

2010

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Course Release / Spring 2010

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Recommended Citation

Gai, Yunwei and Minniti, Maria, "Minority Business Start-Up, Survival and Financing in the U.S." (2010). *Babson Faculty Research Fund Working Papers*. Paper 66.

<http://digitalknowledge.babson.edu/bfrfwp/66>

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**BABSON
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**MINORITY BUSINESS START-UP, SURVIVAL
AND FINANCING IN THE U.S.**

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No. WP 1005 – SP 10 CR

BFRF WORKING PAPER SERIES

This research was supported by the
Babson Faculty Research Fund

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MINORITY BUSINESS START-UP, SURVIVAL AND FINANCING IN THE U.S.

Abstract

In spite of an overall increase in minority self-employment, the difference between the percent of self-employed black and white Americans is still striking (11.6% vs 3.8% respectively). We use the data from the Kaufman Foundation survey to examine whether the use of commercial financing has a different impact on the survival of black owned firms compared to that of other groups. Since the survival of a startup is largely determined by the owners' human capital, we use propensity score matching method to address the endogeneity problem, and panel data and survival models to account for the fact that survival rates change significantly with the age of the business. Our results suggest that the use of commercial financing reduces the exit rates of new firms regardless of the race of their owners but that the reduction is smaller for black owned businesses. We attribute this differential to unobserved heterogeneity probably linked to owners' startup capital.

JEL Codes: J15, M13, L26

Keywords: Minorities, Start-ups, Entrepreneurship, Commercial Financing

1. Introduction

In recent years, new and smaller businesses have been increasingly recognized as an important vehicle for the improvement of the social and economic status of minority and immigrant groups (Fairlie and Robb 2006). Several studies have shown that, because of constraints in formal labor markets, these groups often tend to concentrate on the creation of small businesses and, oftentimes, achieve remarkable levels of penetration and success. Within this context, black owned businesses in the United States show a somewhat different pattern.

Significant differences exist in entrepreneurial activities between ethnic groups. Specifically, it has been shown that minorities exhibit greater entrepreneurial behavior but the trends across ethnic/racial groups also change over time. Nevertheless, much remains unexplained about the function and impacts of different financing options on these new start-ups, and this information is important at a time when the relative size of these groups is increasing rapidly in the United States.

To address these issues, this project investigates what causes differences in the survival rate of entrepreneurial endeavor and new business creation between ethnic groups. In particular, we are interested in how different financing types and availability, such as commercial financing (including bank loans, trade credits, venture capital) and non-commercial financing (including personal credit card, borrowing from family members, friends and partners) affect the success of the business. Given the current financial crisis and tightening national and international credit markets, a better understanding of these issues has important implications for minority small business owners and policy makers, as well as for the country as a whole.

The paper is ordered as the following. In section 2, we review recent research and results in minority business start-up and survivability. In section 3, we discuss the empirical models used in this paper and the endogeneity problem in the model. In section 4, we focus on the data in this

study and provide summary statistics. In section 5, we analyze and discuss the empirical results. Section 6 is for conclusion and discussion.

2. Literature Review

The last 15 years have seen a significant increase in the participation of minorities in the U.S. labor force and, as a result, a rapid growth in the number of self-employed black, Hispanic, and Asian Americans relative to white Americans (Fairlie and Sundstrom, 1997; Fairlie, 2004). In spite of the increase in minority self-employment, the difference between the percent of self-employed blacks and whites is still striking. While approximately 11.6% of white workers are self-employed, only 3.8% of blacks are self-employed (U.S. Bureau of the Census 1993 and Fairlie, 1999). The three-to-one ratio in the self-employment rate holds for both men and women and for men has remained roughly constant over the past 80 years (Fairlie and Meyer, 2000). Other important studies on the connection between racial differences and self-employment patterns include Bates (2000), Borjas and Bronars (1989), Fairlie (1999, 2004), Fairlie and Meyer (1996), Hout and Rosen (2000), Light and Rosenstein (1995), and Meyer (1990). Despite different data sources, these works found remarkable regularity; black and Hispanic Americans are shown to exhibit lower rates of self-employment than other ethnic groups.

A number of theoretical and empirical models of self-employment and entrepreneurial behavior have emerged to explain this difference (see Parker (2004) for a detailed and comprehensive analysis of the decision to become self-employed). At the empirical level, several works have used individual level data to identify socio-economic characteristics of self-employed individuals such as age, education, work status, and income (among them Blanchflower, 2004; Evans and Leighton, 1989; Parker and Robson, 2004; Reynolds et al., 2003). Socio-economic characteristics have also been analyzed by looking at human and social capital (Davidsson and

Honig, 2003). In this area, of particular relevance are studies on the influence of formal and informal networks (Aldrich, 1999; Aldrich and Martinez, 2001), as well as works on the importance of role models (Wagner and Sternberg, 2004; Walstad and Kourilsky, 1998) for entrepreneurial decisions. Recent studies have complemented these works by adding explicitly the role played by perceptual variables on the decision to start a business (Arenius and Minniti, 2005; Koellinger et al. 2005).

Finally, some scholars have analyzed the role played by macroeconomic conditions and overall market environment (Borjas and Bronars (1989), Meyer (1990), Light and Rosenstein (1995), and Thurik et al., (2002)) on an individual's decision to start a business and shown that technology, level of economic development, culture, and institutions all influence the demand for entrepreneurship by providing start up opportunities.

Although large differences across races in variables such as age, education, work status, asset levels, and parental self-employment, are found to contribute somewhat to the differences in self-employment rates across racial groups, Fairlie and Meyer (1996) find that socio-economic characteristics explain only a small portion of the large gap between US racial groups and, in particular, between the rate of self-employment for black Americans and the average U.S. self-employment rate. What else then contributes to the observed differences in entrepreneurial involvement between black and white Americans?

Köllinger and Minniti (2006), for example, find that African Americans are more likely to *try* starting a business than whites, but they are significantly less likely than white Americans to actually start the business and own an established one that survives in the market beyond the initial start up process. Thus, their findings suggest that such a lack of participation in post-start-up business ownership among African Americans is not due to a lack of entrepreneurial propensity/preferences but, rather, due to the existence of barriers to resources and to higher

failure rates among minorities. External constraints such as discrimination in the lending market could be at the roots of the asymmetry.

This suggestion has some empirical support. In one of the most influential studies in small business financing, Bates and Timothy (1991) found that there is strong evidence of discrimination of lending by commercial banks. This finding is further confirmed by a recent study of Fairlie and Robb (2006), Blanchard et al (2005), Coleman (2002), Bitler et al (2001) and Mitchell and Pearce (2004). Compared to white start-up firms or established business owners, black and Hispanic firms have significant less start-up capital; they are more likely to be denied bank loans; they rely more on self-financing or borrowing from family members. Previous experience and perception also discourage their applications for bank loans. Less start-up capital can affect both the start-up decision and the performance of the new business. Blanchflower (1998) suggested that due to the lack of credit, many black businesses were not in operation. Holtz-Eakin et al (1994) found that an external shock: a sizeable inheritance substantially increased the probability of becoming an entrepreneur mainly through eliminating constraints of the start-up capital. Blanchflower and Oswald (1998) found similar results in UK. Astebro and Bernhardt (2003), Holtz-Eakin et al (1994), Avery et al (1998), and Bates (1990) found that firms with more capital were more likely to survive and succeed after controlling for other factors.

These studies, however, often do not distinguish between ethnic groups. Astebro and Bernhardt (2003) excluded minorities from the data. Holtz-Eakin et al (1994), and Avery et al (1998) did not include racial or ethnic information in their study. Bates (1990) found that high start-up capital was associated with higher survivability. However the focus of the study was male non-minority business. Cressy (1996), using a sample of 2,000 new firms in UK, found that the survival of a startup is largely determined by the owners' human capital. Banks provide loans to businesses most likely to succeed. Alternatively, business owners may self-select the types of

financing. Thus “the influence of finance on performance is nil and the correlation between finance and survival vanishes once human capital is controlled for.” However, minority firms or different ethnic groups are not accounted for in the study.

Thus empirical evidence is very limited on how different financing options and availability affect the performance and survival of minority small business. The direction and magnitude of the impacts can only be verified from empirical studies. For example, obtaining bank loans in theory promotes start-up, improves business performance by relaxing or eliminating financial constraints. The ability to secure bank loans is also an indicator of higher reputation and better track record. Self-financing and family financing may limit business owners’ financial capacity and their ability for expansion and investment. However, family members may have more information about the business prospect than banks and the financial support from them may be a sign of good business opportunity. They can negotiate a better deal with family members in payment plan and interest rate. When faced with financial crisis, they have more flexibility than their counter parties using commercial resources such as banks and venture capitals (Astebro and Bernhardt (2003)).

3. Data and Variables

We use the data from the Kaufman Foundation, which includes 4,928 new businesses that started operations in 2004. These businesses were interviewed in 2005, 2006, 2007 and 2008, and the interviews kept track of both business performance and financing options. In this project we focus on both single-owner and multiple-owner firms. Of the 4,928 firms, less than two percent (98 firms) has more than 5 owners. Because of its small sample size and unreliable information for the firm, they are not included in the study. Another 248 firms are deleted from the sample because of refusal in all the three follow-ups in 2006, 2007 and 2008.

Among the remaining 4,582 observations, 2,828 firms (61.75% of the sample) are single-owner firms in 2004. 1,259 firms (27.49% of the sample) are two-owner firms in 2004. The percentage remains stable over the sample. The other 10.76% are owned by three or more people.

One advantage of the Kaufman foundation data is the inclusion of owners' characteristics and firm related information. Many studies including Astebro and Bernhardt (2003), Cressy (1996), Coleman (2002) have found they have important impacts on the survival of the startups. The owner's social-economic and demographic information includes gender, age, education, race, previous working experience in related industries. For multiple-owner firms, we use the primary owner's information. The primary owner is defined as the owner with the largest equity share. When the share is equal, weekly hours spent in the business and other variables are used to define the primary owner. This is the same practice adopted in (Fairlie and Robb 2006) and (Fairlie and Robb 2009).

Firm related information includes financing resources and options available to the owner, firm location identified by four census regions (region1: Northeast; region2: Midwest; region3: South; region4: West), industry of the firm defined by two-digit NAICS codes, weekly hours spent by the owner, number of owners, and whether the firm holds intellectual properties such as patents, and copyrights. We now discuss in detail the firm and owner characteristics in our sample.

There is an extremely rich classification of financing options in the Kauffman survey data. Financing options can be categorized into the following six categories: 1) owner equity, 2) insider equity (including equity from spouse and parents), 3) outsider equity (from businesses, government, venture capitalists and other informal investors), 4) owner debt (including personal credit card debt, and personal owner loan), 5) insider debt (including loans and borrowings from family members), 6) outsider debt (including bank loans, business credit card, and other business and

government loans). Some categories have small sample sizes (186 observations for insider equity, and 223 for outsider equity). The sample sizes of different financing options become even smaller when they are subdivided by races.

To overcome this problem certain aggregation is necessary. We group the financing options into the following two main categories based on whether external/commercial resources are used: external/commercial financing (including commercial bank loans; business credit card; financing from other financial institution such as venture capital or other business; trade credit with input suppliers) and non-commercial/internal financing (including own personal savings; personal loans from family members, spouse, friends and other individuals; and personal credit card).

This categorization of external/commercial finance is similar to the definition used in investment and finance literature (e.g. Beck and Demirguc-Kunt 2006). Although it is debatable whether business credit card should be put in this category, we argue that business credit card shares many features of commercial bank loan in terms of evaluating the business credit worthiness and debt based financing nature, as well as the reliance on commercial banks and financial institutions. The internal/non-commercial finance shares the common feature of relying heavily on personal credit and social networks such as family members, friends, employees and business partners. This category is similar to “other loans” defined in Astebro and Bernhardt (2003) and the “informal financing” in Zhang (2008).

In table 1 we list the summary statistics of the surveyed firms in 2004 (the base year), 2005, 2006 and 2007. The demographic variables include race, gender and age. Race is divided into three categories: white, black and other race (including Asian, American Indian, Native Hawaiian and Hispanic). The survey does not report individual ages directly; rather it is categorized as less than or equal to 34 (age34); between 34 and 44 (age44); between 45 and 54

(age54); and over 55 (age75). The socioeconomic variables include the owners' education and working experience. Education is divided into four groups: high school, some college, college education and beyond college education. Working experience is identified as years the owner has worked in the firm's industry. The business is divided into eight categories based on the two digit NAICS codes, a common practice in similar studies. The eight groups are construction, manufacturing, wholesale, retail, information, finance, professional services, personal services and other industries. Other business information includes the census region of the business, number of full time or part time employees, and the average number of hours the owner spent on the business weekly. The number of full time employees and part time employees ranges from zero to 15 or more, with majority of the firms having less than 2 full time or part time employees. The average number of weekly hours spent on a business is a categorical variable with value 1 meaning 1 to 19 hours; 2 for 20-35 hours; 3 for 36-45 hours; 4 meaning 46-55 hours; 5 for 56-65 hours and value 6 for 66 hours and over. This variable can either measure small business owners' efforts or whether this is a full time or part time venture. Working experience in related industry is measure by years and we further divide them into 5 categories: Exp1 (0 to 1 year of experience); Exp2 (2 to 5 years of experience); Exp3 (6 to 9 years of experience); Exp4 (10 to 19 years of experience); Exp5 (over 19 years).

The characteristics of survived business owners in term of age, gender, education and working experience are stable over the period, although the proportion of owners with higher education level, more years of experience and older age sees a small increase in later years. The industry composition of the firms is also stable across the sample period. The average number of hours per week owner worked at the business is in the range of 36 to 45 hours. The proportion of owners who work between 46 and 55 hours increases steadily from 15.5% in 2004 to 19.4% in 2007. As both theory and intuition will suggest, the average number of full-time employees

increases from 0.963 in 2004 to 1.694 in 2006 and 1.485 in 2007; while the average number of part-time employees increase by a smaller magnitude from 0.433 to 0.779.

The proportion of different financing types changes over the sample period. From 2004 to 2007, the use of non-commercial financing decreased from 90.7% to 47.4%, a 43.3% decline; while the commercial financing increased slightly from 53.3% in 2004 to 53.9% in 2005. It decreased to 48.6% in 2007. The changes are uneven across subcategories. For commercial financing, the largest increase is for business credit card from 54% to 62.2% in 2005 and 58.9% in 2007; commercial bank loans declined from 53.7% in 2004 to 49.5% in 2007. As for non-commercial financing, the largest decline is using own savings and money from 80.6% to 27.7%. The implications from these changes can be complicated due to the endogenous nature of financing. On one hand, the use of commercial financing may increase the survivability of the firm; on the other hand, survived firms are likely to have higher credits and thus more likely to get loans or business credits. Survived firms can also have more capability to use own revenue to finance future development, thus eliminating the need for both commercial and non-commercial financing.

Table 1 Variable and Summary Statistics from 2004 to 2007

Category	Variable	2004 N=4582		2005 N=4220		2006 N =3827		2007 N=3378	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Race	White	0.823	0.381	0.827	0.378	0.830	0.376	0.833	0.373
	Black	0.082	0.274	0.079	0.270	0.078	0.268	0.076	0.265
	other	0.093	0.290	0.093	0.291	0.092	0.289	0.091	0.287
Age	age34	0.177	0.382	0.172	0.378	0.172	0.378	0.167	0.373
	age44	0.330	0.470	0.333	0.471	0.333	0.471	0.335	0.472
	age54	0.295	0.456	0.296	0.456	0.294	0.455	0.296	0.457
	age75	0.198	0.399	0.199	0.399	0.202	0.401	0.201	0.401
Gender	Female	0.263	0.441	0.258	0.438	0.255	0.436	0.247	0.432
	Male	0.737	0.441	0.742	0.438	0.745	0.436	0.753	0.432
Education	Highschool	0.126	0.332	0.126	0.331	0.122	0.328	0.122	0.327
	Somecollege	0.363	0.481	0.363	0.481	0.358	0.480	0.353	0.478
	College	0.246	0.430	0.242	0.428	0.244	0.429	0.243	0.429
	Graduate	0.265	0.442	0.269	0.444	0.276	0.447	0.282	0.450
Work Experience	Workexp	12.750	10.468	12.914	10.465	13.061	10.473	13.311	10.440
	Exp1(0-1)	0.132	0.338	0.127	0.332	0.122	0.328	0.117	0.322
	Exp2(2-5)	0.210	0.408	0.209	0.407	0.202	0.402	0.195	0.397
	Exp3(6-9)	0.101	0.302	0.099	0.299	0.103	0.304	0.102	0.303
	Exp4(10-19)	0.270	0.444	0.273	0.446	0.275	0.446	0.277	0.447
	Exp5(>19)	0.287	0.452	0.292	0.455	0.298	0.457	0.308	0.462
Industry	Construction	0.078	0.268	0.079	0.270	0.079	0.269	0.082	0.274
	Manufacture	0.140	0.347	0.143	0.350	0.145	0.352	0.149	0.356
	Wholesale	0.044	0.205	0.044	0.205	0.043	0.204	0.041	0.199
	Retail	0.108	0.310	0.105	0.307	0.100	0.300	0.097	0.297
	Information	0.034	0.181	0.033	0.178	0.033	0.179	0.033	0.180
	Finance	0.073	0.260	0.075	0.264	0.075	0.264	0.071	0.256
	Professional	0.249	0.432	0.248	0.432	0.254	0.435	0.260	0.439
	Personal	0.241	0.428	0.240	0.427	0.238	0.426	0.232	0.422
	Other	0.033	0.180	0.033	0.179	0.033	0.178	0.034	0.181
Commercial Financing		0.533	0.499	0.539	0.499	0.516	0.500	0.486	0.500
	Combank	0.537	0.499	0.511	0.500	0.498	0.500	0.495	0.500
	Bcredit	0.540	0.499	0.622	0.485	0.585	0.493	0.589	0.492
	Comother	0.057	0.232	0.052	0.221	0.049	0.216	0.043	0.203
	Trafin	0.232	0.422	0.267	0.442	0.261	0.439	0.257	0.437

		0.907	0.290	0.627	0.484	0.535	0.499	0.474	0.499
Non-Commercial Financing	Ownfin	0.806	0.396	0.447	0.497	0.339	0.473	0.277	0.447
	Percredit	0.729	0.445	0.640	0.480	0.576	0.494	0.573	0.495
	Famfin	0.610	0.488	0.433	0.496	0.375	0.484	0.340	0.474
	Othfin	0.031	0.173	0.021	0.145	0.015	0.123	0.012	0.109
Hours Worked Weekly	Workhour	3.443	1.701	3.433	1.654	3.363	1.655	3.339	1.638
	Hour1 (1-19)	0.165	0.371	0.164	0.371	0.175	0.380	0.178	0.382
	Hour2 (20-35)	0.198	0.398	0.182	0.386	0.188	0.390	0.184	0.388
	Hour3 (36-45)	0.148	0.355	0.155	0.362	0.155	0.362	0.159	0.365
	Hour4 (46-55)	0.155	0.362	0.178	0.382	0.189	0.392	0.194	0.395
	Hour5 (56-65)	0.187	0.390	0.197	0.398	0.170	0.376	0.173	0.378
	Hour6 (>= 66)	0.148	0.355	0.124	0.330	0.124	0.329	0.113	0.317
Full-Time Employees	N	0.963	2.319	1.545	3.084	1.694	3.291	1.485	3.094
	full1	0.677	0.468	0.568	0.495	0.551	0.497	0.620	0.485
	full2	0.145	0.352	0.173	0.378	0.171	0.376	0.137	0.344
	full3	0.071	0.257	0.087	0.282	0.093	0.290	0.073	0.261
Part-Time Employees	N	0.433	1.353	0.645	1.528	0.663	1.557	0.779	2.070
	part1	0.813	0.390	0.716	0.451	0.705	0.456	0.715	0.451
	part2	0.095	0.293	0.137	0.344	0.145	0.352	0.136	0.342
	part3	0.043	0.203	0.072	0.258	0.075	0.264	0.069	0.254
Census Region	region1:NE	0.132	0.338	0.143	0.350	0.147	0.354	0.154	0.361
	region2:MW	0.222	0.416	0.241	0.428	0.246	0.431	0.251	0.434
	region3:S	0.280	0.449	0.304	0.460	0.308	0.462	0.308	0.462
	region4:W	0.222	0.416	0.241	0.428	0.240	0.427	0.244	0.430
# of owner		1.527	0.820	1.713	3.113	1.781	3.726	1.825	4.137
Intellectual Property		0.183	0.387	0.191	0.393	0.199	0.399	0.203	0.402

In table 2 we list the pair-wise comparison of survival probability by race. For white business, 25.4% did not survive by the end of 2007. 7.5% of the business did not make it after the first year, with the percentage increasing each year. 68.3% black businesses survived by the end of 2007, making the overall failure rate for black business at 31.7%. The out-of-business rate is significantly different between black and white businesses in the overall sample period at 1% significance level. The failure rate between white and other races (mostly Asian and Hispanic) is 2.8% and it is only significant at 10% level for the entire sample period.

Table 2 pair-wise comparison of survival probability by race

Sample Period	White	Black	Difference		White	Other	Difference
2004-2007	0.254*** (0.007)	0.317*** (0.024)	-0.063*** (0.023)		0.254*** (0.007)	0.282*** (0.022)	-0.028* (0.022)
2004-2005	0.075*** (0.004)	0.109*** (0.016)	-0.034*** (0.014)		0.075*** (0.004)	0.077*** (0.013)	-0.002 (0.014)
2005-2006	0.090*** (0.005)	0.108*** (0.017)	-0.018 (0.017)		0.090*** (0.005)	0.107*** (0.015)	-0.017 (0.015)
2006-2007	0.114*** (0.006)	0.141*** (0.020)	-0.027* (0.019)		0.114*** (0.006)	0.128*** (0.017)	-0.015 (0.018)
* significant at 10% ** significant at 5% *** significant at 1%							
The significance of the difference is from lower tail t test. Standard errors are in the brackets.							

4. Research Design and Methodology

Studies in business survival typically use binary probit or logit model, where the probability of the survival of business is modeled as a function of various social-economic factors of the owner (age, gender, years of education, income, etc) and industry or business related variables (SIC industry code, average number of firms in the industry, legal structure of the firm, and firms' financing options etc.)

There are a couple of problems with this method. First, the data are typically cross-sectional at two time periods. For example, Astebro and Bernhardt (2003) used the 1987 and 1991 Characteristics of Business Owners (CBO) database to study firms' 4-year survival. Cressy (1996)

examined UK firms established in 1988 and their chances of survival in 1992. Bates and Robb (2008) included firms started in the 1986-1992 period and analyzed their survival probability in 1996. The sample in Bates (1990) is individuals who entered self-employment in the 1976 to 1982 period and was still in operation in 1986. A snapshot treatment of small start-ups ignores the fact that firms' survivability changes after the first year of operation. Furthermore, the OLS (or logit) regression does not take into consideration time varying covariates.

Second, the business survival data is right censored. We do not observe the status of the survived business after the sample period. Many firms will continue to operate. A simple OLS (or logit) regression of operation time (or survival probability) on business and owner attributes, ignoring continued operation of some firms, would underestimate survival probability and create biased estimates of the parameters.

A typical solution to these problems would be to adopt Cox proportional hazard models in the analysis. Following Máñez et al. (2006), Robb (2000) and Allison (1995) let $h(t | x_{it}) = h_0(t) \exp(x_{it} \beta)$ be the hazard function which describes the relationship between firms' survival (hazard rate) and time, and various business and individual attributes including the use of commercial financing. $h(t, x_{it})$ is referred as the hazard rate. It is the probability that a business will survive at time t given that it has survived up to time $t-1$. $h_0(t)$ is the baseline hazard rate. It is the hazard rate when all covariates are at zero. Alternatively, it is the hazard common to all observations purely because of the passage of time after controlling for all other factors. The Cox proportional hazard model is semi-parametric in the sense that the baseline hazard rate, $h_0(t)$, is left unspecified.

x_{it} are individual specific characteristics such as education (*Edu*), years of working experience (*Exp*), weekly hours spent in business (*Hour*), race (*Race*), age (*Age*), gender

(*Gender*), industry of the firm (*SIC*), whether the firm has intellectual property (*Intlp*), number of owners (*Numberowner*), census region of the business (*Region*), and commercial financing (*Comfin*) available at the time of interview. They can change over the sample period. The coefficients, β , measure proportional change in firms' survivability by a unit change in the relevant covariates. One concern of using the Cox proportional hazard model with a rather short time span is the sample size requirement. According to the sample size test in Cleves et al. (2008), to detect the impact of commercial financing with a power of 95% under our short time span, we need 514 failures and 1954 firms in the sample. Clearly, our sample satisfies the two requirements. We will address this problem in more detail in the results section.

To analyze whether the effect of commercial financing differs across racial groups, we include interaction terms between race and the dummy variable of whether a firm has used commercial financing. Since we have three racial categories (white, black and other) and two financing choices ("commercial resources" and "do not use commercial resources"), we have six interaction terms. We select the interaction between "white" and "do not use commercial financing" as the base group for comparison.

One problem of using survival model with interaction term in the model is the requirement of sufficient sample size within each racial group. Otherwise the power of the regression would be reduced and estimates would be unreliable. As an alternative we use the following logit model to accommodate both time variant variables and time invariant variables, thus utilizing the panel nature of the survey. More specifically, a firm's survival can be modeled as:

$$\begin{aligned} \text{logit}\{\text{Pr}(\text{survival}_{it} = 1 | d_{it}, X_{it})\} = & \\ & \beta_0 + \alpha_2 d_{2it} + \alpha_3 d_{3it} + \beta_1 \text{Edu}_i + \beta_2 \text{Exp}_i + \beta_3 \text{Race}_i + \beta_4 \text{Age}_i + \beta_5 \text{Gender}_i + \beta_6 \text{SIC}_i + \beta_7 \text{Intlp}_i + \beta_8 \text{Hour}_i \\ & + \beta_9 \text{Region} + \beta_{10} \text{Numberowner} + \beta_{11} \text{white} * \text{com}_{it} + \beta_{12} \text{black} * \text{com}_{it} + \beta_{13} \text{black} * \text{nocom}_{it} + \beta_{14} \text{other} * \text{com}_{it} \\ & + \beta_{14} \text{other} * \text{nocom}_{it} \end{aligned}$$

The first part of the model $\beta_0, \alpha_2 d_{2it}, \alpha_3 d_{3it}$ determines the baseline hazards, the hazards when all the other covariates are zero. They measure the odds of business survival purely because of the passage of time. The three periods in our sample are from 2004 to 2005, 2005 to 2006 and 2006 to 2007.

Our main interests are the coefficients for owners' characteristics (education, experience, weekly hours, race, age, gender), firm related variables (SIC, location, intellectual property, number of owners) and more importantly, financing options of the firm. We interact financing options with racial dummy variables to distinguish different impacts of commercial financing on businesses owned by white, black or other races. Same as the survival model, businesses of other races without commercial financing are used as the comparison group.

Instead of reporting hazard ratios or coefficients from the models, we use marginal effects of each covariate for easier interpretation and for easier comparison with the propensity matching estimator. The difference between the marginal effects of $black * com_{it}$ and $black * nocom_{it}$ measures the contribution of commercial financing on survival among black businesses. Other marginal effects can be derived similarly.

Another important problem one needs to address is the endogeneity problem of financing options in the survival function. As Cressy (1996) pointed out, the survival of a startup is largely determined by the owners' human capital. Banks provide loans to businesses most likely to succeed. Alternatively, business owners may self-select the types of financing. Thus "*the influence of finance on performance is nil and the correlation between finance and survival vanishes once human capital is controlled for.*" Similar questions were raised in Bates (1990). Although he found that human capital, especially education, is a major factor affecting firms' survival. The endogeneity problem of start-up capital and financing options remain a problem on evaluating the relative importance of human capital vs. financial inputs.

There has not been an ideal solution to the endogeneity/ reversed-causality problem in the literature. One recent study attempts to address this problem directly. Girma, Gorg and Eric (2007) studied the impact of government grant on firm survival in Ireland. As the authors pointed out, one option to correct for the endogeneity problem is to find appropriate instrumental variables that affect the probability of obtaining government grant (or commercial financing in this paper's context) but do not affect the survivability of firms directly. As one would expect, it is nearly impossible to find variables that fit this requirement. The authors instead used propensity score matching method. The general idea is to find matched counterparties who did not receive government grants, otherwise were similar in every respect to firms who did received grants. The average difference in survivability between the matched firms can be interpreted as the average effect of government grants on firms' survival. Similarly, Slottje, Millimet, and Buchanan (2007) use PSM to analyze the impact of copy right on firm values. One difference between the two studies is that the first one uses new matched panel sample to re-estimate a hazard model while the second one directly uses PSM estimator.

In our paper, we follow similar strategies by using propensity score matching method. Denote $Surv_{it}^1$ the probability of survival for firm i who used commercial financing at time t . Denote $Surv_{it}^0$ the probability of survival for the same firm *had it not used commercial financing*. Then the average effect of commercial financing on business survival can be estimated as:

$$E\{Surv_{it}^1 - Surv_{it}^0 \mid Commercial\ Financing=1\} = E\{Surv_{it}^1 \mid Commercial\ Financing=1\} - E\{Surv_{it}^0 \mid Commercial\ Financing=1\}$$

The first part of the equation, $E\{Surv_{it}^1 \mid Commercial\ Financing=1\}$, is observable in the data. The second part, $E\{Surv_{it}^0 \mid Commercial\ Financing=1\}$, is counterfactual outcome for the same firms that used commercial financing, *had they not used it*. This outcome is unobservable. To overcome this problem, one needs to match firms who used commercial financing at time t

with counterfactual firms without commercial financing at time t. The requirement for these counterfactual firms is that, based on observable characteristics, they have similar probabilities of using commercial financing as firms who used commercial financing. In particular, in the first stage of the model, we calculate the probability of using commercial financing at time t as a function of observable characteristics of firms and the owners:

$$\begin{aligned} \text{logit}\{\text{Pr}(Com_{it} = 1 | X_{it-1}) = \\ \beta_0 + \beta_1 Edu_i + \beta_2 Exp_i + \beta_3 Race_i + \beta_4 Age_i + \beta_5 Gender_i + \beta_6 SIC_i + \beta_7 Intlp_i + \beta_8 Hour_{it-1} \\ + \beta_9 Ftemp_{it-1} + \beta_{10} Ptemp_{it-1} + \beta_{11} Credrisk_{it-1}) \end{aligned}$$

Denote P_{it} the predicted probability of firm i using commercial financing at time t. This predicted probability is also called propensity score. It is a function of time invariant variables and lagged values of time variant variables. In addition to variables used in the survival model, we include two other sets of variables. One set is the number of full time and part time employees as a measurement of the size of the firm. More importantly, we include firms' business credit risk supplied from Dun & Bradstreet. Five credit risk classes are included in the model with one being the highest score in the range of 536 and 670; five being the lowest score in the range of 101 to 375. One important assumption in PSM is the conditional independence assumption, which states that having access to commercial financing should be fully determined by observable characteristics. Whether this assumption can be satisfied depends on the data available to researchers. In this paper, we observe detailed owner and firm related characteristics, especially the business credit risk. In fact, the logit model can correctly predict over 70% of the choice of commercial financing.

After propensity score are estimated, nearest neighbor matching or caliper matching can be used to match firms with commercial financing and the firms without commercial financing.

In nearest neighbor matching, a non-commercial financed firm is matched to a commercially financed firm if the absolute difference of propensity scores is the smallest among

all possible pairs. In caliper matching, a pair is found if the absolute difference of propensity scores is below a prespecified level.

After matched pairs are found at each time t , we can use the PSM estimator directly to measure the impact of commercial financing, a similar method in Slottje, Millimet, and Buchanan (2007):

$$E[Surv_{it}^1 | Commercial\ Financing=1, PScore, t] - E[Surv_{it}^0 | Commercial\ Financing=0, PScore, t]$$

Where Pscore is the estimated propensity score.

Alternatively, we can pool matched sample of each year to construct a new panel and re-estimate the survival model and logit model. Coefficients from the re-estimated models can be interpreted as the treatment effect of commercial financing on business survival.

5. Results

In table 3, we list the marginal effects from Cox hazard models (column 1 and 2) and logit models (column 3 and 4) with and without interaction terms. The results, especially the coefficients for commercial financing, should be interpreted as association rather than causality. Because of the semi-parametric nature of hazard models, the base line is not reported. But we can see from the logit models, during 2005 to 2006, the probability of going out of business increases 2%. During 2006 to 2007, the probability again increases by more than 4%. After controlling owners and firms' attributes, we do not find racial and gender differences in business survival. We find that owner's age between 34 and 44 (Age44) have lower odds of going out of business. The decrease, however, is not significant. Higher education beyond college, i.e. graduate education, reduces the probability of going out of business by 2.8% in survival models and 1.3% in logit models. More working experience lowers the probability of business failure, although its magnitude is very small. We do not find choice of industry has any significant effect on business survival. Increase in the number of weekly hours is associated with a reduction of the probability

by 0.5% in survival models and 0.2% in logit models. Having intellectual property reduces the probability by 5.6% and 2.5% in survival models and logit models respectively.

Without controlling for endogeneity of financing options, commercial financing is associated with an overall 20% reduction in the probability of going out of business in the survival model and 8.7% reduction in the logit model. In column 2 where interaction terms are included in the survival model, we find that the use of commercial financing is associated with 9.6% decrease in the probability of going out of business for black business owners, and 10.6% decrease for owners of other races. In column 4 logit model, the decreases are smaller: 4.3% for black business owners and 4.7% for owners of other races.

Table 3 results from survival and logit models with and without interaction terms

	(1)	(2)	(3)	(4)
	Survival Model w/o Interaction	Survival Model w interaction	Logit model w/o interaction	Logit model w interaction
Year 2005-06			0.0199*** (3.51)	0.0200*** (3.54)
Year 2006-07			0.0418*** (6.69)	0.0419*** (6.74)
Black	-0.0000245 (-0.00)		0.000809 (0.11)	
Other Race	0.00338 (0.20)		0.00153 (0.21)	
Age44	-0.0116 (-0.86)	-0.0114 (-0.85)	-0.00530 (-0.91)	-0.00523 (-0.90)
Age54	0.00113 (0.08)	0.00129 (0.09)	0.000474 (0.08)	0.000566 (0.09)
Age75	0.000491 (0.03)	0.000455 (0.03)	0.000158 (0.02)	0.000179 (0.03)

Female	0.0138	0.0135	0.00613	0.00602
	(1.15)	(1.13)	(1.27)	(1.25)
Some college	0.00882	0.00905	0.00413	0.00424
	(0.54)	(0.55)	(0.62)	(0.63)
College	0.00596	0.00585	0.00245	0.00240
	(0.34)	(0.34)	(0.34)	(0.33)
Graduate	-0.0279*	-0.0279*	-0.0127*	-0.0127*
	(-1.75)	(-1.77)	(-1.85)	(-1.87)
Working Exp.	-0.00182***	-0.00181***	-0.000833***	-0.000833***
	(-3.31)	(-2.85)	(-3.66)	(-3.66)
Construction	-0.000833	-0.000481	-0.0000120	0.000163
	(-0.03)	(-0.01)	(-0.00)	(0.01)
Manufacture	-0.00988	-0.00932	-0.00394	-0.00372
	(-0.35)	(-0.33)	(-0.32)	(-0.30)
Wholesale	0.0489	0.0486	0.0235	0.0234
	(0.96)	(0.96)	(1.26)	(1.25)
Retail	0.0368	0.0366	0.0188	0.0188
	(0.89)	(0.89)	(1.25)	(1.24)
Information	-0.00241	-0.00233	-0.000417	-0.000355
	(-0.06)	(-0.06)	(-0.03)	(-0.02)
Finance	-0.000242	-0.000561	0.000453	0.000318
	(-0.01)	(-0.02)	(0.03)	(0.02)
Professional	-0.0146	-0.0144	-0.00620	-0.00616
	(-0.56)	(-0.55)	(-0.52)	(-0.52)
Personal	0.00617	0.00632	0.00301	0.00310
	(0.20)	(0.21)	(0.25)	(0.25)
Commercial Financing	-0.197***		-0.0867***	
	(-4.70)		(-14.69)	

Hours	-0.00509*	-0.00493*	-0.00222*	-0.00216*
	(-1.65)	(-1.70)	(-1.72)	(-1.68)
# owner	0.000311	0.000322	0.000162	0.000167
	(0.18)	(0.18)	(0.23)	(0.24)
Intl. Property	-0.0560***	-0.0558***	-0.0249***	-0.0249***
	(-3.36)	(-3.36)	(-5.01)	(-5.04)
Region 2	-0.153***	-0.151***	-0.0680***	-0.0679***
	(-4.90)	(-4.88)	(-17.46)	(-18.05)
Region 3	-0.148***	-0.147***	-0.0670***	-0.0669***
	(-4.88)	(-4.85)	(-16.35)	(-16.85)
Region 4	-0.142***	-0.141***	-0.0636***	-0.0635***
	(-4.88)	(-4.86)	(-16.44)	(-17.02)
White*Comf		-0.183***		-0.0808***
		(-4.72)		(-14.63)
Black*Comf		-0.102***		-0.0451***
		(-4.13)		(-8.15)
Black*noComf		-0.00631		-0.00210
		(-0.33)		(-0.25)
Other*Comf		-0.107***		-0.0473***
		(-4.39)		(-10.12)
Other*noComf		-0.00139		-0.000457
		(-0.07)		(-0.05)
N	12586	12586	12586	12586
Reported are marginal effects; t statistics in parentheses.				
* significant at 10% ** significant at 5% *** significant at 1%				

To control for the endogeneity problem, we use the propensity score matching method. First we use the PSM to match firms that used commercial financing with firms that did not in each year. As suggested in Slottje, Millimet, and Buchanan (2007), by matching within each year, we can remove “time-specific” unobservable factors. We then use PSM estimator to calculate the average treatment effect of commercial financing across the sample period:

$$E[Surv_{it}^1 | Commercial\ Financing=1, PScore, t] - E[Surv_{it}^0 | Commercial\ Financing=0, PScore, t]$$

In order to making use of this formula, we assume linear probability of business survival. Alternatively, we use the whole sample from 2005 to 2007 for matching and calculate the treatment effect. We adopt three widely used matching algorithms: one-to-one nearest neighbor matching with no replacement, one-to-one caliper matching (caliper = 0.05) with no replacement and kernel-based matching. In all three matching algorithms, the first stage is always a logit model for the choice of commercial financing. We find that black businesses and businesses of other races are significantly less likely to use commercial financing compared to white owners. Female owners also have lower probability of using commercial financing. Increase of full time and part time employees significantly increases the chances of commercial financing. Higher credit risk lowers the probability significantly. Relative to partnership, limited liability companies and corporations are more likely to use commercial financing.

In table 4, we list the results from within year PSM and PSM across entire sample period. The impact of commercial financing ranges from 11% to 4.3% (insignificant in this case). For each matching, we measure the balancing of independent variables by testing the equality of their means before and after matching. The matching has significantly reduced the mean differences of main variables of interest including race, age, gender, education, working experience and hours, region, credit risk, and legal status of the company. For variables including industry of the business, and the number of full and part time employees, the marching has significantly reduced

the differences in mean, but the differences still exist post matching. To test the robustness of the model, we dropped these variables from PSM and the results remain very similar.

Table 4 PSM results for all races, black and other races

		Matching Within Each year			Matching Across entire sample period		
		nearest neighbor	caliper	kernel	nearest neighbor	caliper	kernel
All Races	Average Treatment Effect	-0.103*** (-15.13)	-0.0917*** (-12.62)	-0.0781*** (-9.08)	-0.104*** (-15.42)	-0.106*** (-14.67)	-0.0923*** (-11.07)
	Sample Size	1433	1090	2329	4318	3651	4318
Black	Average Treatment Effect	-0.108*** (-5.40)	-0.0677** (-2.45)	-0.043 (-1.47)	-0.1104*** (-5.53)	-0.073** (-2.74)	-0.054* (-1.91)
	Sample Size	471	192	496	471	206	493
Other race	Average Treatment Effect	-0.0898*** (-3.95)	-0.0742** (-2.45)	-.086*** (-3.26)	-0.097*** (-4.32)	-0.0941*** (-3.33)	-0.100*** (-3.93)
	Sample Size	423	229	665	423	255	704

t statistics in parentheses. * significant at 10% ** significant at 5% *** significant at 1%

To adjust for other firm and owner specific characteristics, we match the data within each year and then merge the matched data into a new panel data. Doing so allows us to use both the survival models and logit models. Using similar method in table 3, we include interaction terms in both the survival models and logit models to distinguish the impact of commercial financing across different races. Columns 1 to 4 are based on the sample matched by nearest neighbor. Columns 5 to 8 are based on the sample matched by caliper set at 0.05. Compared to table 3, the matched samples show even larger baseline probability of business failure. For example, in column 8, the probability of going out of business increases 2.8% during 2005 to 2006, and it increases 5.6% during 2006 to 2007, holding everything else constant. We do not observe racial and gender differences in business survival after controlling for owner and firm attributes. In the nearest neighbor matching sample, age 33 to 44 is associated with a decrease of 1.3% in the

probability of business failure significant at 10%. Having graduate degree reduces the probability by 1.6% in the same sample. Working experience in related industry and weekly hours spent in business continue to be important factors in improving business survival. Their magnitudes increase in the matched sample. Holding intellectual properties decrease the probability by over 7% in the caliper matched samples. The magnitudes are smaller in other samples and models. Significant regional differences in business survival are found. Compare to region 1, northeast, businesses in other regions have lower probability by 6.9% to 17.8%. We are unclear the reason behind this findings, which by itself can be an interesting research topic.

Our main variable of interest, commercial financing, continues to be an important factor on business survival. Having access to commercial financing reduces the business failure probability by 19.3% and 21.7% in the two survival models in columns 1 and 5. The marginal effect is much smaller at 9% in the two logit models in columns 3 and 7. In columns 2,4,6 and 8, we include interaction terms with commercial financing. We find that commercial financing has similar large marginal effect on white-owned businesses. Commercial financing also decreases the probability of business failure of black owners and owners of other races, but the magnitude is smaller. For black business, the marginal effect ranges from 11% in column 2 to 4.7% in column 8 (calculated as the difference of the marginal effect between “black*commercial financing” and “black*no commercial financing”). For businesses of other races, the marginal effect ranges from 12.5% in column 6 to 5.3% in column 8. In all models, the marginal effects are significant at 1%.

Table 5 PSM results from survival models and logit models with and without interaction terms

	Nearest Neighbor Matching				Caliper Matching			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Survival Model w/o interaction	Survival Model w interaction	Logit model w/o interaction	Logit model w interaction	Survival Model w/o interaction	Survival Model w interaction	Logit model w/o interaction	Logit model w interaction
Year 2005-06			0.0204***	0.0206***			0.0276***	0.0279***
			(2.62)	(2.65)			(3.21)	(3.24)

Year 2006-07			0.0497***	0.0500***			0.0558***	0.0562***
			(5.99)	(6.02)			(6.18)	(6.22)
Black	-0.0184		-0.00805		-0.0313		-0.0125	
	(-0.91)		(-0.87)		(-1.27)		(-1.30)	
Other Race	0.0119		0.00629		0.00433		0.00209	
	(0.53)		(0.63)		(0.17)		(0.21)	
Age44	-0.0258	-0.0255	-0.0130*	-0.0129*	-0.0185	-0.0183	-0.00789	-0.00784
	(-1.54)	(-1.54)	(-1.66)	(-1.66)	(-0.91)	(-0.91)	(-0.94)	(-0.94)
Age54	0.000671	0.000657	0.000118	0.000160	0.00858	0.00860	0.00372	0.00380
	(0.04)	(0.04)	(0.01)	(0.02)	(0.37)	(0.37)	(0.41)	(0.42)
Age75	-0.00132	-0.00143	-0.000629	-0.000615	0.00220	0.00221	0.00123	0.00130
	(-0.06)	(-0.07)	(-0.07)	(-0.06)	(0.09)	(0.09)	(0.12)	(0.13)
Female	0.0165	0.0160	0.00827	0.00809	0.00716	0.00672	0.00308	0.00290
	(1.11)	(1.09)	(1.27)	(1.25)	(0.42)	(0.40)	(0.46)	(0.43)
Some college	0.0219	0.0220	0.0110	0.0111	0.0292	0.0293	0.0129	0.0130
	(0.97)	(0.98)	(1.17)	(1.18)	(1.05)	(1.06)	(1.31)	(1.32)
College	0.0176	0.0171	0.00847	0.00826	0.0159	0.0154	0.00672	0.00656
	(0.73)	(0.72)	(0.82)	(0.80)	(0.56)	(0.55)	(0.63)	(0.61)
Graduate	-0.0330	-0.0330	-0.0161*	-0.0162*	-0.0305	-0.0305	-0.0128	-0.0130
	(-1.62)	(-1.63)	(-1.69)	(-1.70)	(-1.24)	(-1.26)	(-1.27)	(-1.29)
Working Exp.	-0.00243***	-0.00240***	-0.00120***	-0.00120***	-0.00293***	-0.00291***	-0.00126***	-0.00127***
	(-2.86)	(-2.86)	(-3.78)	(-3.79)	(-2.83)	(-2.84)	(-3.84)	(-3.85)
Construction	-0.00560	-0.00573	-0.00298	-0.00301	0.00348	0.00341	0.00159	0.00163
	(-0.14)	(-0.14)	(-0.16)	(-0.16)	(0.07)	(0.07)	(0.08)	(0.08)
Manufacture	-0.0164	-0.0160	-0.00831	-0.00818	-0.00619	-0.00575	-0.00275	-0.00255
	(-0.48)	(-0.47)	(-0.50)	(-0.50)	(-0.14)	(-0.13)	(-0.15)	(-0.14)
Wholesale	0.0615	0.0600	0.0328	0.0323	0.0956	0.0945	0.0438	0.0436
	(0.93)	(0.92)	(1.23)	(1.21)	(1.08)	(1.08)	(1.49)	(1.49)

Retail	0.0218	0.0212	0.0128	0.0126	0.0404	0.0399	0.0194	0.0193
	(0.49)	(0.48)	(0.67)	(0.67)	(0.69)	(0.69)	(0.94)	(0.94)
Information	-0.0208	-0.0205	-0.00938	-0.00928	-0.0348	-0.0345	-0.0142	-0.0141
	(-0.51)	(-0.51)	(-0.48)	(-0.47)	(-0.74)	(-0.74)	(-0.70)	(-0.70)
Finance	-0.0212	-0.0215	-0.00996	-0.0101	-0.00189	-0.00216	-0.000289	-0.000380
	(-0.63)	(-0.65)	(-0.60)	(-0.61)	(-0.04)	(-0.05)	(-0.02)	(-0.02)
Professional	-0.0345	-0.0340	-0.0163	-0.0162	-0.0403	-0.0397	-0.0165	-0.0164
	(-1.19)	(-1.18)	(-1.07)	(-1.06)	(-1.16)	(-1.15)	(-1.03)	(-1.02)
Personal	-0.0115	-0.0113	-0.00544	-0.00538	-0.00498	-0.00470	-0.00191	-0.00175
	(-0.35)	(-0.35)	(-0.35)	(-0.34)	(-0.12)	(-0.11)	(-0.11)	(-0.10)
Commercial Financing	-0.193***		-0.0919***		-0.217***		-0.0901***	
	(-4.54)		(-14.74)		(-4.27)		(-13.96)	
Hours	-0.00861**	-0.00845**	-0.00437**	-0.00433**	-0.00881**	-0.00862*	-0.00386**	-0.00381**
	(-2.27)	(-2.25)	(-2.40)	(-2.38)	(-1.98)	(-1.95)	(-2.05)	(-2.03)
# owner	0.00276	0.00271	0.00134	0.00133	0.00294	0.00288	0.00125	0.00123
	(1.29)	(1.27)	(1.44)	(1.43)	(1.20)	(1.19)	(1.34)	(1.33)
Intl. Property	-0.0663***	-0.0655***	-0.0322***	-0.0321***	-0.0729***	-0.0721***	-0.0308***	-0.0308***
	(-3.14)	(-3.13)	(-4.70)	(-4.69)	(-2.92)	(-2.91)	(-4.28)	(-4.27)
Region 2	-0.168***	-0.166***	-0.0818***	-0.0816***	-0.178***	-0.176***	-0.0761***	-0.0760***
	(-4.63)	(-4.62)	(-16.26)	(-16.24)	(-4.34)	(-4.34)	(-14.07)	(-14.05)
Region 3	-0.166***	-0.164***	-0.0817***	-0.0816***	-0.170***	-0.169***	-0.0737***	-0.0736***
	(-4.60)	(-4.59)	(-15.26)	(-15.23)	(-4.31)	(-4.30)	(-12.86)	(-12.85)
Region 4	-0.157***	-0.155***	-0.0773***	-0.0771***	-0.160***	-0.158***	-0.0694***	-0.0692***
	(-4.59)	(-4.59)	(-14.81)	(-14.80)	(-4.30)	(-4.29)	(-12.38)	(-12.37)
White*Comf		-0.181***		-0.0868***		-0.204***		-0.0857***
		(-4.55)		(-14.52)		(-4.28)		(-13.84)
Black*Comf		-0.132***		-0.0625***		-0.150***		-0.0624***
		(-4.02)		(-8.31)		(-3.79)		(-7.88)

Black* noComf		-0.0206		-0.00967		-0.0360		-0.0152
		(-0.93)		(-0.94)		(-1.33)		(-1.42)
Other*Comf		-0.111***		-0.0540***		-0.131***		-0.0558***
		(-3.83)		(-7.12)		(-3.70)		(-7.19)
Other* noComf		0.00110		0.00106		-0.00578		-0.00232
		(0.04)		(0.09)		(-0.20)		(-0.20)
N	8634	8634	8634	8634	8050	8050	8050	8050
Reported are marginal effects; t statistics in parentheses.								
* significant at 10% ** significant at 5% *** significant at 1%								

6. Conclusion

In this paper we examine whether the availability and types of financing, are related to observed differences in the number of Americans from different racial groups involved in the startup stage of the entrepreneurial process, and whether the relative importance of these variables change when different stages of the entrepreneurial process are considered.

Overall, our paper contributes to the existing literature on baby entrepreneurship by showing that financing constraints may be the likely cause of racial differences in minority business ownership, a finding that has significant policy implications. There is little empirical evidence on how different financing options affect start-ups of minorities. Astebro and Bernhardt (2003) excluded minorities from the data. Holtz-Eakin et al (1994), and Avery et al (1998) did not include racial or ethnic information in their study. Bates (1990) found that high start-up capital was associated with higher survivability. However the focus of the study was male non-minority business.

According to our results, equal access to credit markets could be important in promoting self-employment and small business ownership. Federal and state regulation, and internal loan reviews can be used jointly to achieve this target, but equally important is awareness and

knowledge by minority groups of different financing options and the function of credit markets. Minority businesses may be encouraged and assisted in using financing options other than family members.

Most of the data in previous studies are from 1990s or earlier. Astebro and Bernhardt (2003) used information on start-ups in 1987. Holtz-Eakin et al (1994) used individual data in 1981 and 1985. In the last decade we have made much progress in improving both the accessibility and equality of small business financing and its impacts on minority business could have changed. Macroeconomic factors also have changed dramatically in the past 10 years. For example, Avery et al (1998) found that compared to mid 1990s, credits were more restricted and requirements for personal guarantees were much higher in early 1990s. Studies based on most recent data/survey and comparisons with previous findings are warranted.

The recent financial free fall and rush of bank failure have created very difficult conditions for many small business owners. They either have problems getting loans or maintaining existing credit lines. Findings from this project suggest that minority groups are affected when credit conditions in a nation contract significantly. To a certain extent, these business owners may be protected by their heavy reliance on family financing. But, reduced access to credit markets coupled with decreased family income can significantly drain financial resources, lead to business failures, and discourage people who are interested in starting their own business.

Finally, our study provides also a good example of why further research on nascent and baby entrepreneurs may be important. Previous studies have mainly focused on established businesses, with findings that are difficult to generalize. For example, minority business in Coleman (2002) had at least 11 years of operation. By describing early stages of the business process, it enables us to understand risk-taking propensities at the start-up level and to avoid

misconceptions by focusing analyses on established entrepreneurs who have already survived in the market.

Although we find that commercial financing is important for new start-up survival for white, black and other race owners, and the impact remains significant after controlling for endogenous problem, there are several shortcomings in this study. First, the extent to which PSM can remove selection bias is up to the quality and details in the data. Although we have used detailed observable owner and firm level variables to correct for the selection bias, there could still be unobservable factors that determine whether a firm uses commercial financing. PSM method will not remove the bias from unobservable factors.

Second, although we have records of four commercial financing options: loans from commercial banks, business credit card, trade credit and other commercial financing, we do not include them separately in the model because they are highly collinear with each other. These four financing options are all endogenous and to correct for it would require carry out PSM for each option which significantly reduces the sample size, a requirement that cannot be met in the current survey data.

Further, the data do not have information on business owners' financial background such as the housing equity of the owners and other assets or equities owned. Previous studies suggest that they affect individuals' decisions in starting a business and affect the performance of these businesses. These uncontrolled factors are included in the error term. Since they are likely to be correlated with firms' financing decision, the financing options are thus correlated with the error term. This unobservable factor can affect the quality of PSM and could cause omitted variable bias as well. Unfortunately, they are not available in our data and thus left undressed in this study.

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