.5 per cent). Women were also more willing to turn to external advisors (7.9 per cent vs. 4.5 per cent) to help them recover from a failure experience.

Taken together, much of this previous literature suggests that women are less likely to be involved in highly risky and innovative types of industries and activities. However, a new and growing stream of research contends that our definitions of innovation tend to be *gendered* and biased towards the types of industries (such as information technology and manufacturing) typically dominated by men (Blake & Hanson, 2005; Eriksson & Aromaa, 2012; Ranga & Etzkowitz, 2010; Sjogren & Lindberg, 2012). This contention is consistent with observations regarding the *gendered* nature of entrepreneurship in general. In reviewing a sample of 81 research articles, Ahl (2006: 595) found “a tendency to recreate the idea of women as being secondary to men and of women’s businesses being of less significance.” Similarly, Brush et al. (2009: 19) argued that, for women, context affects the ways in which the entrepreneurial process unfolds as well as the “growth prospects or even novelty of the venture.”

In terms of financing firms, regardless of whether they are high growth or lifestyle firms, previous studies reveal that women start their businesses with smaller amounts of capital and are less likely to raise capital from external sources (Coleman, 2000; Coleman & Robb, 2009; Constantinidis et al., 2006; Hadary, 2010; Orser et al., 2006; Fairlie & Robb, 2009; Robb & Wolken, 2002). In particular, women employ a much lower percentage of external equity capital to finance their firms (Coleman & Robb, 2009; Ibid, 2012). Some researchers attribute this discrepancy to lower levels of demand prompted by women entrepreneurs’ preference for less, or at least slower, rates of growth (Cliff, 1998; Morris et al., 2006; Orser & Hogarth-Scott, 2002). Others, however, find evidence of supply problems pointing out that networks providing access to external equity tend to be closely knit and male dominated (Brush et al., 2004). Taken together, these results from prior research indicate gender differences in financial strategies and structures persist, and there is a lower predilection for growth among women entrepreneurs. In light of that, one of our tasks in this study will be to identify the strategies and structures, or “best practices” that do, in fact, contribute to and enhance growth in entrepreneurial firms.

From a public policy perspective, nurturing high growth firms is important, because growth-oriented firms generate a larger number of jobs and create a greater economic impact (Tracy, 2011). A recent survey in the first quarter of 2014 of Inc. 500|5000 firms showed just how different financing strategies are for female founders and male founders of these high growth firms. Male founders were more than three times as likely as female founders to access equity financing through angels or VCs (14.4% versus 3.6%). Men were also more likely than women to tap networks of close friends (9.2% versus 1.8%) and business acquaintances (13.5% versus 5.4%). More than half of each (51.3% of men and 55.4% of women) used bank financing as a source of capital for their Inc. 5000 firm (Coleman and Robb, forthcoming).

Data and Research Methodology

The sample for this study is the pooled cross-sectional time series of more than 4,000 businesses in the Kauffman Firm Survey, a nationally representative survey of the cohort of businesses that started operations in 2004, followed over the 2004 to 2011 period. Detailed information on the sample and its construction is available at <http://sites.kauffman.org/kfs/>.

We are able to exploit rich information regarding the owner and firm characteristics, as well as detailed data on financing, motivation, and performance. The baseline survey of new businesses has been followed up with seven subsequent annual surveys to date in an ongoing effort to track new business trajectories (Ballou, Barton, Desroches, Potter, Reedy, Robb, Shane and Zhao 2008; Reedy and Robb 2009). Importantly, the most recent surveys spanned the financial shocks of 2008-2010, which began in the fourth year of operations for the firms in this survey. Thus, we are able to examine access to capital, financial strategies, and structures in women-owned firms in a relatively benign economy as well as in a much more challenging economy.

The method for assigning owner demographics at the firm level was to first 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 where two or more owners owned equal shares, hours worked and a series of other variables were used to create a rank ordering of owners in order to define a primary owner. (For more information on this methodology, see Robb et al., 2009). Firms with a female primary owner are classified as women-owned firms. All empirical analyses used sample weights provided that adjust for non-response and over-sampling of high-tech firms.

We first provide an overview of the firms in the KFS at the baseline year of 2004, comparing firms owned by men and women, and then comparing high growth potential firms owned by women with women-owned firms overall. In this analysis, high growth potential firms are those that have at least five employees by the end of the period. While this may seem relatively small, remember that out of around 25 million tax returns filed each year, only about 6 million businesses have any employees other than the owners themselves. A very small percentage of firms have more than five employees. As such, this was used to proxy for high growth potential (HGP).

We also created a subset of the largest HGP firms owned by women and by men as measured by employment in 2011, the end year of the survey. This group is called "Top 25". There are some interesting differences by gender in terms of the top ranking firms owned by men versus women. For example, by 2011, 40% of the top female ranked firms were solo-owners, compared with about 15% of top male ranked firms. Thus, 85% of the top ranked firms owned by men had team ownership, compared with just 60% of female owned firms. Similarly, there were dramatic differences, by gender, in firm size. The employment threshold for the Top 25 women-owned firms was 9 employees compared with more than 40 employees for firms owned by men. In fact, about half the top ranked women-owned firms had fewer than 15 employees, while none of the top male ranked firms had fewer than 40 employees and half had more than 65.

We considered another measure of high growth potential by using growth aspirations for the 2008-2011 period that respondents were asked about in a follow up survey. Our results revealed different realized growth rates compared to expected growth rates, which is interesting in its own right, but makes using growth aspirations as a proxy for high growth potential problematic. Nevertheless, when we examine differences in growth expectations and motivations by gender, our comparison provides valuable insights into both the demand and the supply of growth capital, particularly in the form of external equity financing, for women-owned firms.

First, in terms of expectations for growth, respondents were asked in 2009 how fast, if at all, they expected their firms to grow over the 2008-2011 period. In 2012, the growth over that period of time could actually be measured from the employment numbers provided for 2008 through 2011. While we

only have growth expectations for firms that survived through 2008, we can still see some striking gender differences in terms of expectations of growth. While nearly one quarter of males said they expected their firms to grow by at least 30% from 2008 to 2011, only 16% of women expected this rate of growth. About 38% of females expected to grow by less than 5% at most or even decrease for that timeframe. This compares with 35% of men. More than 46% of women expected their firms to grow by 5% to 29% over the period, compared with 41% of men.

Table 2: Growth Expectations and Actual Growth (2008-2011)

	2008-2011 Growth expectations		Actual growth for 2008-2011	
	Male	Female	Male	Female
Decrease	15.8%	13.5%	23.3%	22.4%
Not change or increase by less than 5%	19.4%	24.4%	22.1%	18.5%
Increase between 5-29%	40.7%	46.2%	1.8%	0.9%
Increase by 30% or more	24.1%	16.0%	52.9%	58.2%
	100%	100%	100%	100%

	Number of employees - Growth expectations		Number of employees - Actual growth	
	Male	Female	Male	Female
2004				
Decrease	1.9	1.7	1.9	1.3
Not change or increase by less than 5%	1.3	0.7	2.3	1.8
Increase between 5-29%	2.3	1.7	2.1	1.5
Increase by 30% or more	1.9	1.6	2.2	1.3
Total	2.0	1.4	2.2	1.3
2008				
Decrease	4.0	1.9	3.7	2.6
Not change or increase by less than 5%	2.2	2.2	6.8	2.8
Increase between 5-29%	4.6	2.6	6.9	2.6
Increase by 30% or more	6.1	3.9	3.6	2.6
Total	4.5	2.6	4.4	2.6
2011				
Decrease	5.1	2.4	3.0	1.9
Not change or increase by less than 5%	1.9	1.6	9.1	3.2
Increase between 5-29%	5.4	2.7	8.8	8.8
Increase by 30% or more	7.5	4.9	5.5	2.9
Total	5.3	2.8	5.9	2.8

Source: KFS microdata

When we compare actual employment growth rates over the 2008- 2011 timeframe, we see more than 58% of women-owned firms grew by 30% or more, compared with 53% of firms owned by men. Roughly 23% of males and 22% of females experienced a decrease in employment over the 2008-2011 period, while about 24% of men and 20% of women saw an increase in employment of 30% or less.

Regardless of expectations for growth or realized growth, however, female-owned firms were smaller than male-owned firms in terms of starting year employment, 2008 employment, or end year employment (2011). Thus, consistent with previous research, women-owned firms were smaller than those owned by men, as measured by revenues, employment, or assets. These gaps persisted even in those Top 25 women-owned firms that were the largest measured by employment.

Looking at just the high growth potential firms (HGPs) in the middle columns, women were of similar age as men, and very well educated. They had fewer years of previous industry experience, however, and were much less likely to have previous startup experience. In terms of firm characteristics, women-owned firms that were high growth potential had fewer employees, were less likely to be in high tech fields, and were less likely to have intellectual property than firms owned by men. They were also much less likely to have product offerings and much more likely to be home based. Finally, high growth potential women-owned firms were slightly less likely to be incorporated or to be owned by teams, and they had lower credit scores.

Our findings revealed some important differences in terms of how high growth potential firms compared with firms overall. HGPs were more likely to be owned by teams, to be in high tech industries, to be located outside of the home, to have higher credit scores, and to be incorporated. In addition, HGP owners had higher levels of education than owners of firms on average. The Top 25 firms in terms of employment were much more likely to have owners with previous startup experience and more years of industry experience.

Table 3: Baseline Characteristics (2004)

Firm Characteristics	All		High Growth Potential		Top 25		
	All	Female	Male	Female	Male	Female	Male
Employment	1.74	1.13	2.06	3.76	6.28	5.29	19.96
High Tech	5.5%	2.6%	6.9%	5.1%	9.0%	4.9%	8.6%
Any Intellectual Property	19.5%	18.2%	19.9%	17.3%	27.1%	9.2%	44.5%
Product Offered	51.8%	54.8%	50.5%	37.1%	60.0%	46.6%	44.3%
Home Based	49.8%	50.9%	49.4%	32.7%	16.8%	16.0%	10.6%
Incorporated	57.8%	48.5%	62.0%	83.5%	87.1%	88.0%	97.0%
Team Ownership	30.1%	28.5%	30.8%	52.9%	57.8%	56.4%	58.5%
High Credit Score	8.5%	7.8%	8.8%	12.9%	20.1%	17.0%	7.0%
Medium Credit Score	49.0%	47.1%	50.0%	47.9%	57.0%	42.0%	76.0%
Low Credit Score	42.5%	45.2%	41.2%	39.3%	23.0%	41.0%	16.9%
Primary Owner Characteristics							
Hours Worked	42.2	40.2	43.1	42.3	56.1	39.8	48.1
Owner Age	44.9	44.8	44.9	42.7	44.1	45.7	46.3
Prev. Industry Exp.	11.7	8.9	12.9	10.4	14.5	11.9	16.8
Prev. Startup Exp.	42.7%	35.7%	45.9%	33.0%	48.2%	53.3%	63.5%
Some High School	2.0%	0.8%	2.6%	0.0%	0.5%	0.0%	0.0%
High School Grad or Less	13.6%	10.6%	15.3%	5.0%	7.6%	5.1%	0.7%
Some College	36.6%	42.7%	34.8%	30.3%	25.6%	31.8%	33.4%
College Grad	30.2%	28.1%	31.8%	45.1%	42.1%	53.8%	28.0%
Graduate Degree+	17.5%	18.1%	17.7%	19.7%	24.8%	9.3%	37.9%

Source: KFS microdata

We next examine the types of startup financial capital, both internal and external, that are employed by women-owned firms and how their amounts and sources of capital differ from those of firms owned by men. In addition, we examine how the sources of capital used by growth-oriented firms compare to those that are smaller, lifestyle businesses.

We follow Robb and Robinson (2013) and group financial capital into six main categories: 1) Owner Equity: Equity invested by the owner(s) of the firm; 2) Insider Equity: Equity invested by spouse(s) or parent(s) of the owner(s); 3) External Equity: Equity invested by informal investors, venture capitalists, other businesses, government, or other individuals, such as angel investors; 4) Owner Debt: Owner loans to the business, personal credit cards in the name of the owner(s) used for business financing; 5) Insider Debt: Personal credit for the business provided to the owner from family, employees, and others and business credit provided by family of the owners, employees of the businesses; 6) External Debt: Business credit cards, personal bank loans, business bank loans, business credit lines, other business loans, business loans from the government, business loans from nonbank sources, other business loans from individuals and others. Thus, Total Financial Capital is the sum of all financing from the six categories: owner debt, owner equity, insider debt, insider equity, external debt, and external equity.

As shown in Table 4, women started their firms with about \$75,000 on average, compared with nearly \$135,000 for men. Women were slightly more reliant on owner equity and insider and outsider debt. The biggest difference was with regard to outside equity. Only 2 percent of the funding came from outside equity for women-owned firms, compared with 18 percent for men. This gap also occurred in both the HGP firms and the Top 25 firms ranked by employment. For women-owned firms the percentages were 6% and 9% respectively, while for men the percentages were 18% and 48%.

Overall, high growth potential firms started their businesses with about twice as much capital as non-growth businesses. HGPs were also more likely to rely on outsider financing, both debt and equity. Firms owned by men, growth or non growth, used far more capital than their female-owned business counterparts. While male-owned firms used nearly twice the amount of capital that female-owned firms did in the non-growth cases, they used more than twice the amount of capital that females did in the high growth potential cases. The financing gap between men and women was even larger for the Top 25 firms. Thus, women are relatively less capitalized than men, and even more so in HGP and Top 25 employer firms. This finding may partially explain our earlier results indicating that the male-owned Top 25 employer firms were much larger than the women-owned Top 25 employer firms.

Table 4: Startup Capital (2004)

	All	All		High Growth Potential		Top 25	
		Female	Male	Female	Male	Female	Male
Owner Equity	\$33,153	\$24,087	\$37,087	\$46,764	\$79,356	\$47,076	\$170,472
Insider Equity	\$2,106	\$1,901	\$2,022	\$930	\$4,808	\$1,835	\$-
Outsider Equity	\$16,619	\$1,450	\$23,794	\$8,868	\$56,037	\$19,664	\$611,814
Owner Debt	\$4,810	\$3,750	\$5,327	\$6,152	\$18,188	\$7,282	\$45,058
Insider Debt	\$6,699	\$5,994	\$7,160	\$12,169	\$16,199	\$19,130	\$45,408
Outsider Debt	\$51,847	\$37,871	\$59,010	\$73,379	\$144,731	\$116,077	\$407,121
Total Fin. Cap.	\$115,233	\$75,053	\$134,399	\$148,262	\$319,320	\$211,064	\$1,279,873
Outside Debt Ratio	19%	18%	19%	21%	28%	23%	16%

Source: KFS microdata

Table 4 summarizes financing patterns, which reflect outcomes rather than capital market experiences. The KFS does, however, include data that allows us to delve into financing demand and expectations. In terms of external equity, the Survey includes questions about outside equity applications for three years: 2009 through 2011. Specifically, respondents were asked if they did not apply for outside equity at some point when they wanted it because they felt they would be turned down. Between 4% and 5% of respondents, both women and men, indicated that was the case in each of the years.

While the KFS does not allow us to explore the demand of outside equity beyond that three-year period, we can examine the demand for credit for the 2007-2011 timeframe which includes the global financial crisis and Great Recession. As we see from Table 5, in terms of new loan applications, only about 10% of women-owned firms sought out new credit in the years from 2007-2009, compared with about 13% for men. The rates fell slightly for each in the 2010-2011 timeframe. In contrast, growth oriented firms were much more likely to seek credit than non-growth companies. For HGP firms, about 30% of male and female-owned firms sought out new credit for 2007-2009. For 2010-2011, however, the percentage dropped substantially more for women than for men. Due to small samples sizes, we won't spend too much time discussing the Top 25 firms, but it is noteworthy that, for that subset of HGP firms, women were actually more likely to apply for new loans in 2007 and 2008.

Table 5 reveals that women were more likely to be discouraged from applying for loans for fear of having their loan application denied, especially during the height of the financial crisis and Great Recession (2008-2010). During those years, fear of denial climbed markedly for women owners of HGPs while remaining relatively stable for their male counterparts. Table 5 also suggests that this fear was somewhat justified for women. In terms of loan approvals, they were much less likely to have their loans approved, especially for the largest or Top 25 firms. For both non growth and high growth potential firms, approval levels dropped for both men and women during the crisis years, but more so for women-owned firms.

Table 5: Credit Market Experiences (2007-2011)

	All		High Growth Potential		Top 25		
	All	Female	Male	Female	Male	Female	Male
New Loan Apps							
2007	12.3%	9.8%	13.3%	30.9%	29.5%	44.9%	25.8%
2008	12.6%	10.4%	13.6%	27.3%	28.1%	32.3%	24.8%
2009	12.0%	10.2%	12.5%	29.0%	29.2%	19.4%	40.4%
2010	11.2%	8.3%	11.9%	15.2%	26.1%	19.1%	36.0%
2011	10.5%	9.9%	10.8%	17.5%	23.6%	10.3%	48.2%
Did not Apply for Fear of Denial							
2007	15.9%	16.8%	15.6%	14.5%	15.6%	24.4%	0.8%
2008	19.2%	21.1%	18.2%	29.2%	19.2%	27.8%	25.9%
2009	20.5%	22.7%	19.4%	39.2%	18.7%	47.7%	8.6%
2010	18.6%	19.8%	17.3%	31.5%	15.0%	37.5%	18.6%
2011	18.0%	20.0%	17.1%	31.3%	17.6%	37.3%	0.7%
Always Approved							
2007	71.3%	74.0%	70.3%	68.4%	84.4%	51.0%	95.4%
2008	65.2%	56.7%	67.6%	47.6%	69.9%	59.8%	82.3%
2009	60.9%	54.9%	63.0%	37.1%	71.0%	*	81.8%

2010	61.3%	56.3%	64.4%	45.6%	74.3%	*	78.0%
2011	68.4%	58.6%	73.2%	56.3%	82.7%	*	92.7%

* Sample size too small

Source: KFS microdata

Multivariate Analysis

Our descriptive results revealed that women had lower credit scores than men. This prompted us to examine credit market experiences in a multivariate setting that would allow us to control for differences in factors that might influence those experiences. In particular, we employed a series of multivariate regressions to examine the determinants of financing patterns (outsider equity, outsider debt ratio) and credit market experiences (not applying for fear of denial, loan application outcome), by gender. For example, the model for outside debt ratio can be expressed as a function of the following characteristics:

$$\text{Outside Debt Ratio } (t)_j = \alpha + \beta_1 \text{Gender}_j + \beta_2 \text{Firm}_j + \beta_3 \text{Owner}_j + \text{CredRisk}(t)_j + e_j$$

where:

Firm is the vector of firm characteristics such as baseline employment, legal form, industry, product offering, and industry (2 digit NAICS level controls);

Owner is the vector of the entrepreneur's personal characteristics such as age, education, industry experience, startup experience, and team ownership;

Gender is a dummy variable equal to 1 if the primary owner is female; and

CreditRisk is a measure of the firm's creditworthiness, which also provides an indication of the firm's ability to raise external capital.

The dependent variables we examine are the following: log of total financial capital, the ratio of outside debt to total financial capital, the log of outsider equity, not applying for a loan when credit was needed due to a fear of having the loan application denied, and loan application(s) always approved. We run the multivariate regressions pooled with a gender dummy for each of these models for the whole sample. Results are presented in Tables 6-10.

The first multivariate regression looked at the log of total financial capital injected in each year. As shown in Table 6, the coefficient on female was negative in each of the eight years examined and was statistically significant in the years after startup and before the financial crisis (2005-2007). Thus, even after controlling for industry and other factors, women were still used less financial capital in the early and middle years of their firms' development. The coefficient on high growth potential was generally positive and was statistically significant in the last four years covered in the survey (2008-2011) indicating that growth-oriented firms raise larger amounts of capital. Other significant variables were previous startup experience (positively related), good credit scores (positive), incorporation (positive), product offerings (positive), home based (negative), employment (positive), and team ownership (positive).

In terms of outsider equity (venture capitalists, angel investors, business investors), Table 7 reveals that women-owned firms were less likely to rely on this source, even after controlling for industry, high growth potential, and a myriad of other factors. The coefficient on female ownership was negative and statistically significant in five of the eight years of observation. Higher education was generally positive and statistically significant, while startup experience was positively related and statistically

significant in three of the eight years of observation. Incorporation and intellectual property were positive and statistically significant in the early years of observation (the first three years for incorporation and the first five years for intellectual property). Employment and team ownership were also positive and statistically significant in many of the years, while the coefficient on high growth potential was mixed and only statistically significant in two of the years. It is interesting to note that during the years that encompassed the worst of the recession (2008-2009) and its immediate aftermath (2010-2011), very few of our variables were both significant and positive. This may reflect the relatively dire condition of the market for venture capital and external equity in general during that period of time.

Table 6: Regressions by year of Log of Total Financial Capital

	2004	2005	2006	2007	2008	2009	2010	2011
Female	-0.0380 (0.128)	-0.739*** (0.208)	-0.665*** (0.234)	-0.726*** (0.270)	-0.0734 (0.271)	-0.444 (0.288)	-0.0886 (0.312)	-0.0950 (0.314)
Some College	-0.0266 (0.182)	-0.0433 (0.306)	0.0252 (0.339)	0.223 (0.400)	0.246 (0.403)	0.833* (0.430)	0.553 (0.453)	0.698 (0.473)
Coll. Degree	-0.135 (0.200)	0.0614 (0.326)	-0.328 (0.358)	0.175 (0.420)	0.307 (0.424)	1.017** (0.443)	-0.0155 (0.474)	0.276 (0.502)
Grad Degree	0.0508 (0.224)	0.326 (0.360)	-0.0267 (0.394)	0.333 (0.459)	-0.228 (0.474)	1.178** (0.485)	-0.461 (0.522)	0.315 (0.546)
Startup Exp.	0.0961 (0.121)	0.402** (0.188)	0.530** (0.209)	0.394* (0.238)	0.560** (0.242)	0.160 (0.257)	0.458* (0.272)	0.407 (0.277)
Ind.Experience	-0.0320*** (0.00636)	-0.0221** (0.00927)	-0.0243** (0.0107)	-0.0127 (0.0122)	0.000483 (0.0123)	-0.0126 (0.0130)	-0.0151 (0.0140)	-0.0207 (0.0140)
Owner Age	0.0778** (0.0382)	0.0624 (0.0542)	0.0333 (0.0606)	-0.0678 (0.0727)	-0.104 (0.0737)	0.0570 (0.0797)	0.0722 (0.0868)	0.139* (0.0844)
Aqe squared	-0.000660 (0.000419)	-0.000623 (0.000576)	-0.000314 (0.000642)	0.000850 (0.000767)	0.00110 (0.000774)	-0.000435 (0.000839)	-0.000437 (0.000922)	-0.00124 (0.000900)
Hours worked	0.0305*** (0.00282)	0.0283*** (0.00411)	0.0271*** (0.00475)	0.0291*** (0.00519)	0.0264*** (0.00536)	0.0221*** (0.00561)	0.0202*** (0.00594)	0.0269*** (0.00585)
High Credit Score	0.722*** (0.254)	0.970*** (0.346)	0.541 (0.395)	0.783* (0.449)	0.904* (0.469)	0.371 (0.495)	0.390 (0.540)	0.428 (0.520)
Med. Credit Score	0.632*** (0.127)	0.666*** (0.195)	0.410* (0.218)	0.109 (0.250)	0.176 (0.258)	-0.00131 (0.266)	0.0822 (0.283)	0.176 (0.290)
Incorporated	0.642*** (0.131)	0.562*** (0.205)	0.690*** (0.230)	0.257 (0.269)	0.207 (0.267)	0.717** (0.282)	0.556* (0.299)	0.558* (0.302)
Intel. Property	0.0529 (0.145)	0.574*** (0.219)	0.224 (0.258)	0.430 (0.290)	0.285 (0.305)	0.178 (0.307)	0.430 (0.330)	0.336 (0.340)
Product	0.347** (0.139)	0.675*** (0.209)	0.775*** (0.229)	0.717*** (0.268)	0.548** (0.275)	0.827*** (0.289)	0.610** (0.296)	0.511* (0.307)
Home Based	-0.781*** (0.137)	-0.518** (0.206)	-0.453** (0.225)	-0.513** (0.262)	-0.631** (0.270)	-0.511* (0.279)	-0.237 (0.301)	0.242 (0.295)
Employment	0.0665*** (0.0188)	0.0691*** (0.0227)	0.0580*** (0.0213)	0.0276 (0.0336)	0.0541* (0.0284)	0.0866*** (0.0300)	0.0343 (0.0345)	0.0288 (0.0341)
Team Ownership	0.408*** (0.145)	0.511** (0.217)	0.188 (0.249)	0.280 (0.290)	0.0797 (0.293)	0.521* (0.306)	0.372 (0.333)	-0.0943 (0.328)
High Growth Pot.	0.344 (0.255)	0.540 (0.342)	-0.127 (0.393)	0.457 (0.419)	0.786* (0.428)	0.963** (0.417)	1.943*** (0.457)	1.960*** (0.443)
Constant	4.985*** (0.908)	3.800*** (1.299)	4.882*** (1.454)	6.600*** (1.764)	7.993*** (1.795)	2.085 (1.949)	0.732 (2.105)	-0.555 (2.063)

Observations	3,971	3,458	3,031	2,540	2,415	2,209	2,034	1,893
R-squared	0.173	0.123	0.087	0.083	0.082	0.100	0.087	0.091

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regressions by year of Log of Outsider Equity

	2004	2005	2006	2007	2008	2009	2010	2011
Female	-0.230*** (0.0817)	-0.192** (0.0776)	-0.0798 (0.0788)	-0.140*** (0.0530)	-0.122** (0.0502)	0.0879 (0.0806)	-0.0979* (0.0569)	0.00994 (0.0897)
Some College	0.194* (0.102)	0.173** (0.0725)	0.171* (0.0972)	-0.0253 (0.0671)	0.0898 (0.0606)	0.0623 (0.0596)	-0.000299 (0.0690)	0.0768 (0.0513)
Coll. Degree	0.0539 (0.115)	0.221** (0.0933)	0.150 (0.103)	0.127 (0.0785)	0.0316 (0.0593)	0.0892 (0.0675)	0.0347 (0.0946)	0.151** (0.0765)
Grad Degree	0.280* (0.154)	0.344*** (0.123)	0.418*** (0.153)	0.403*** (0.144)	0.231** (0.108)	0.0382 (0.0777)	0.0432 (0.122)	-0.0260 (0.0476)
Startup Exp.	0.125 (0.0870)	0.112 (0.0783)	0.0942 (0.0804)	0.0157 (0.0713)	0.132** (0.0596)	0.0956 (0.0745)	0.116* (0.0649)	0.183*** (0.0697)
Ind.Experience	-0.00877* (0.00459)	0.00303 (0.00443)	0.000715 (0.00438)	-0.000444 (0.00412)	-0.00118 (0.00383)	-0.00125 (0.00427)	-0.00555 (0.00345)	-0.00874** (0.00444)
Owner Age	0.0567*** (0.0207)	-0.00713 (0.0253)	-0.00393 (0.0202)	-0.0137 (0.0283)	0.00244 (0.0196)	0.0171 (0.0180)	0.00622 (0.0173)	0.000320 (0.0133)
Aqe squared	-0.00534** (0.000214)	8.30e-05 (0.000267)	6.93e-05 (0.000219)	0.000200 (0.000322)	-1.86e-05 (0.000202)	-0.000158 (0.000204)	-1.24e-05 (0.000168)	8.07e-05 (0.000156)
Hours worked	0.00145 (0.00178)	0.00455*** (0.00175)	0.000410 (0.00174)	0.00483** (0.00221)	-0.000994 (0.00136)	0.00167 (0.00252)	0.000777 (0.00135)	0.00250 (0.00236)
High Credit Score	-0.00116 (0.184)	-0.0197 (0.182)	0.0606 (0.181)	-0.273** (0.118)	-0.0363 (0.143)	-0.270*** (0.0794)	-0.264** (0.126)	-0.0945 (0.106)
Med Credit Score	0.00857 (0.0867)	-0.0196 (0.0800)	0.0284 (0.0819)	-0.0754 (0.0687)	-0.0210 (0.0606)	-0.0153 (0.0714)	-0.112 (0.0699)	0.0259 (0.0684)
Incorporated	0.450*** (0.0816)	0.200*** (0.0704)	0.219*** (0.0802)	0.0784 (0.0556)	0.0419 (0.0408)	0.0884 (0.0744)	0.0474 (0.0669)	0.0992 (0.0644)
Intel. Property	0.277** (0.118)	0.411*** (0.123)	0.283** (0.120)	0.173* (0.0997)	0.365*** (0.123)	0.184 (0.113)	0.123 (0.133)	0.00255 (0.0931)
Product	0.0195 (0.0971)	-0.0178 (0.0858)	0.0831 (0.0985)	0.146* (0.0853)	0.142* (0.0854)	-0.0306 (0.0723)	-0.0195 (0.0891)	-0.00360 (0.0824)
Home Based	-0.192** (0.0853)	-0.148* (0.0865)	-0.0468 (0.0784)	0.00600 (0.0787)	-0.0519 (0.0648)	-0.0673 (0.103)	-0.173*** (0.0592)	-0.0105 (0.0929)
Employment	0.0610*** (0.0167)	0.0428** (0.0214)	0.0293* (0.0171)	0.0180** (0.00917)	0.0271 (0.0202)	0.0449* (0.0237)	0.00288 (0.00848)	0.0120 (0.0109)
Team Ownership	0.226* (0.117)	0.236** (0.111)	0.242** (0.115)	0.222** (0.0960)	0.162* (0.0956)	-0.0840 (0.0935)	-0.0248 (0.0981)	-0.0440 (0.0916)
High Growth Pot.	0.345 (0.246)	-0.0635 (0.225)	-0.305* (0.169)	-0.0478 (0.153)	0.0894 (0.183)	-0.0573 (0.182)	0.505** (0.198)	0.193 (0.150)
Constant	-1.558*** (0.486)	-0.358 (0.593)	-0.167 (0.469)	-0.247 (0.555)	-0.104 (0.447)	-0.550 (0.489)	-0.129 (0.417)	-0.197 (0.356)
Observations	3,971	3,458	3,031	2,540	2,415	2,209	2,034	1,893
R-squared	0.074	0.059	0.039	0.055	0.056	0.051	0.053	0.037

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The next regression examined the ratio of outsider debt to total financial capital injected in each year (Table 8). Controlling for other factors, the coefficient on female ownership was negative in all years and statistically significant in the early years after startup (2005, 2006, and 2007) indicating that women were less reliant on external debt than men. In contrast, HGP firms were more likely to rely on outsider debt. The coefficient on this variable was positive in all years and statistically significant in six of the eight years observed. Industry experience typically had a negative impact on the percentage of external debt, while owner age was had a positive impact. Hours worked, good credit scores, incorporation, employment, and product offerings were also positively related with greater reliance on outsider debt. Conversely, intellectual property had a consistently negative coefficient as did the variable representing home based firms. If we relate these finding regarding the use of external debt to our Table 7 findings on the use of external equity, they suggest that firms with intellectual property tend to rely on the latter rather than the former. Table 7 revealed that the intellectual property variable was one of the few variables that was both positive and significant for five of the eight years surveyed.

Our next multivariate model examined experiences in the credit market. Table 9 indicates that women are more likely to not apply for credit when they need it because they fear their loan applications will be denied. The coefficient on female ownership was positive in all five years (2007-2011), and the difference was statistically significant in two of the five years (2009 and 2011). Previous startup experience was also positively related to having a fear of denial. Unfortunately, we do not know the outcomes of the previous startups. Thus, it is possible that these businesses owners had previous business failures that contributed to their fear of denial. The number of hours worked was positively related to fear of denial, suggesting that owners of less creditworthy firms were putting in more time in order to improve the firm's performance. Higher credit scores were negatively associated with having a fear of denial, as would be anticipated.

Table 8: Regressions by year of Outside Debt Ratio

	2004	2005	2006	2007	2008	2009	2010	2011
Female	-0.000426 (0.0131)	-0.0343** (0.0171)	-0.0447** (0.0201)	-0.0459** (0.0225)	-0.00379 (0.0223)	-0.0311 (0.0235)	-0.0188 (0.0254)	-0.0120 (0.0249)
Some College	-0.0167 (0.0184)	0.00826 (0.0234)	0.00660 (0.0289)	0.0534* (0.0311)	0.0638** (0.0315)	0.0359 (0.0357)	0.0151 (0.0370)	0.0531 (0.0369)
Coll. Degree	-0.0365* (0.0196)	0.00646 (0.0255)	-0.00239 (0.0304)	0.0205 (0.0325)	0.0707** (0.0327)	0.0246 (0.0367)	-0.00922 (0.0385)	0.0235 (0.0379)
Grad Degree	-0.0147 (0.0221)	-0.00571 (0.0277)	-0.0247 (0.0328)	0.00717 (0.0361)	-0.00610 (0.0361)	0.0211 (0.0401)	-0.0368 (0.0418)	-0.00115 (0.0408)
Startup Exp.	-0.00324 (0.0117)	0.00158 (0.0158)	-0.00291 (0.0182)	0.0243 (0.0202)	0.00552 (0.0208)	0.00448 (0.0218)	0.0237 (0.0223)	-0.0107 (0.0221)
Ind.Experience	-0.00147** (0.000604)	-0.00178** (0.00076)	-0.00190** (0.00092)	-0.00230** (0.00100)	0.000544 (0.00103)	-0.00128 (0.00107)	-0.000762 (0.00109)	0.000246 (0.00112)
Owner Age	0.00831*** (0.00301)	0.00885** (0.00434)	0.00977** (0.00493)	0.00105 (0.00560)	-0.000122 (0.00598)	0.0175*** (0.00575)	0.0120* (0.00663)	0.0167*** (0.00604)
Hours worked	0.000600** (0.000235)	0.00156*** (0.00033)	0.00181*** (0.00036)	0.00155*** (0.00041)	0.00169*** (0.00042)	0.00129*** (0.00044)	0.000904* (0.00046)	0.00153*** (0.000462)
High Credit Score	0.0809*** (0.0242)	0.0972*** (0.0310)	0.0103 (0.0331)	0.105*** (0.0393)	0.121*** (0.0413)	0.0839** (0.0410)	0.0672 (0.0455)	0.0703 (0.0434)
Med Credit Score	0.0460*** (0.0120)	0.0436*** (0.0161)	0.0156 (0.0188)	0.0248 (0.0210)	0.00923 (0.0216)	0.0248 (0.0220)	0.00693 (0.0231)	0.0370 (0.0230)
Incorporated	0.0340*** (0.0127)	0.0783*** (0.0167)	0.0671*** (0.0195)	0.0799*** (0.0222)	0.0782*** (0.0225)	0.0867*** (0.0230)	0.0781*** (0.0244)	0.0791*** (0.0250)

Intel. Property	-0.0243*	-0.0205	-0.0363*	-0.0424*	-0.0168	-0.0361	0.00341	-0.0241
	(0.0136)	(0.0187)	(0.0215)	(0.0243)	(0.0252)	(0.0265)	(0.0278)	(0.0267)
Product	0.0226*	0.0218	0.0279	0.00633	-0.00134	0.0638***	-0.0298	0.0132
	(0.0128)	(0.0172)	(0.0195)	(0.0218)	(0.0227)	(0.0237)	(0.0242)	(0.0243)
Home Based	-0.0256**	0.00359	-0.0360*	-0.0195	-0.0282	-0.0280	-0.0134	0.00873
	(0.0121)	(0.0169)	(0.0194)	(0.0214)	(0.0218)	(0.0230)	(0.0238)	(0.0245)
Employment	0.00631***	0.00441**	0.00535***	0.00282	0.00324	0.00165	-0.000682	-0.000956
	(0.00137)	(0.00210)	(0.00199)	(0.00258)	(0.00220)	(0.00222)	(0.00231)	(0.00236)
Team Ownership	0.0114	0.0241	-0.00363	-0.00541	0.0196	0.0412	0.0178	-0.0224
	(0.0136)	(0.0183)	(0.0208)	(0.0237)	(0.0248)	(0.0258)	(0.0271)	(0.0263)
High Growth Pot.	0.0321	0.0778**	0.0390	0.0633*	0.0966***	0.127***	0.201***	0.207***
	(0.0235)	(0.0307)	(0.0322)	(0.0350)	(0.0368)	(0.0364)	(0.0370)	(0.0355)
Constant	-0.0613	-0.0167	0.0933	0.235*	0.218	-0.195	-0.0595	-0.255*
	(0.0715)	(0.106)	(0.121)	(0.142)	(0.147)	(0.144)	(0.165)	(0.150)
Observations	3,971	3,458	3,031	2,540	2,415	2,209	2,034	1,893
R-squared	0.067	0.076	0.066	0.070	0.086	0.092	0.086	0.109

Standard errors in parentheses

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

Table 9:

Logistic Regression: Did not apply for credit when needed for fear of denial

	2007	2008	2009	2010	2011
Female	0.142	0.244	0.279*	0.194	0.379**
	(0.165)	(0.161)	(0.165)	(0.179)	(0.176)
Some College	0.142	0.266	0.0416	0.454*	0.201
	(0.240)	(0.237)	(0.239)	(0.272)	(0.264)
Coll. Degree	-0.245	-0.138	-0.219	0.0312	-0.155
	(0.256)	(0.253)	(0.253)	(0.287)	(0.279)
Grad Degree	-0.122	0.0929	-0.183	-0.0766	-0.445
	(0.288)	(0.293)	(0.282)	(0.317)	(0.323)
Startup Exp.	0.339**	0.303**	0.173	0.262*	0.584***
	(0.141)	(0.146)	(0.143)	(0.157)	(0.156)
Ind.Experience	-0.00904	0.00140	-0.0166**	-0.0108	-0.00561
	(0.00805)	(0.00787)	(0.00750)	(0.00843)	(0.00880)
Owner Age	-0.0828*	-0.0348	-0.00934	0.113*	0.0337
	(0.0436)	(0.0460)	(0.0461)	(0.0600)	(0.0574)
Aqe squared	0.000697	0.000177	7.13e-05	-0.00135**	-0.000605
	(0.000471)	(0.000500)	(0.000494)	(0.000661)	(0.000634)
Hours worked	0.0152***	0.0130***	0.0159***	0.0105***	0.00843**
	(0.00342)	(0.00310)	(0.00316)	(0.00325)	(0.00343)
High Credit Score	-0.160	-0.509*	-0.585**	-0.315	-0.279
	(0.278)	(0.292)	(0.281)	(0.309)	(0.295)
Med Credit Score	-0.0682	-0.150	-0.00285	-0.111	-0.0570
	(0.147)	(0.148)	(0.150)	(0.164)	(0.163)
Incorporated	0.0936	0.130	0.162	0.354**	0.298
	(0.151)	(0.155)	(0.161)	(0.180)	(0.183)
Intel. Property	0.0390	0.106	0.145	0.0242	-0.0883
	(0.174)	(0.177)	(0.172)	(0.195)	(0.194)
Product	0.0329	0.202	0.118	0.0432	0.0590
	(0.165)	(0.160)	(0.161)	(0.178)	(0.173)
Home Based	-0.179	0.000231	-0.00581	-0.205	0.0549

	(0.158)	(0.157)	(0.157)	(0.174)	(0.178)
Employment	0.00337	0.00283	0.00537	-0.00638	0.00253
	(0.0139)	(0.0118)	(0.0127)	(0.0145)	(0.0176)
Team Ownership	-0.273	-0.415**	-0.105	-0.274	-0.174
	(0.166)	(0.173)	(0.166)	(0.193)	(0.190)
High Growth Pot.	-0.208	0.147	0.0779	-0.104	0.126
	(0.256)	(0.230)	(0.226)	(0.259)	(0.229)
Constant	-0.136	-1.390	-1.783	-4.449***	-2.392*
	(1.048)	(1.094)	(1.099)	(1.421)	(1.321)
Observations	2,443	2,223	2,060	1,879	1,886

Standard errors in parentheses

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

In terms of actual loan application outcomes (Table 10), we see that the coefficient on female ownership was negative in four of the five years of observation, but only statistically significant in 2008. This finding indicates that women were less likely to have their loans approved consistently. Industry experience was positively related to loan approval in four of the five years, but only statistically significant in the last two years of observation. Higher credit scores were generally associated with higher loan approvals, as was high growth potential, although the relationship was not statistically significant in all of the years observed. This set of regressions is conditional on the firms actually applying for credit. Thus, due to small sample sizes in the loan application outcome regressions, statistical power is more limited. In contrast, the earlier set of regressions on not applying for fear of denial shown in Table 9 included all firms in the sample.

Table 10
Logistic Regression: Loan Application(s) Always Approved

	2007	2008	2009	2010	2011
Female	0.0347 (0.480)	-0.925** (0.417)	-0.156 (0.450)	-0.612 (0.649)	-0.586 (0.492)
Some College	0.529 (0.581)	1.173* (0.676)	-0.183 (0.763)	-0.0237 (0.760)	-0.152 (0.835)
Coll. Degree	0.547 (0.569)	0.772 (0.629)	-0.512 (0.762)	-0.200 (0.715)	-1.092 (0.723)
Grad Degree	0.339 (0.656)	0.162 (0.693)	0.160 (0.803)	0.0706 (0.784)	-0.181 (0.956)
Startup Exp.	-0.299 (0.368)	-0.280 (0.361)	0.563 (0.365)	-0.614 (0.421)	-0.314 (0.487)
Ind.Experience	-0.0154 (0.0202)	0.0195 (0.0211)	0.0120 (0.0167)	0.0669*** (0.0245)	0.0608*** (0.0226)
Owner Age	0.0910 (0.129)	0.0956 (0.141)	0.185 (0.135)	-0.295 (0.216)	-0.0186 (0.192)
Aqe squared	-0.000538 (0.00143)	-0.000580 (0.00157)	-0.00181 (0.00145)	0.00343 (0.00251)	0.000216 (0.00214)
Hours worked	-0.00704 (0.00835)	-0.0202** (0.00882)	-0.000732 (0.00811)	-0.00619 (0.00997)	-0.0183* (0.0106)
High Credit Score	0.827 (0.630)	1.895*** (0.572)	0.646 (0.553)	0.844 (0.660)	0.0864 (0.768)
Med Credit Score	-0.491 (0.376)	0.308 (0.407)	0.0988 (0.394)	0.840* (0.437)	0.0191 (0.459)
Incorporated	-0.317 (0.415)	0.156 (0.467)	0.690 (0.441)	-0.429 (0.541)	-0.353 (0.529)
Intel. Property	-0.232 (0.419)	-0.342 (0.413)	-0.620 (0.409)	0.136 (0.488)	-0.0617 (0.500)
Product	0.0299 (0.344)	0.157 (0.375)	-0.202 (0.363)	-0.0388 (0.451)	0.0804 (0.445)
Home Based	0.00241 (0.376)	0.463 (0.391)	-0.933** (0.417)	-1.136** (0.459)	-0.168 (0.478)
Employment	-0.0111 (0.0175)	0.0232 (0.0369)	-0.0562** (0.0262)	-0.0355* (0.0181)	0.106 (0.0776)
Team Ownership	-0.0185 (0.420)	0.0537 (0.376)	-0.316 (0.372)	0.175 (0.465)	0.961* (0.531)
High Growth Pot.	0.974** (0.494)	-0.128 (0.469)	0.369 (0.420)	0.516 (0.488)	0.427 (0.481)
Constant	-1.245 (2.902)	-2.458 (3.097)	-3.785 (3.279)	6.889 (4.666)	2.084 (4.376)
Observations	306	289	262	207	205

Standard errors in parentheses

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

Conclusions

Growth-oriented firms generate jobs and economic impact, and female entrepreneurs are markedly unrepresented in this subset of firms. Data for the United States as a whole indicate that women's representation in business ownership has plateaued. In 2012, it is estimated that women owned just 30% of businesses in the United States and 16% of firms that had any employees other than the owner(s). Women-owned firms generated only about 4% of receipts and payroll, and employed 6.2% of the workforce. It is estimated that only about 2% of women-owned firms generate more than a million dollars, and there are less than one million women-owned firms in the entire country that have any employees other than the owner herself. These are striking statistics that suggest women entrepreneurs represent a large and untapped resource for generating jobs and high growth businesses.

Prior research suggests that access to financial capital, a key resource input for growth-oriented firms, may be more of a challenge for women-owned firms than for men. Our study examined gender differences in firm growth, as well as financing patterns and credit market experiences, for a large sample of U.S. companies that began operations in 2004 and were tracked over the period 2004 through 2011. Our analysis of this data sheds some light on factors related to the lower employment growth of women-owned firms. While women are on par with men in terms of educational levels, we know from previous research they are less likely to have degrees in the STEM fields. These fields tend to be a "nesting ground" for growth-oriented industries in areas such as technology, bioscience, and health care. Other factors associated with higher growth include previous industry experience, previous startup experience, team ownership, and hours worked. Women, on average, have lower levels of all of all of these attributes. Businesses that are in high tech industries and those having intellectual property are also more likely to be higher growth businesses. Women are less likely to own businesses with these characteristics. Being home based is negatively related to growth prospects, and women have much higher rates than men in owning businesses that are home based.

In terms of financial capital, we see large gender gaps in the amounts of financing across all firms, HGP firms, and even in a subset of the Top 25 firms ranked by employment. Overall, men start firms with nearly twice the capital that women do. Similarly, in HGP firms, men raise twice as much capital as women. For the Top 25 firms as measured by employment and gender, men use six times the amount of financing that women do. These discrepancies, which actually widen at the higher end of firm size spectrum, have implications for the growth trajectories of firms and appear to be one driver of the relatively smaller sizes of women-owned firms. Multivariate analyses revealed that women were injecting significantly lower levels of financial capital into their firms in multiple years, even after controlling for credit risk, industry, and a variety of other factors that influence the demand (and supply) of credit.

In terms of the mix of startup sources, women were more reliant on owner equity and insider financing than men. A very small fraction of funds come from outsider equity for firms owned by women, regardless of where they were on the size spectrum. Multivariate analysis confirmed that women used significantly lower levels of outsider equity, even after controlling for owner education and experience, credit scores, and firm characteristics such as industry, incorporation status, and size. The same held true for the ratio of outside debt to total financial capital injected. Women used a lower percentage of external debt in all years, and the difference was statistically significant in several of the years of observation.

In terms of credit market experiences, women had similar loan application rates as men, controlling for other variables. Nevertheless, our results suggests a greater unmet credit need among women, because women were more likely than men to not apply for credit when they needed it for fear of having their loan application denied. In terms of actual loan approvals, univariate statistics indicated lower rates of loan approval for women than for men for those that did apply. Multivariate analysis revealed a similar pattern, although the difference was statistically significant in only one out of five years. Positive drivers for loan approval rates were industry experience and credit scores, both measures where women ranked lower than men. Conversely, operating a home based business, which is more prevalent among women, was a negative driver for loan approval rates.

When we compare the top ranking female businesses by employment (Top 25) and those that had high growth potential (HGP) with women-owned firms overall, we see some striking differences. The Top 25 firms had more employees from the startup year onwards, they were more likely to be in high tech industries, they more likely to offer services (over products), and they were less likely to be home based. Top 25 firms were also much more likely to be incorporated, to be owned by teams, and to have higher credit scores. In terms of owner characteristics, Top 25 owners had more years of industry experience, and they were much more likely to have previous startup experience. From an educational standpoint, our results reveal that the Top 25 women owners were more likely to have a college degree than a graduate degree. This is a particularly interesting finding, because the reverse was true for the Top 25 male owners. In terms of financing, both Top 25 and HGP women-owned firms in general started with much more capital than firms overall. Nevertheless, these women-owned firms started with dramatically lower levels of capital than their male owned Top 25 and HGP counterparts. Similarly, growth-oriented women-owned firms used higher levels of outside equity, but again, much less than their male owned counterparts.

Our findings have highlighted a substantial financing gap between high growth potential firms owned by women and those owned by men. Since financing is one of the key inputs and resources required by a growth oriented firm, this financing gap is clearly related to the size gap between men- and women-owned businesses. In light of that, we conclude with several recommendations that will help to close the funding and size gaps for high growth potential women entrepreneurs. First, building the financial capabilities of women and ensuring access to bank financing and equity financing by venture capitalists and angel investors is paramount to having more high growth entrepreneurship by women. Second, encouraging greater participation by women on the financing and investing side might also be an avenue worth pursuing. Prior research documents the low level of representation of women as investors in angel investing and venture capital funds. A growing number of angel groups, such as Golden Seeds, Astia Angels, and the Pipeline Fellowship, are preparing women to become investors in this space. More is needed to overcome the gender imbalance on the funding side.

Other steps can also be taken to support high growth women's entrepreneurship in ways that will allow us to tap this greatly underutilized resource. This issue needs to be addressed on multiple fronts: 1) by offering more opportunities in industry that will give women the experience needed to pursue entrepreneurship, 2) by providing more opportunities to learn about starting and growing businesses, and 3) through exposure to successful female entrepreneurs who can share their stories and insights from their successes (and challenges). Family friendly policies that allow women the flexibility to work outside of their homes and schedule activities around family commitments might also encourage women to tackle higher growth opportunities.

Encouraging and facilitating team startups (men, women, and mixed) is another avenue to pursue given that our findings highlight the importance of team ownership in securing financial capital, particularly during the critical early years of the firm. There are an increasing number of organizations and events such as Startup Weekend Women's Edition, Startup Grind, Founder Fridays, and Co-Founder speed dating that serve as encouraging examples of ways to meet this need.

Programs that specifically target HGP women-owned firms have also shown considerable success. Astia and Springboard Enterprises are two programs that have built successful track records in helping scale women-owned companies by providing them access to equity financing, as well as business mentorship and training. Clearly more of these types of programs are needed if we are going to truly move the needle on high growth women's entrepreneurship.

References

- Anna, Alexandra L., Gaylen N. Chandler, Erik Jansen, and Neal P. Mero (1999). Women Business Owners in Traditional and Non-Traditional Industries. *Journal of Business Venturing* 15, 279-303.
- Ballou, Janice, Tom Barton, David DesRoches, Frank Potter, E.J. Reedy, Alicia Robb, Scott Shane, and Zhanyun Zhao. "The Kauffman Firm Survey: Results from the Baseline and First Follow-Up Surveys." Ewing Marion Kauffman Foundation, March 2008.
- Bitler, Marianne, Alicia M. Robb and John D. Wolken (2001, April). Financial Services Used by Small Businesses: Evidence from the 1998 Survey of Small Business Finances. *Federal Reserve Bulletin*, 183-204.
- Brush, Candida, Nancy Carter, Elizabeth Gatewood, Patricia Greene, and Myra Hart (2001). *The Diana Project: Women Business Owners and Equity Capital: The Myths Dispelled*. Kauffman Center for Entrepreneurial Leadership, Kansas City, Missouri.
- Ibid. (2004). *Gatekeepers of Venture Growth: A Diana Project Report on the Role and Participation of Women in the Venture Capital Industry*. Kansas City, Missouri: Kauffman Center for Entrepreneurial Leadership.
- Carter, Nancy, M., Mary Williams, and Paul D. Reynolds (1997). Discontinuance Among New Firms in Retail: The Influence of Initial Resources, Strategy, and Gender. *Journal of Business Venturing* 12, 125-145.
- Cliff, Jennifer E. (1998). Does One Size Fit All? Exploring the Relationship Between Attitudes Toward Growth, Gender, and Business Size. *Journal of Business Venturing* 13, 523-542.
- Coleman, Susan (1999). Sources of Small Business Capital: A Comparison of Men- and Women-Owned Small Businesses. *Journal of Applied Management and Entrepreneurship* 4 (2), 138-151.
- Ibid. (2000). Access to Capital and Terms of Credit: A Comparison of Men- and Women-Owned Businesses. *Journal of Small Business Management* 38 (3), 37-52.
- Ibid. (2007). The Role of Human and Financial Capital in the Profitability and Growth of Women-Owned Small Firms. *Journal of Small Business Management*, 45 (3), 303-319.
- Coleman, Susan and Alicia Robb (2009). A Comparison of New Firm Financing by Gender: Evidence from the Kauffman Firm Survey. *Small Business Economics*, 33, 397-411.
- Ibid. (2010). Financing Strategies of New Technology-based Firms: A Comparison of Women- and Men-Owned Firms. *Journal of Technology Management and Innovation* 5 (1), 30-50.
- Ibid. (2012a). Gender-based Performance Differences in the United States: Examining the Roles of Financial Capital and Motivations. In K.D. Hughes and J.E. Jennings (Eds.) *Showcasing the Diversity of Women's Entrepreneurship Research*. New York: Edward Elgar, pp. 75-92.
- Ibid. (2012b). *A Rising Tide: Financing Strategies for Women-Owned Firms* (Stanford University Press).
- Ibid (forthcoming). *The Next Wave: Financing Strategies for High Growth Women-Owned Firms* (Stanford University Press).
- Constantinidis, Christina, Annie Cornet and Simona Asandei (2006). Financing of Women-Owned Ventures: The Impact of Gender and Other Owner- and Firm-Related Variables. *Venture Capital* 8 (2), 133-157.

Developments in Women-owned Business, 1997-2007 (2011, September). Retrieved from <http://www.sba.gov/advo> on 8/29/13.

Fairlie, Robert, and Alicia Robb (2009). Gender Differences in Business Performance: Evidence from the Characteristics of Business Owners Survey. *Small Business Economics*, 33 (375-395).

Hackler, Darrene, Ellen Harpel, and Heike Mayer (2008, April). Human Capital and Women's Business Ownership. Retrieved from <http://www.sba.gov/advo> on 7/25/13.

Hadary, Sharon (2010, October). *Launching Women-Owned Businesses on to a High Growth Trajectory*. Retrieved at <http://www.nwbc.gov> on 8/29/13.

Menzies, Teresa V., Monica Diochon, and Yvon Gasse (2004). Examining Venture-related Myths concerning Women Entrepreneurs. *Journal of Developmental Entrepreneurship* 9 (2), 89-107.

Morris, Michael, H., Nola N. Miyasaki, Craig E. Watters, and Susan M. Coombes (2006). The Dilemma of Growth: Understanding Venture Size Choices of Women Entrepreneurs. *Journal of Small Business Management* 44 (2), 221-244.

National Women's Business Council 2012 Annual Report. Retrieved at <http://www.nwbc.gov> on 8/29/13.

Orser, Barbara and Sandra Hogarth-Scott (2002). Opting for Growth: Gender Dimensions of Choosing Enterprise Development. *Canadian Journal of Administrative Sciences* 19 (3), 284-300.

Orser, Barbara J., A.L. Riding, & K. Manley (2006, September). Women Entrepreneurs and Financial Capital. *Entrepreneurship Theory and Practice*, 643-665.

Robb, Alicia and E.J. Reedy (2011). "An Overview of the Kauffman Firm Survey: Results from 2009 Business Activities." Ewing Marion Kauffman Foundation.

Robb, Alicia M. & John Wolken (2002). Firm, Owner, and Financing Characteristics: Differences between Female- and Male-owned Small Businesses. Federal Reserve Working Paper Series: 2002-18.

Tracy, Spencer L. Jr. (2011, July). *Accelerating Job Creation in America: The Promise of High-Impact Companies*. Retrieved from <http://www.sba.gov/advo> on 8/29/13.

2007 Survey of Business Owners. <http://www.census.gov/csd/sbo>.

2002 Survey of Business Owners. <http://www.census.gov/csd/sbo>.

1997 Survey of Business Owners. <http://www.census.gov/csd/sbo>.