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Author(s): Timothy Bates
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ENTREPRENEUR HUMAN CAPITAL INPUTS AND SMALL BUSINESS LONGEVITY

Timothy Bates*

Abstract—Small business longevity is investigated, utilizing a nationwide random sample of males who entered self-employment between 1976 and 1982. Highly educated entrepreneurs are most likely to create firms that remained in operation through 1986. Owner educational background, further, is a major determinant of the financial capital structure of small business startups. Financial capital endogeneity notwithstanding, firms with the larger financial investments at startup are consistently overrepresented in the survivor column. Firm leverage, finally, is trivial for delineating active from discontinued businesses. Reliance upon debt capital to finance business startup is clearly not associated with heightened risk of failure.

A. Introduction

SMALL business longevity is investigated in this study, utilizing a nationwide random sample of nonminority male entrepreneurs who entered self-employment between 1976 and 1982. Owner human and financial capital inputs, according to the findings, are capable of differentiating active firms from those that had discontinued operations by late 1986. Specifically, highly educated owners employing larger financial capital inputs are more likely to create viable, lasting firms than poorly educated cohorts whose financial capital inputs are less bountiful.

Entrepreneur factor inputs are directly related to firm longevity, but input levels are frequently linked to each other as well. The ability of owners to raise debt capital is related to the values of other explanatory variables: the financial capital

structure of the small business at the point of startup is therefore endogenous. Specifically, the level of owner education is a major determinant of the loan amounts that commercial banks extend to small business formations. The problem of explanatory variable interrelatedness is handled initially by excluding financial capital variables and by assuming that there is no relationship between the viability of the firm and its financial structure. Logit models are estimated for a sample of 4,429 firms owned by nonminority males utilizing owner human capital measures and demographic traits as explanatory variables. This exercise identifies owner education level as a key determinant of firm survival: yet this same factor is a determinant of debt inputs for small business startups. Factors that explain debt inputs are examined in detail (section E), and sample subsets are identified in which owner education and levels of debt are (1) strongly related, and (2) weakly related. Discriminant analysis models explaining firm survival are then estimated utilizing financial capital as well as human capital and demographic measures as explanatory variables. Financial capital input levels, irrespective of owner education, are strong determinants of small business survival prospects. The logit and discriminant models produce entirely consistent results regarding the impact of demographic and human capital variables on small business longevity. Separate analyses of sample subsets possessing differing degrees of financial capital endogeneity do not alter this conclusion.

B. The Behavior of Recent Self-Employment Entrants

Economists to date have performed few empirical or theoretical studies of entrepreneurship: there have been numerous studies of production

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functions but few of entrepreneurs. Sociologists and psychologists have dominated the field, pursuing studies of the characteristics of self-employed persons (Brock and Evans, 1986, pp. 39–41). On the theoretical side of economics, however, several recent articles on entrepreneurship have produced a rich crop of hypotheses about small business behavior. A straightforward model by Lucas suggested that persons having relatively more entrepreneurial ability became entrepreneurs while those possessing relatively less became workers. In the Lucas model, business formation and discontinuances involve "marginal" managers characterized solely by a known managerial ability parameter (1978, pp. 510–518).

A more realistic model developed by Jovanovic assumes that uncertainty characterizes the managerial ability factor at the point of small business startup. Those who enter self-employment gradually learn about their managerial abilities by engaging in the actual running of a business and observing how well they do (1982, pp. 650–653). As they learn more about their abilities, firm behavior changes through time: those who revise their ability estimates upward tend to expand output while those embracing downward estimates tend to contract or to dissolve their businesses. Over time, survivors acquire through experience precise estimates of their abilities; the younger firms exhibit relatively more variable behavior because they have less precise estimates of their true abilities. Because younger firms are commonly smaller firms, these behavior patterns are predicted to typify smaller and larger firms.

Data describing selected traits of small businesses run by white males (table 1) are consistent with Jovanovic's characterizations of entrepreneurship. This nationwide sample of 7,743 small firms is split into groups of younger and older businesses: the older firms, by definition, are owned by white males who entered self-employment before 1976; the younger firms involve entry over the 1976–1982 time period. Table 1 reports mean values of 1982 total sales, before tax profits, measures of sales and profit variance, and finally, the percentage of the sample firms that had discontinued business operations by late 1986. Relative to the older firm group, the younger firms were (1) much more likely to discontinue operations by late 1986, (2) smaller regarding

TABLE 1.—BUSINESS TRAITS: WHITE MALES ENTERING SELF-EMPLOYMENT BEFORE 1975 VERSUS THOSE ENTERING BETWEEN 1976 AND 1982

	Pre-1976 Entrants	1976–1982 Entrants
Discontinuance rate, 1986	16.8%	26.0%
1982 total sales (mean)	$198,908	$118,791
1982 total sales (Std. dev./mean)	4.26	4.73
1982 before tax profits (mean)	$27,196	$16,066
1982 before tax profits (Std. dev./mean)	1.50	2.13
n	3314	4429
n − for profit figures[a]	3118	4111

[a] Reported sample sizes are smaller due to deletion of firms that did not report before tax profits.

1982 annual sales ($118,791 versus $198,908), (3) much less profitable—earning less than 60% of the $27,196 mean profits reported by the older firms—and (4) more dispersed around the sales and profits mean values. The younger firms clearly exhibit the less settled behavior that is consistent with Jovanovic's hypothesis that they are in the process of learning what their entrepreneurial abilities are.

If managerial uncertainty does typify firm startups, then new owners may reduce this uncertainty by buying into existing firms where managerial procedures of previous owners are imbedded in the business. If this process of piggybacking upon existing expertise is successful, then buying ongoing firms should be associated with lower business discontinuance rates.

While Jovanovic captures the essence of the turmoil that typifies recently entered small businesses, other branches of the social sciences have addressed the question: who are the likely survivors of the sorting out process? Some of their findings are straightforward: entrepreneurs are relatively well educated (Douglas, 1976). Other studies emphasize less tangible elements of entrepreneurial success, such as test score patterns on psychological tests, suggesting that individuals are endowed with differing levels of business acumen (Shapiro, 1975).

This study empirically addresses the question —who are the entrepreneurs that are likely to survive the sorting process that characterizes early years of self-employment? Those who remain

small business owners are expected, relative to discontinuances, to possess greater business acumen as well as conventional labor force skills and greater access to financial capital. Finally, the youngest firms are most likely to fail.

C. The Data Base

The samples of business owners analyzed throughout this study are drawn from the 1982 Characteristics of Business Owners (CBO) survey.[1] This is the first data base of national scope that describes self-employed people as individuals *as well as* describing traits of businesses these people run, such as sales, earnings, employees, capital inputs, etc.

The definition of a "small business" is by no means clear-cut. The CBO survey drew its small business universe from individuals who filed in 1982 one of the following types of federal income tax forms: (1) Schedule C, form 1040 (sole proprietorships); (2) Form 1065 (operators of partnerships); (3) Form 1120s (small business corporations). From the universe of persons filing one or more of these forms, 25,000 nonminority males were selected for further data collection. Census questionnaires covering both owner traits and business traits were sent out to these persons and over 84% of the questionnaires were returned. In some instances, one owner of several firms is picked up in the sample; in other cases, multiple owners of one firm are encountered. In this study, each firm has a unique owner; financial capital variables, however, were constructed by summing the inputs of all owners in cases of multiowner firms. Among persons filing schedule C forms, many are not small business owners according to the commonly understood meaning of the term. I identified small business owners as the subset of the sample where owners (1) had a financial capital investment in the business that was greater than zero, and (2) annual sales of a least $5000 in 1982. Observations not meeting these criteria were dropped from further consideration. The constraint that sales total at least $5000 forced 38.0% of the otherwise eligible observations out of the sample.

The CBO survey collected data on several aspects of owner human capital, including variables measuring (1) years of education, (2) managerial experience, and (3) small business exposure within one's family. Family business background is of particular interest because this factor has been repeatedly linked by social scientists to the business acumen characteristic. Family (close relative) pursuit of self-employment is expected to encourage the development of entrepreneurial values within an individual as well as increasing one's familiarity with the small business milieu. When asked, "Prior to your going into business, had any of your close relatives ever owned a business...,"[2] 41.9% of the CBO white male owner sample responded affirmatively. Shapiro found that more than 50% of the entrepreneurs he studied had self-employed fathers (1975, pp. 84–85).

Variables utilized in table 2, in addition to owner human capital measures, include (1) year of entry into self-employment, (2) age of owner, and (3) whether the owner created a firm de novo or entered an existing business. All of the owners analyzed in table 2 were white males who entered into small business ownership between 1976 and 1982: while most were the original founders, 24.2% entered businesses (largely sole proprietorships) that were already operating. The logit model dependent variable equals one if the firm is still operating in late 1986; it equals zero otherwise. Note that businesses sold to new owners are counted as continuing firms as long as they remain in operation: departure of an owner is not equated to business discontinuance. Definitions of the logit explanatory variables appear below:

$Ed2$: for owners completing four years of high school, the value of $ED2 = 1$; otherwise $Ed2 = 0$.

$Ed3$: for owners completing at least one but less than four years of college, the value of $Ed3 = 1$; otherwise $Ed3 = 0$.

$Ed4$: for owners completing four years of college, the value of $Ed4 = 1$; otherwise $Ed4 = 0$.

$Ed5$: for owners completing five or more years of college, the value of $Ed5 = 1$; otherwise $Ed5 = 0$.

Family self-employment: for owners whose close relatives (mother, father, brothers,

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[1] The CBO data base is described in Bates (1990).

[2] Census questionnaire item nine, CBO survey.

TABLE 2.—LOGIT MODEL: *MLE* RESULTS EXPLAINING SMALL BUSINESS LONGEVITY FOR WHITE MALES ENTERING BUSINESS IN THE 1976–1982 TIME PERIOD

	Logit Coefficient	Standard Error	Chi-square Statistic
Constant	-1.3112^a	1.1677	61.14
Ed2	0.1083^a	0.0592	3.35
Ed3	0.0838^b	0.0638	1.72
Ed4	0.2522^a	0.0687	13.44
Ed5	0.3074^a	0.0686	20.04
Family	0.0433	0.0365	1.41
Management	-0.0256	0.0375	0.47
Age2	0.0274	0.0428	0.41
Age3	0.0916^a	0.0510	3.23
Age4	-0.0410	0.0590	0.48
Ongoing	0.1229^a	0.0419	8.62
Time80	-0.3074^a	0.0397	59.97
Time82	-0.3990^a	0.0482	68.63
n	4429		
Likelihood ratio	419		
Chi square	501.49;	the hypothesis that the explanatory variables have no effect is rejected ($\alpha = 0.01$)	

^{a} Statistically significant (5% level).
^{b} Statistically significant (10% level).

sisters, others with whom frequent contact was maintained) either owned a business or were self-employed in professional practice, *Family* = 1, otherwise *Family* = 0.

Management experience: for owners who had worked in a managerial capacity prior to owning the business they owned in 1982, *Management* = 1; otherwise *Management* = 0.

Age2: for owners between the ages of 35 and 44, *Age2* = 1, otherwise *Age2* = 0.

Age3: for owners between the ages of 45 and 54, *Age3* = 1; otherwise *Age3* = 0.

Age4: for owners 55 or older, *Age4* = 1; otherwise *Age4* = 0.

Method of acquiring the business—if the owner entered a business that was already in operation, *Ongoing* = 1; if the owner was the original founder of the business, then *Ongoing* = 0.

Year in which the business was started or acquired—a series of two variables reflecting the following categories:

1. *Time82*: if the business was started or ownership was acquired during 1982, then *Time82* = 1; otherwise *Time82* = 0;

2. *Time80*: if the business was started or ownership was acquired during 1980 or 1981, then *Time80* = 1; otherwise *Time80* = 0.

In table 2's logit exercise, the education variable group excludes owners having less than 12 years of formal schooling and the age variable group excludes owners who were under age 35.

D. Empirical Findings for the Nonminority Male Sample

Small business owners, according to Jovanovic, know least about their entrepreneurial abilities at the point when they first enter self-employment. The variable *time82* identifies the newest businesses in the white male sample: firms formed in 1982 accounted for 17.1% of the total sample as well as 22.7% of the 1986 discontinuances. The newest firms are most likely to fail, other factors constant, and the *time82* variable coefficient indicates that this factor is the strongest single determinant of business survival identified in table 2. Similarly, firms entered during the 1980–81 period (*time80*) were much more likely to discontinue operations by 1986 than those entered between 1976 and 1979, but they were less likely to discontinue relative to those entered in 1982. The

longer the period since the owner entered into business, the more likely it is that the business will remain in operation in 1986.

Other dominant variables (table 2) for delineating surviving businesses from discontinuances are education measures, particularly *ed*4 and *ed*5. Relative to owners having less than four years of high school, high school graduates (*ed*2) and those with one to three years of college (*ed*3) are more likely to see their businesses survive to 1986. The likelihood of business discontinuance falls off sharply, however, for the owner education groups having four years of college (*ed*4) and five plus years of college (*ed*5). The most conventional measure—years of education—is the strongest human capital variable for identifying business continuance.

The other human capital variables produced mixed results. The family background variable coefficient, although positive, was statistically insignificant. Past studies attributing the family business background trait to firm viability did not control for factors such as owner education or entry by purchasing an existing business; this may account for the differing findings. The insignificance of the management variable is more difficult to interpret. Alternative specifications of this variable were investigated, as were various functional forms. These different variable formulations produced unstable coefficients—due partly to correlations with two other variables, age and education.

Age of owner was expected to be related to business survival in a nonlinear fashion. A recent study of entrepreneur earnings found that "a 47 year old highly educated male has the greatest likelihood of being a high earner of self-employment income" (Bates, 1987, p. 546). Age variable coefficients in table 2 are consistent with this characterization. In the *age*4 group (55 and older), age may be correlated to a lessening of owner effort that corresponds to the old age phenomenon.

Finally, table 2 indicates that ongoing firms are more likely to remain in business than those started de novo. This finding is consistent with the hypothesis that purchase of an existing business may permit the new owner to benefit from established managerial practices that are embodied in the firm.

E. Owner Inputs of Financial Capital

1. Regression Analysis of Debt Capital

Built upon perfect market assumptions, the modern theory of finance has derived conclusions about business financing that are elegant in their simplicity. When a business investment opportunity becomes available, the owner/manager need only announce publicly the information relevant to the valuation of the project. If the project is expected to result in a positive market value (for a new company) or an increased market value for an existing company, the prices of the securities of the firm will instantly reflect this information. Life is not this simple for most small business startups. Often, the value of the small firm hinges upon something that cannot readily be bought and sold: the efforts of a single owner-manager. The small business owner often finds it "impossible to persuade potential suppliers of equity capital to share his subjective belief," regarding future returns from investment in the firm (Steigum, 1983, p. 637).

A recent article by Zeira demonstrates theoretically that "the exact levels of profits at larger amounts of capital can be discovered only by actually increasing the quantity of capital..." (1987, p. 205). Zeira's model is particularly applicable to the small business startup whose owner is unsure of his/her managerial abilities. When uncertainty typifies entrepreneurial talents, as well as the return that can be expected from investing financial capital in the enterprise, it is not surprising that capital market access is limited.

Over 98% of the businesses previously analyzed (table 1) received no equity capital from organized financial markets at the point of startup, but most of them did have access to debt capital. Two dominant sources of debt—commercial bank loans were most frequent, debt from family and friends was second—accounted for 83.1% of the loans received by the nonminority male sample (of 1976–1982 startups). Debt from former business owners ranked a distant third, accounting for 8.7% of the loans received. Equity capital was supplied largely from the owner's own resources, secondarily from family and friends. Those who have access to debt capital are usually

TABLE 3.—EXPLAINING DEBT CAPITAL INPUTS FOR WHITE MALES ENTERING BUSINESS

	All Borrowers		Commercial Bank Loan Recipients Only		Nonbank Borrowers Only	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Constant	1.3123	9.8612	− 7.7653	12.1018	17.0179	12.6048
Ed2	6.6227	9.8712	15.9305	12.0125	− 12.1199	12.7808
Ed3	7.0814	10.5940	14.0062	13.1237	− 3.9546	13.3458
Ed4	12.0839	11.2144	34.5259[a]	13.9627	− 10.3679	14.0047
Ed5	18.3443[a]	11.0762	22.9350[a]	13.5456	19.9373	14.2408
Equity capital	1.4406[a]	0.0346	1.8320[a]	0.0417	0.4867[a]	0.0457
Age2	7.3097	6.9869	9.9799	8.9494	5.0318	8.1236
Age3	14.8652[a]	8.0523	2.8834	10.0464	32.0620[a]	9.8499
Age4	7.0813	11.2109	10.3650	14.1287	19.7895	13.4155
Ongoing	1.7318	6.3273	13.7751[a]	8.1981	1.2975	7.2998
n	2197		1419		778	
$\bar{R}^2$	0.4501		0.5849		0.1605	
F	198.89		220.62		16.31	

[a] Statistically significant at the 0.05 level.

those possessing substantial equity as well as traits that are associated with small business survival, such as strong educational background.

Table 3 investigates the relationships between the debt capital inputs of the borrowing firms at the point of business startup (the dependent variable) and the explanatory variables (1) owner equity capital inputs and (2) human capital and demographic traits found to possess explanatory power in table 2. The debt and equity capital variables are expressed in thousands of dollars; their respective mean values for the sample of all borrowers are $48.7 thousand (debt) and $22.1 thousand (equity). A direct relationship is hypothesized to exist between the size of debt capital inputs at the point of business startup and (1) equity capital, as well as (2) human capital and demographic traits associated with firm survival.

Table 3's regression coefficients show that a highly educated middle aged white male who is investing a large sum of equity capital in his small business is going to have a maximum access to debt capital. Disaggregation of the sample into bank loan recipients and nonbank borrowers, however, indicates that a college education improves access to debt capital most directly for the commercial bank borrowers: education variables are statistically insignificant determinants of debt levels for nonbank borrowers. Table 3's findings indicate that equity and debt capital are complements at the point of business startup, but dissimilar variable coefficients once again typify the bank and nonbank borrower subgroups. An extra

dollar of equity capital is associated with 1.83 additional dollars of debt capital for commercial bank loan recipients, versus 0.49 additional dollars for nonbank borrowers. Explaining debt levels for the commercial bank borrower group was more precise statistically ($R^2 = 0.585$ versus 0.160 for nonbank borrowers), and more of the hypothesized determinants of debt possessed statistically significant variable coefficients. Of the variables associated with business survival in table 2's logit exercise, only Age3 was a statistically significant determinant of debt inputs for the nonbank borrowers.

2. Discriminant Analysis; Active versus Discontinued Firms

Table 3's findings on bank borrowers call into question the validity of table 2's logit model. The logit exercise indicated that certain human capital and demographic traits were capable of delineating small business survivors from discontinuances. Alternative explanations, however, are consistent with the logit findings: human capital inputs partially cause financial capital inputs, and the latter variables may be the true predictors of firm survival.

Table 4's discriminant analyses attempt to clarify the relationships between firm viability and owner inputs of human capital and financial capital. Causal interrelationships between human and financial capital inputs in fact typify only the bank borrower subset of the small business startup

TABLE 4.—DISCRIMINANT ANALYSIS: WHITE MALES
ENTERING BUSINESS IN THE 1976–1982 TIME PERIOD

| Variable | Discriminant Function Coefficients | Group Mean Vectors | |
	Standardized Coefficients	Active Firms	Discontinued Firms
	Entire Sample		
Ed2	0.2405	0.3157	0.3371
Ed3	0.1581	0.2041	0.2363
Ed4	0.4070	0.1760	0.1477
Ed5	0.5069	0.1986	0.1460
Management	−0.0994	0.6159	0.6151
Family	0.0749	0.4253	0.3901
Age2	0.0334	0.3328	0.3197
Age3	0.1192	0.2123	0.1807
Age4	−0.0883	0.1153	0.1295
Capital	0.3772	9.4113	9.1289
Ongoing	0.1544	0.2544	0.2155
Time80	−0.6655	0.3594	0.4431
Time82	−0.7113	0.1550	0.2294
Leverage	0.0220	3.7000	3.3394
n		3278	1151

First model:
canonical correlation = 0.188
approx. standard error = 0.014
likelihood ratio = 0.964
F = 11.61, indicating that the group
   differences are statistically
   significant (α = 0.01).

Sample Excluding Commercial
Bank Loan Recipients

Ed2	0.0828	0.3055	0.3395
Ed3	0.0892	0.2129	0.2330
Ed4	0.2768	0.1847	0.1586
Ed5	0.2970	0.1993	0.1586
Management	−0.1165	0.6169	0.6221
Family	0.1601	0.4389	0.3879
Age2	0.1141	0.3386	0.3110
Age3	0.1507	0.2029	0.1685
Age4	−0.0158	0.1321	0.1375
Capital	0.3362	9.0477	8.7977
Ongoing	0.0854	0.2320	0.2007
Time80	−0.6925	0.3631	0.4548
Time82	−0.7867	0.1480	0.2416
Leverage	0.0185	1.6236	1.4797
n		2203	802

Second model:
canonical correlation = 0.204
approx. standard error = 0.017
likelihood ratio = 0.958
F = 9.327, indicating that the group
   differences are statistically
   significant (α = 0.01)

sample. For startups not receiving bank loans, inputs of human and financial capital are not systematically related; factor input interrelationships, therefore, are unlikely to skew the applicable discriminant analysis variable coefficients. The entire sample of nonminority male firms started between 1976 and 1982 is examined in table 4, as well as the subset of firms that excludes all bank loan recipients. As in table 2, the dependent variable measures firm survival: businesses that are still operating are referred to as "active" firms; those that have closed down are "discontinued." Explanatory variables utilized in table 4 include all human capital and demographic measures used in table 2 and two new variables:

(1) Capital: the logarithm of the sum of debt and equity capital.
(2) Leverage: the ratio of debt capital to equity capital.[3]

Greater quantities of both debt and equity capital inputs are expected to improve the viability of small business startups. Indeed, scale economies are expected to be operative, thus reinforcing the positive relationship between quantity of financial capital inputs and firm viability.

Theorists have produced contradictory hypotheses about the impact of debt financing on firm viability. Clearly, borrowers suffer when incremental debt capital inputs fail to generate returns exceeding borrowing costs. Modigliani and Miller have shown, however, that a corporate tax system with interest payment deductibility creates a situation where the value of the firm is an increasing function of its debt—total value ratio (1963). Others have claimed a downside for increased use of debt financing: the present value of the expected costs associated with potential future bankruptcy also increase (Brennan and Schwartz, 1978). The basic hypothesis—greater financial capital inputs (whether debt or equity) increase firm viability—is therefore qualified: higher leverage may heighten the risk of failure.

The objective of table 4's discriminant analyses is to weigh and combine the explanatory variables in a fashion that forces the groups to be as statistically distinct as possible. The exercise is

[3] Due to the sensitivity of financial ratios to extreme values, the denominator (equity) was constrained to be greater than zero and the value of the overall ratio was constrained to be no larger than 19.

successful in the sense that the active and discontinued firms are shown to be statistically distinct. Table 2's logit model, in contrast, sought to establish the statistical significance of the individual explanatory variables. Use of logit in table 4 would be inappropriate because multicollinearity problems would compromise the interpretation of individual variable coefficients. Thus logit's power to establish variable coefficient significance is sacrificed, but the choice of the discriminant technique has produced clear-cut results without resorting to violating the underlying assumptions that discriminant analysis is built upon.

The conclusions derived from table 2's logit exercise are consistent with those of the discriminant analyses. The $time80$, $time82$ variables possess the greatest explanatory power in all models, and the education variables are consistently strong; owners with four or more years of college are most likely to remain in business. The financial input variables perform quite similarly in the discriminant functions of the overall sample as well as the subset of firms that excludes commercial bank loan recipients. Particularly for the latter group, the large variable coefficients for both the financial capital and the education variables indicate clearly that both factors are causally related to firm survival. Both of the table 4 discriminant functions suggest that it is the highly educated owner with the larger financial capital input that is most likely to create the surviving firm. Nonetheless, the endogeneity of the financial capital variable lessens our ability to judge the relative importance of human versus financial capital inputs as determinants of survival for the entire sample of firms.

The leverage variable produced standardized coefficients of 0.0220 and 0.0185 in table 4's discriminant functions. The finding that firm leverage is trivial for delineating active from discontinued businesses must be interpreted in view of the fact that the active firms (table 4) are clearly more highly leveraged than the discontinued businesses. Reliance upon debt capital at the point of business startup is clearly not associated with business weakness or heightened risk of failure. Table 4 shows that additional debt capital inputs increase business viability, and that the discontinued firms actually utilize debt less than the surviving businesses. This finding, however,

does not clearly prove or disprove the various theories about the impact of debt on firm viability. High degrees of leverage may indeed be imprudent for some businesses; if lenders refuse, however, to supply debt to such firms, the latent inverse relationship between leverage and business viability will not appear in the econometric models.

Another highly consistent pattern in the logit and discriminant functions concerns the relationship between age of owner and firm survival. In all instances, owners 55 and over are least likely to remain in business, while those in the 45–54 grouping are most likely to endure. Finally, the family and ongoing variables emerge consistently as less important determinants of business longevity, and the applicable variable coefficients vary somewhat in magnitude across models. Further disaggregation of the data set along industry lines may reveal additional information about the impact of these factors on firm survival.

The various econometric techniques applied to the nonminority male small business sample (and subsamples) have yielded several highly consistent empirical findings. As expected, the very young firms are least likely to survive; highly educated entrepreneurs—those with four or more years of college—are most likely to create firms that remain in operation; owners 55 and older are most likely to see their firms cease to exist. Financial capital endogeneity notwithstanding, firms with the larger financial capital inputs at startup are consistently overrepresented in the survivor column. For the 32% of the businesses that were launched with bank financing, having a highly educated owner is clearly associated with investing substantial sums of capital in one's business. Leverage notwithstanding, both of these traits— human capital and financial capital—are strongly linked to business viability, irrespective of financing source. Carving the small business sample into various subgroups does not vary these econometric results: owner education and financial capital inputs consistently explain firm longevity.

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