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The Impact of Entrepreneurs' Personal Wealth Allocations in Determining Their Firms' Capital Structures

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ABSTRACT

We study the effect of entrepreneurs' wealth allocations on their firm level capital structure by using a sample of small privately owned firms in U.S. from the 2003 Surveys of Small Business Finance. We find that financial leverage decreases as entrepreneurs allocate more wealth on their firm investments. We also find that wealth allocation only affects capital structure in limited liability firms. Lastly, we show that the effect of wealth allocation on capital structure does not disappear after adjusting for collateral and personal guarantees.

JEL Classifications: *G11, G32*

Keywords: *capital structure; wealth diversification; entrepreneurship*

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I. INTRODUCTION

Capital structure is one of the most important issues in corporate finance because it leads to the firm's valuation and its cost of capital. Extant empirical literature has focused primarily on publicly traded firms. However, according to Kobe (2007), small privately owned firms account for about 50% of non-farm real GDP and 50% of the job growth in the period from 1998 to 2004. It is important for us to pay serious attention to small businesses. Research on the capital structure determinants in these firms is desirable because capital structure affects cost of capital, which eventually affects the survival and growth of small privately owned firms.

Extant literature has attempted to explain the observed capital structure as a result of bankruptcy costs, tax shields, adverse selection, and agency conflicts. However, few studies have examined the link between firms' capital structure decisions and their decision-makers' personal wealth allocations. Entrepreneurs (principal owners[1]) in private firms own significant portions of their firms and face fewer governance constraints. Thus their tolerance of losing their firm investments might play a significant role in determining the amounts of financial leverage[2] on the firm level. In this paper, we contribute to the existing literature by studying the effect of decision makers' wealth allocations on firm-level capital structure.

We use data on limited liability firms from the 2003 Surveys of Small Business Finance (SSBF) and find firms with limited liability protection tend to use more financial leverage as the entrepreneurs allocate more wealth outside of their firms. This result remains unchanged after we adjust our measure of wealth allocation by the amount of loans that entrepreneurs obtain by using personal guarantees or out-of-firm personal assets as collateral. As a robustness test, we also examine a larger sample that includes both limited liability firms and unlimited liability firms. We find that wealth allocation only affects the capital structure of limited liability firms. Moreover, our tests show that wealth allocation does not play a significant role in determining the capital structure of unlimited liability firms.

II. LITERATURE REVIEW

Modern capital structure theory begins with the theory of capital structure irrelevancy developed by Modigliani and Miller (1958). It suggests that in the absence of corporate taxes, transaction costs, bankruptcy costs, and information asymmetry, capital structure does not have any effect on the value of a firm.

By relaxing the assumptions in the Modigliani and Miller framework, several alternative capital structure theories have been developed. For example, when both corporate tax and bankruptcy costs exist, the trade-off hypothesis suggests that there is an optimal leverage level for the firm when the marginal benefit of tax shields is equal to the marginal expected deadweight costs of bankruptcy (Kraus and Litzenberger, 1973).

The pecking order hypothesis suggests that there is a pecking order when firms decide their capital structures. Firms first use their retained earnings, then debt, and then equity (Myers and Majluf, 1984; Myers, 1984).

The agency theory suggests agency conflicts exist not only between managers and shareholders, but also between shareholders and debt holders (Jensen and Meckling,

1976). Thus, owner-managers prefer internal financing to debt financing and outside equity financing because of the agency cost.

Empirical research has examined extensively the above capital structure theories using cross-sectional data on publicly traded firms. Frank and Goyal (2007) examine U.S. firms on annual Compustat data for the period from 1950 to 2003. They find that leverage is positively related to tangible assets and firm size, but negatively related to growth options and profitability. Their results are consistent even when they use different measures of leverage. They conclude that these results support the trade-off hypothesis.[3]

Cole (2008) provides the first empirical evidence on the capital structure decisions of privately owned firms. He uses data from the 1987, 1993, 1998, and 2003 *Surveys of Small Business Finances (SSBF)*. He finds that firm leverage is negatively related to firm size, age, profitability, liquidity, and credit-worthiness measures and positively related to firm tangible assets, limited liability, and number of bank and non-bank financial service providers. He also finds that female owners use less leverage. Cole concludes that in general his evidence is consistent with the pecking order hypothesis and inconsistent with the trade-off hypothesis.

One possible explanation for these different findings is that small privately owned firms have more severe information asymmetry problems than the publicly traded firms because privately owned firms are not required to be audited nor disclose information to the public. Furthermore, some privately owned firms, such as S-corporations, do not pay corporate taxes and have no benefit of tax shields, which is the key element of the trade-off hypothesis. Therefore, it is not surprising that researchers find evidence consistent with the pecking order hypothesis when they examine privately owned firms and evidence supporting the trade-off hypothesis when they examine publicly traded firms.

Additionally, Mueller (2008) examines the effect of entrepreneurs' shares of personal wealth invested in their firms on firm-level leverage. Her sample is a group of small private firms from the *SSBF 1998* data. She finds that leverage is positively related to the share of personal wealth invested in the firm and concludes that less diversified entrepreneurs are exposed to more idiosyncratic risk. Thus they demand higher returns on their equity investment, suggesting a higher cost of equity for their firms. Her point estimates suggest that firm leverage increases by 0.75 percentage points as the entrepreneur's proportional wealth invested to the firm increases by 1 percentage point. [4]

Mueller's empirical analysis excludes all book insolvent firms. She argues that these firms' equity values are negative and should be excluded. This limits the sample significantly. Book insolvent firms are more than 16% of all the limited liability firms in *SSBF 1998* and *SSBF 2003* respectively. Yet the book insolvent firms in 1998 and 2003 were still in operation several months later when the main interview took place[5]. Book insolvent firms may not necessarily have negative market equity values. For example, it is possible that these firms are high growth firms that do not have many assets in place. Because the denominator, book assets, is a proxy for assets-in-place, high growth firms might have book leverage ratios greater than one. Excluding the book insolvent firms might artificially distort the regression results, because they are the highest levered firms and their entrepreneurs are the least diversified. Mueller does not differentiate the unlimited liability firms from limited liability ones and includes

these unlimited liability firms in her main analysis. As a robustness check, she tests her model on limited liability firms. The point estimates are not significantly different from those in her main analysis. However, the significance level of the coefficients decreases from better than the 1% level to 10% level.[6]

Frank and Goyal (2007) suggest that empirical capital structure research should differentiate financially constrained firms from unconstrained ones. Small privately owned firms are often constrained in obtaining outside debt financing (bank loans) due to reasons such as the lack of credit-worthiness. The leverage in these small private firms might not be at the level that their owner-managers prefer. One can argue that Mueller's result could have been different if she had differentiated financially constrained firms from unconstrained firms.

III. DATA

We use data from the *SSBF 2003* conducted by the Board of Governors of the Federal Reserve System (FED). In *1987*, *1993*, *1998*, and *2003*, the FED collected information on small businesses that have fewer than 500 employees.[7] Among these surveys, *SSBF 1998* and *SSBF 2003* reported information on entrepreneurs' personal wealth outside of their firms. We use *SSBF 2003* data for our main analysis and *SSBF 1998* data as a robustness check.

In 2003, a total of 4,240 firms completed interviews. The survey participants reported information on principal ownership share; firm's equity; principal owner's equity in home residence; principal owner's other net worth (excluding home equity); firm's two-digit SIC code; firm's total assets; total liabilities; total sales; etc.[8]

We excluded 84 firms whose principal owners were not individuals.[9] In our main analysis, we excluded firms with unlimited liability because there is no clear distinction between entrepreneurs' firm wealth and out-of-firm wealth without the protection of limited liability. There were 1499 observations that are unlimited liability firms (35% of the sample). In a robustness check, we studied a sample that included these unlimited liability firms.[10]

Frank and Goyal (2007) suggest that empirical capital structure research should differentiate financially constrained firms from unconstrained ones. We focus on firms that are not financially constrained by excluding firms that were declined credits and firms which feared being declined and did not apply in the past three years. A total of 823 firms is excluded because they were either declined loans or discouraged to apply for loans.

Outliers can generate seriously misleading conclusions if we ignore them. The most common method of dealing with the outliers is to remove the extreme observations (truncation). We truncated the extreme observations in the following measures at 1% and 99%: leverage, firm size, profitability, liquidity[11], and tangible assets[12].We obtained a sample of 2,091 firms after excluding outliers. In a robustness check, we also winsorized[13] these key variables at 1% and 99% and studied a sample of 2233 observations.

IV. METHODOLOGY

A. Model

Our estimation model is:

$$Leverage_i = \alpha + \beta * DIV_i + \gamma * CV_i + \varepsilon_i \quad (1)$$

in which $Leverage_i$ is the ratio of total loans to total assets or as a robustness check, the ratio of total liabilities to total assets for firm *i*. We show later that the results are comparable with either dependent variable. DIV_i is the ratio of entrepreneur *i*'s out-of-firm wealth to his total net worth, which measures entrepreneur *i*'s wealth allocation level. CV_i is a vector of control variables which includes firm *i*'s financial statement variables (log of total assets, return on assets, liquidity, tangible assets, etc.); number of financial service providers; entrepreneurs' demographic information (experience, gender and founder status); and firms' and entrepreneurs' personal credit-worthiness. We discuss these control variables in more detail in the following paragraphs. ε_i is the error term. We assume heteroskedasticity and use robust standard errors in our regression.

B. Variables and Predictions

We define the variables of regression 1 in Table 1[14]. We show the predicted signs of the variables in Table 2. The ratio of total loans to total assets (*LR1*) is a more popular measure of leverage than the ratio of total liabilities to total assets (*LR2*) because loans rather than accounts payable and other current liabilities items are considered a capital structure decision. The cross-sectional correlation coefficient between these two leverage measures is 87% for *SSBF 2003* and 81% for *SSBF 1998*. We present results using both measures, but the ratio of total loans to total assets is our main focus[15].

We measure an entrepreneur's wealth allocation by using the ratio of his wealth outside of his firm (out-of-firm wealth) to his total net worth. Around 16% of our sample firms are book insolvent, suggesting that they may have negative equity values and thus, negative entrepreneurs' firm wealth. These firms were still in operation during the interview time, which was months after the end of their last fiscal year. Furthermore, the leverage levels in these firms could be the levels that entrepreneurs prefer according to their risk preferences. Because we focus on firms with limited liability, we set the firm equity to zero if the firm is book insolvent. We compute the entrepreneur's total net worth as the sum of his firm wealth and his out-of-firm wealth. Therefore, our main variable of interest, the entrepreneur's wealth allocation (*DIV*), is the ratio of the entrepreneur's out-of-firm wealth to his total net worth. This variable measures the percentage of an entrepreneur's wealth allocated outside of his firm. The entrepreneur is more tolerate to the financial risk of his firm investment when the *DIV* is higher.

Table 1
Definitions of variables

Variable	Definition
LR1	Total loans divided by total assets
LR2	Total liabilities divided by total assets
DIV	The entrepreneur's out-of-firm wealth divided by his total net worth
DIV2	The entrepreneur's out-of-firm wealth adjusted for collateral divided by his total net worth
Size	Log of total assets
Growth Options (Employment)	Dummy variable for firms with positive employment growth during 2003 fiscal year
Growth Options (Sales)	Dummy variable for firms with positive sales growth during 2003 fiscal year
Profitability	Net income divided by total assets
Tangible Assets	Sum of inventory and book value of land divided by total assets
Liquidity	Cash divided by total assets
Firm Age	Log of firm age
Number of FSP	The number of the firm's financial service providers
Gender	1 if the entrepreneur is female, 0 otherwise
Founder	1 if the entrepreneur is the original founder, 0 otherwise
Owner Bankruptcy	1 if the entrepreneur declared personal bankruptcy in the previous 7 years, 0 otherwise
Firm Bankruptcy	1 if the firm declared bankruptcy in the previous 7 years, 0 otherwise
Experience	Log of the entrepreneur's experience in his current business (in years)

*Data are from the 2003 Surveys of Small Business Finance

We hypothesize that entrepreneurs with more wealth invested in their firms use less leverage to reduce the likelihood of bankruptcy. In contrast, entrepreneurs with more wealth outside of the firms use more leverage because they can absorb more risk of losing their firm investments. Thus, we expect leverage to be positively related to the entrepreneur's wealth allocation measure, *DIV*, as indicated in column 7 of Table 2.

When some entrepreneurs use out-of-firm personal assets as collateral or personal guarantees to obtain loans for their firms, that part of their out-of-firm assets is subject to the claims of firms' creditors and is tied to their firms. We adjust out-of-firm assets by subtracting the amount of collateralized or guaranteed loans from the out-of-firm assets. *DIV2* is the ratio of the adjusted out-of-firm assets to entrepreneurs' total net worth[16].

We control for capital structure determinants that have been identified in the extant literature. Frank and Goyal (2007) review the extant empirical literature and suggest that only a small number of determinants are statistically and economically significant. These variables include growth options[17], firm size, tangible assets[18], and profitability.

Table 2 presents the theoretical predictions and empirical findings of different determinants of capital structure. In columns 1, 2, and 3, we show the inferences of the trade-off hypothesis, the pecking order hypothesis, and agency theory respectively. In column 4, we show the empirical findings of Frank and Goyal (2007). The empirical results of Cole (2008) are presented in column 5. Mueller (2008)'s results are presented in column 6. In column 7, we show the inferences of regression 1.

Table 2
Theoretical predictions and empirical findings of the coefficients

	Theory Predictions			Empirical Findings			
	1	2	3	4	5	6	7
Variables	Trade-Off	Pecking-Order	Agency	Frank & Goyal (2007)	Cole (2008)	Mueller (2008)	Li (2009)
DIV	?	?	?	?	?	-	+
Firm Size	+	+/-	+	+	-	0	+/-
Growth Options	-	+/-	-	-	0	?	+/-
Profitability	+	-	?	-	-	?	+/-
Tangible Assets	+	+/-	+	+	+	?	+/-
Liquidity	?	-	?	?	-	?	-
Firm Age	?	+/-	?	?	-	-	-
FSP	?	?	?	?	+	?	+
Gender	?	?	?	?	-	?	-
Founder	?	?	?	?	?	?	-
Experience	?	?	?	?	?	?	+
Owner Bankruptcy	?	?	?	?	-	?	-
Firm Bankruptcy	?	?	?	?	-	?	-

0 stands for the coefficient is not significant at the 10% level. ? stands for the theory having no prediction on the coefficient or the variable is missing or not reported in the empirical study. Variables are defined in Table 1.

Entrepreneurs' working experience in their fields can play an important role in obtaining credit. More experienced entrepreneurs are likely to know more bankers and can obtain loans more easily. We use the natural log of entrepreneurs' experience and expect the sign of the coefficient to be positive[19].

Entrepreneurs who are the original founders of the firms might be emotionally tied to their firms and avoid financial risk by limiting leverage usage. We include a dummy variable that equals 1 if entrepreneurs are original founders and 0 otherwise. We expect the coefficient to be negative. However, it is also possible that we fail to find a significant coefficient because founders have the option to be highly levered and only commit funds to their firms when needed.

SSBF 2003 reports information on an entrepreneur's personal and business credit-worthiness. We control for credit-worthiness of entrepreneurs and firms by constructing two dummy variables. The first dummy variable is equal to 1 if firms declared bankruptcy in the previous seven years and 0 otherwise. The second dummy variable is equal to 1 if entrepreneurs declared personal bankruptcy in the previous seven years and 0 otherwise. We hypothesize that entrepreneurs with more credit-worthiness find it easier to obtain credits. Thus, the expected signs of these two coefficients are negative.

V. RESULTS

A. Summary Statistics

We present the mean, median, standard deviation, minimum and maximum of key variables in Table 3. The average total loans to total assets ratio is 44% and the average total liabilities to total assets ratio is 66%. The average *DIV* is 0.79, suggesting that entrepreneurs on average allocate 79% of their wealth outside of their firms. After adjusting for out-of-firm wealth collateral and personal guarantees, we observe a lower value for the average out-of-firm wealth allocation measure. The average *DIV2* is 0.71. We also observe a lower value of the median *DIV2* (84%) than the value of the median *DIV* (88%).

Table 3 shows that the average *firm size* (log of total assets) is 13.13, suggesting that on average firms have total assets of about $0.5 million. The smallest *firm size* value is 6.40 (just $602), while the largest value is 17.32 ($33 million). The average *firm age* (log of firm age) is 2.6, suggesting that firms have been in their businesses for about 14 years. The youngest firm has just operated for 1 year, while the oldest firm has existed for 103 years.

Table 3
Summary statistics

Table 3 presents the summary statistics of our key variables based on the *SSBF 2003* data. Our sample has 2091 observations. Variables are defined in Table 1.

Variable	Mean	Median	Std. Dev.	Min	Max
LR1	0.44	0.20	0.81	0.00	9.49
LR2	0.66	0.47	1.00	0.00	10.54
DIV	0.79	0.88	0.23	0.00	1.00
DIV2	0.71	0.84	0.34	0.00	1.00
SIZE	13.14	13.25	2.12	6.40	17.32
Growth Options	0.25	0.00	0.43	0.00	1.00
Profitability	0.73	0.14	2.26	-4.40	24.55
Tangible Assets	0.19	0.08	0.24	0.00	1.00
Liquidity	0.21	0.11	0.25	0.00	1.00
Firm Age	2.58	2.77	0.88	0.00	4.63
Number of FSP	3.14	3.00	1.90	0.00	16.00
Gender	0.16	0	0.37	0.00	1.00
Founder	0.64	1	0.48	0.00	1.00
Experience	3.01	3.18	0.65	0.00	4.26
Firm Bankruptcy	0.00	0	0.06	0.00	1.00
Owner Bankruptcy	0.00	0	0.06	0.00	1.00

Table 3 shows that the mean Number of Financial Service Providers (FSP) is 3.14, suggesting that firms have approximately 3 financial service providers on average. Some firms have as many as 16 financial service providers, while other firms have none. In our sample, 64% of the entrepreneurs are the original founders of their businesses. Only 16% of the entrepreneurs are female, while 84% are male.

On average, entrepreneurs have around 20 years of experience in their own businesses (log of experience is 3.00). The most experienced entrepreneur has been working in his field for 71 years (log of experience is 4.26), while the least experienced one has only 1 year (log of experience is 0). Table 3 also shows that most entrepreneurs are credit-worthy in terms of both firm and personal bankruptcy histories. Less than 1% of the entrepreneurs have declared firm or personal bankruptcy in the previous 7 years.

B. Multivariate Statistics

Table 4 Column 1 shows that the coefficient for the allocations measure, *DIV*, is around 0.830 at better than the 1% significance level, suggesting that the ratio of total loans to total assets increases by 0.830 percentage points when *DIV* increases by 1 percentage point. This finding is consistent with the hypothesis that entrepreneurs who allocate more wealth outside their firms tend to use more leverage.

The coefficients of control variables are also generally consistent with the inference of the pecking-order theory. Column 1 shows that the leverage ratio decreases by 0.065 percentage points as the firm's total assets increase by 1 percent. The coefficient of *ROA* suggests that leverage decreases by 3.6 percentage points as *ROA* increases by 100%. Column 1 also shows that leverage decreases by 0.281 percentage points as liquidity (measured by the ratio of cash to total assets) increases by 1 percentage point. The coefficient of firm age suggests that leverage decreases by 4.8 percentage points as the firm age increases by 1%.

The coefficient on the number of financial service suggests that leverage increases by 4.4 percentage points as the firm adds one more financial service provider. The coefficient of entrepreneurs' experience is positive. However, it is not statistically significant at the 10% level when we use DIV to measure wealth allocation. When we adjust the effect of personal guarantees and out-of-firm assets collateral by using DIV2, column 2 shows that the financial leverage ratio increases by 6.6 percentage points when the entrepreneur's experience increases by 1%.

The coefficient suggests that leverage ratio in firms where entrepreneurs are original founders is 8.3 percentage points lower than it is in other firms, which is consistent with our prediction that entrepreneurs who are original founders are more emotionally tied with their firms and more conservative in using debt.

The coefficient of the entrepreneurs' personal bankruptcy dummy variable suggests that firms' leverage decreases by 36% if entrepreneurs have declared personal bankruptcy before. This result shows that entrepreneurs who have declared personal bankruptcy in the previous 7 years significantly use less debt financing on the firm level. The coefficient of the firm bankruptcy dummy variable is not statistically different than zero at better than 10% level.

Table 4
Multivariate results

Column 1 presents the regression 1 result on the sample excluding credit-constrained firms and outliers in *SSBF 2003* by LR1 as the dependent variable and DIV as the variable of interest. In column 2, we use DIV2 as the alternative variable of interest. In column 3, we use LR2 as the alternative dependant variable. Column 4 presents the result of regression 1 on a sub-sample of firms that do not use out-of-firm wealth collateral, personal guarantees, and co-signers. Column 5 shows the result of regression 1 when we use the increase in sales as the alternative proxy for growth options. Column 6 shows the result of regression 1 using *SSBF 1998* data. Variables are defined in Table 1. Regression 1 is: LOANS/ASSETSi=B0+B1*DIVi+B2*SIZEi+B3*GROWTH OPTIONSi+ B4*ROAi+B5*TANGIBLE ASSETSi+B6*LIQUIDITY i+B7*NUMBER OF FSPi+B8*FIRMAGEi+B9*EXPERIENCEi+B10*GENDERi+B11*FOUNDERi+ B12*OWNER BANKRUPTCYi+ B13*FIRM BANKRUPCTYi +ERRORi

	1	2	3	4	5	6	7	8	9
	SSBF 2003	*SSBF 2003*	*SSBF 2003*	*SSBF 2003*	*SSBF 1998*	*SSBF 2003 No Partial #*	*SSBF 2003 Winsorized*	*SSBF 2003 Winsorized*	*SSBF 2003 50%+ Shares*
	LR1	*LR1*	*LR2*	*LR1*	*LR1*	*LR1*	*LR1*	*LR1*	*LR1*
DIV	0.830		1.117	0.833	0.783	0.834	0.743		0.862
	(13.84)***		(15.61)***	(13.72)***	(8.76)***	(13.85)***	(11.62)***		(10.48)***
DIV2		0.425						0.438	
		(12.44)***						(12.49)***	
SIZE	-0.065	-0.092	-0.082	-0.062	-0.041	-0.063	-0.098	-0.118	-0.079
	(3.60)***	(5.56)***	(3.65)***	(3.54)***	(1.80)*	(3.50)***	(5.24)***	(6.85)***	(3.27)***
Growth Options	0.032	0.034	0.114			0.020	0.034	0.036	0.047
(Employment)	(0.79)	(0.82)	(2.01)**			(0.50)	(0.80)	(0.86)	(0.90)
Growth Options				-0.023					
(Sales)				(0.68)					
Profitability	-0.036	-0.036	-0.043	-0.036	0.082	-0.040	-0.004	-0.004	-0.043
	(2.39)**	(2.45)**	(2.59)**	(2.36)**	(1.59)	(2.64)***	(0.23)	(0.30)	(1.85)*

Table 4 (continued)

Tangible Assets	0.114	0.085	0.141	0.109	0.326	0.131	0.108	0.082	0.200
	(1.53)	(1.13)	(1.37)	(1.47)	(2.62)***	(1.73)***	(1.28)	(0.97)	(1.82)**
Liquidity	-0.281	-0.313	-0.385	-0.281	-0.311	-0.274	-0.221	-0.253	-0.293
	(2.80)***	(3.11)***	(3.19)***	(2.80)***	(1.18)	(2.68)***	(1.92)*	(2.20)**	(2.42)**
Number of FSP.	0.044	0.054	0.062	0.046	0.084	0.042	0.055	0.063	0.034
	(5.31)***	(6.48)***	(5.80)***	(5.39)***	(1.96)**	(5.32)***	(5.74)***	(6.59)***	(3.36)***
Firm Age	-0.048	-0.063	-0.062	-0.051	-0.053	-0.062	-0.076	-0.087	-0.018
	(2.05)**	(2.64)***	(1.98)**	(2.16)**	(1.38)	(2.42)**	(2.34)**	(2.69)***	(0.54)
Experience	0.031	0.066	0.050	0.027	0.004	0.033	0.085	0.110	0.043
	(0.80)	(1.73)*	(0.94)	(0.70)	(1.31)	(0.84)	(1.90)*	(2.49)**	(0.86)
Gender	-0.025	-0.037	-0.041	-0.024	-0.012	-0.026	-0.070	-0.077	0.017
	(0.47)	(0.69)	(0.64)	(0.46)	(0.14)	(0.49)	(1.24)	(1.36)	(0.24)
Founder	-0.083	-0.078	-0.093	-0.076	-0.103	-0.080	-0.109	-0.104	-0.181
	(2.22)**	(2.09)**	(2.12)**	(2.09)**	(1.43)	(2.14)**	(2.64)***	(2.52)**	(3.20)***
Owner bankrupt	-0.357	-0.373	-0.614	-0.361	-0.913	-0.366	-0.502	-0.505	-0.277
	(1.70)*	(1.70)*	(2.73)***	(1.73)*	(0.88)	(1.73)*	(2.23)**	(2.21)**	(1.03)
Firm Bankrupt	0.237	0.244	0.328	0.228	dropped	0.246	0.056	0.067	0.395
	(0.76)	(0.77)	(0.99)	(0.73)	dropped	(0.78)	(0.19)	(0.22)	(0.85)
Constant	0.643	1.279	0.833	0.637	0.315	0.657	1.060	1.538	0.787
	(2.58)***	(5.75)***	(2.63)***	(2.57)***	(0.93)	(2.58)***	(4.07)***	(6.76)***	(2.41)**
Observations	2091	2091	2091	2091	1319	2055	2233	2233	1284
R-squared	0.11	0.10	0.12	0.11	0.08	0.11	0.109	0.106	0.12

* Significant at 10%; ** significant at 5%; *** significant at 1%. Robust t statistics are in parentheses.

We examine the Variance Inflation Factor (VIF) and tolerances (1/VIF) values of regression 1.[20] The VIF values ranges from 2.46 to 1.01, significantly lower than the critical value of 5.[21] Therefore, it is fair to claim that standard errors are not overestimated in regression 1 and mutlicollinearity is not affecting the estimation of regression 1.

It is arguable that *DIV* might be endogenous. We run a Hausman test by using entrepreneurs' education as an instrumental variable[22]. Our argument is that education is correlated with leverage only through wealth allocations. It is likely that college educated entrepreneurs have higher incomes, accumulate more out-of-firm wealth before they become self-employed, and keep their portfolios more diversified than others[23]. Our test result shows that education is not related to leverage other than through *DIV*[24]. This result suggests that endogeneity does not bias the regression result significantly. OLS (or WLS) is a more efficient approach than the Two-State-Least-Square approach.

Column 2 presents the estimation result of regression 1 using *DIV2*, the alternative measure of wealth allocation. We compute *DIV2* by deducting the total amount of loans that entrepreneurs obtain by using out-of-firm assets as loan collateral, personal guarantees, and co-signers from their out-of-firm wealth and then dividing the residual by entrepreneurs' total net worth. Column 2 shows that the coefficient of *DIV2* is positive and significant at better than the 1% level, which is consistent with our prediction that entrepreneurs who have more personal wealth allocated outside of their firms tend to use more debt financing. Using DIV2, we find that leverage increases by 0.425 percentage points as DIV2 increases by 1 percentage point. This result shows that the effect of wealth allocation on leverage is reduced after we adjust for personal guarantees and out-of-firm assets as collateral because entrepreneurs actually allocate more wealth to their firms than they seemingly do when we use *DIV*.

In column 3 we use the ratio of total liabilities to total assets as the alternative measure of leverage. The coefficient of *DIV* is positive and significant at better than the 1% level, which is consistent with our prediction and the result in column 1. The estimation results on the control variables are also generally consistent with the pecking order hypothesis.

In column 4 we present the result of regression 1 using the increase in sales dummy variable (*Growth Options Sales*) as an alternative proxy for growth options. The estimation results on *DIV* and most control variables are consistent with our predictions and those presented in column 1. However, the coefficient of *Growth Options Sales* itself is not statistically different from zero at better than 10% level. Column 5 shows the result of regression 1 on the *SSBF 1998* data. The coefficient of *DIV* is positive and significant at better than the 1% level. This result is consistent with our prediction.

C. Does Wealth Allocation Matter in Unlimited Liability Firms?

We argue that the wealth allocation of entrepreneurs in unlimited liability firms do not matter in determining their firm-level capital structure decisions because, without the limited liability protection, all creditors of the firms can claim entrepreneurs' out-of-firm assets.

We use the generalized dummy variable technique developed by Gujarati (1970 a, b) to examine whether DIV has a different effect on leverage in firms with limited liability than in firms with unlimited liability. We introduce two additional variables on the right-hand side of regression 1: a dummy variable that is equal to1 if firms are limited liability firms and 0 otherwise; and an interaction term that is the product of DIV and the dummy variable. The modified model is shown below:

$$Leverage_i = \alpha + \beta_1 * DIV_i + \beta_2 * LL_i + \beta_3 * Interaction_i + \gamma * CV_i + \varepsilon_i \quad (2)$$

where LL_i is the dummy variable and $Interaction_i$ is the interaction term of DIV_i and LL_i. Other variables are as defined in Tables 1 and 2. The null hypothesis of this model is that β_2 and β_3 are not statistically different from zero, which means the coefficients of DIV_i and the intercepts are the same across limited and unlimited liability firms. When LL_i is equal to 0, the intercept term is α and the coefficient of DIV_i is β_1. When LL_i is equal to 1, the intercept term is $\alpha + \beta_2$ and the coefficient of DIV_i is $\beta_1 + \beta_3$. If β_1 is not statistically significant, it means that $Leverage_i$ is not related to DIV_i when LL_i is equal to 0 (unlimited liability firms). This null hypothesis is consistent with the economic intuition that wealth allocation only affects entrepreneurs' willingness to use financial leverage in limited liability firms; entrepreneurs' wealth are 100% tied to their firms in unlimited liability firms and thus do not affect the financial leverage on the firm level.

We test regression 2 on the dataset that includes both limited and unlimited liability firms. In Table 5, column 1 presents the estimation result of regression 2 on the dataset that includes both limited and unlimited liability firms. The coefficient of *DIV* is not statistically different from zero, which suggests that wealth allocation does not affect financial leverage in unlimited liability firms (LL_i =0) as expected by economic intuition. However, the coefficient of the interaction term is positive and statistically significant at better than the 1% level, which indicates that financial leverage is positively related to wealth allocation for limited liability firms (LL_i =1). This result is consistent with our earlier result presented in Table 4. We also run regression 1 on a dataset that contains unlimited liability firms as a robustness check. Column 2 shows that the coefficient of *DIV* is not statistically different from zero, suggesting that wealth allocation does not matter in determining financial leverage of unlimited liability firms.

We show that different model specifications should apply to limited liability firms and unlimited liability firms. Because we are interested in the effect of wealth allocation on leverage in this paper, we focus on firms with limited liability.

VI. ROBUSTNESS CHECKS

A. Firm Report Partial Year Data

There are 85 firms in SSBF 2003 that report partial year numbers on the financial statement. By including them, our estimation result could be biased because these firms' operations can be seasonal. In column 6, we test regression 1 using the data set that excludes these firms. Some firms that report partial year numbers are unlimited

Table 5
Regression 2 (Test on unlimited liability firms)

Column 1 shows the estimation result of regression 2 by using the dataset of both limited and unlimited liability firms. The coefficient of *Interaction* is positive and significant, suggesting that wealth allocation only affects financial leverage in limited liability firms (*ll*=1). The coefficient of *DIV* is not statistically different from zero, suggesting that wealth allocation does not affect financial leverage in unlimited liability firms. Column 2 shows the estimation result of regression 1 by using a subset of data that only contains unlimited liability firms. The coefficient of *DIV* is not statistically different from zero, suggesting that wealth allocation does not affect financial leverage in unlimited liability firms. This is consistent with the result in column 1.

	1 Pooled LR1	2 Unlimited LR1
DIV	0.150	0.168
	(0.67)	(0.63)
LL	-0.415	
	(2.53)**	
Interaction	0.700	
	(3.33)***	
SIZE	-0.049	-0.034
	(3.27)***	(1.23)
Growth Options	0.008	-0.067
(Employment)	(0.22)	(0.84)
Profitability	-0.016	0.001
	(1.65)*	(0.07)
Tangible Assets	-0.013	-0.152
	(0.25)	(2.04)**
Liquidity	-0.220	-0.155
	(2.84)***	(1.29)
Number of FSP.	0.058	0.116
	(7.03)***	(5.07)***
Firm Age	-0.065	-0.086
	(2.74)***	(1.50)
Experience	-0.006	-0.062
	(0.18)	(0.98)
Gender	-0.089	-0.146
	(2.33)**	(2.71)***
Founder	-0.089	-0.102
	(2.64)***	(1.42)

Table 5 (continued)

Owner bankrupt	-0.215	-0.187
	(1.89)**	(1.85)*
Firm Bankrupt	0.352	0.492
	(1.46)	(1.41)
Constant	0.964	0.906
	(3.19)***	(1.88)*
Observations	3206	1115
R-squared	0.08	0.06

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

liability firms or overlap with the truncated outliers. Thus we obtain a sample of 2055 observations after we exclude the firms that report partial year numbers. Column 6 shows that the coefficient of DIV is positive and statistically significant at better than 1% level, which is consistent with our prediction and the result presented in column 1. Thus, these 85 firms that report partial year data do not bias our results. The coefficients of other independent variables are generally consistent with the result in column 1.

B. Winsorization

Another common method of dealing with the influence of outliers is to use winsorization, in which the most extreme tails of the distribution are replaced by the specific percentiles of the data. We winsorize *LR1, LR2, Profitability, Firm Size, ROA,* and *Liquidity* at 1 and 99 percentiles and present the estimation result of regression 1 in column 7 and column 8. Column 7 shows that the coefficient of DIV is positive and statistically significant at better than the 1% level, which is consistent with our prediction and the result presented in column 1. Column 8 shows that the coefficient of DIV2 is also positive and statistically significant at better than the 1% level. The magnitudes of these two coefficients are comparable to those when we use truncated data. The coefficients of other independent variables are generally consistent with those presented in column 1 except the coefficients on profitability and experience.

C. 50% or More Ownership

Although entrepreneurs in our sample are the largest shareholders of their firms, some of them do not own more than 50% of the total shares. In this case, it is possible that their wealth allocation do not affect the firm-level capital structure decisions because of the lack of dominant shareholdings. We test regression 1 on a group of entrepreneurs who own more than 50% of the shares. There are 1284 observations in this data set. Column 9 presents the estimation result of regression 1 using this subset of firms with dominant shareholders. The coefficient of DIV is positive and statistically significant at better than the 1% level, which is consistent with our prediction and the earlier estimation results. The coefficients of other independent variables are generally consistent with those presented in column 1 except those on tangible assets and owner bankruptcy dummy.

VII. POLICY IMPLICATION

Our research focuses on small privately owned firms that have limited liability, which is a significant portion of all small privately owned firms. In our nationally representative sample, limited liability firms account for more than 50% of all small privately owned firms. We do not intend to generalize our results to the population of small businesses. However, our results have important policy implications for incorporated small privately owned firms, which account for a significant portion of the overall economy. On the micro-level, we show that entrepreneurs in these firms adjust their firm-level capital structure according to their wealth allocation. It is important for lenders to understand this relation so that they can design products to meet entrepreneurs' financing needs and control lending risk.

On the macro-level, our findings are also meaningful in the following aspects. First, the Small Business Administration (SBA) currently helps small businesses in obtaining financing by offering loan guarantees. However, SBA requires that these SBA-backed loans must also be personally guaranteed by any person that owns 20% or more interest in the firm. If SBA-backed loans do not offer better interest rates than loans obtained directly from banks using personal guarantees, then personal guarantees merely shift wealth allocation from out-of-firm wealth to firm wealth, which discourages entrepreneurs' incentives to apply for loans. Thus we argue that the personal guarantee requirements of the SBA-backed loans are not necessarily helpful to entrepreneurs in privately held limited liability firms unless borrowers can obtain better interest rates by using SBA. Second, we show evidence that is consistent with the inference of the pecking-order theory in these firms where information asymmetry is more prevalent than in public corporations. It is important for policy-makers to understand that information asymmetry is an important factor that makes it more expensive and difficult for these firms to finance their projects. Our findings are consistent with the inference of the pecking order hypothesis that smaller and younger firms are adversely affected by the higher information asymmetry, which result in lower financial leverage. However, outside debt financing is extremely important for these very small and young privately-owned firms. One important policy implication is that lenders and policy makers could develop mechanisms to reduce the information asymmetry problem among small privately owned firms. For example, a universal small business database which keeps track of businesses' operational and financial information and business owners' demographic information might help in reducing the information asymmetry problem.

In our analysis, we also show that firms' leverage increases with the number of their financial service providers. This finding is important especially at the current time when policy makers seek to revive the economy from a deep recession. According to Girard (2009), since the financial crisis began in 2008, the U.S. government has spent enormous amounts of money on bailing out businesses that are "too big to fail". However, as a critical part of the overall economy, small businesses are also facing credit constraints in the crisis. They require the same attention as big businesses do. Our result suggests that small privately owned firms benefit from more competition among lenders, which could be meaningful for policy-makers when they design policies to revive the economy from the recession.

VIII. CONCLUSION

In this paper we examine the relationship between entrepreneurs' allocations of wealth and their firms' leverage levels. We find that entrepreneurs' wealth allocation, measured by the ratio of their out-of-firm wealth to their total wealth, is positively related to their firm-level financial leverage. Compared to the previous literature, we use a sample that is more representative of the population by including book insolvent firms. Moreover, we show that the positive relation between leverage and wealth allocation still exists after we adjust for the out-of-firm wealth collateral, personal guarantees, and cosigners. Our paper contributes to the literature by focusing on the effect of *DIV* on capital structure. We conclude that an entrepreneur's wealth allocation, which had been previously overlooked in the traditional capital-structure literature, plays an important role in determining firm-level capital structure.

It will be interesting if our analysis can be extended to publicly traded firms when data on CEOs' personal wealth becomes available. CEOs in publicly traded firms also have a significant portion of their personal wealth tied to their firms in the forms of stocks, stock options and restricted stocks. One can argue that CEOs' wealth allocation could affect their firm-level decision-makings in these publicly traded firms. May (1995) estimates the personal wealth of CEOs in public traded corporations by using their accumulated salaries and finds CEOs' wealth allocation affects their firm-level decisions, such as acquisition decisions. Future research on the relation between CEOs wealth allocations and firm-level capital structure by using observed personal wealth data are needed.

ENDNOTES

1. In this paper, principal owner refers to the largest shareholder of the firm.
2. Financial leverage is defined as the ratio of total debts to total assets in this paper.
3. The coefficient of profitability is the only one that has a different sign than implied by the trade-off hypothesis. Thus, they argue that profitability can also be a better proxy for growth options than the market-to-book ratio. In such a case, the negative coefficient captures the effect of growth options on leverage predicted by the trade-off hypothesis. An alternative explanation of their results is the sticky dividend policy. If profitable firms choose to keep the earnings and pay dividends later, then the leverage ratio can be lower because the equity is higher holding total debts constant.
4. Replication of Mueller's result is available upon request.
5. For example, in *SSBF 2003*, sample firms in the survey reported their financial standings in 2003. Interviews were carried out in 2004 and 2005.
6. Her sample size decreases from 2617 observations to 1406 observations when she excludes unlimited liability firms.
7. Sample firms in all *SSBF* data sets were selected from *Dun's Market Identifiers (DMI)* database, maintained by *Dun & Bradstreet Corporation (D&B)*. However, firms' identities in each *SSBF* remained confidential, and they were not necessarily selected in the other *SSBF* data sets. In 2008, the FED announced that it would not continue the *SSBF*.

8. A total of 85 firms reported partial year numbers on income statement data. In such a case, survey staff constructed a fiscal year adjustment factor, which is the ratio of 365 to the number of days the income statement covered, to adjust variables such as total sales, profit, etc. If firms reported partial year numbers, all amounts reported for the items on the income statement were adjusted to full-year equivalents by multiplying the income statement items to the adjustment factor. In a robustness check, we excluded these firms that reported partial year numbers. The results were consistent with the results when we included them.
9. If the principal owner of a sample firm was another firm, the computed wealth allocation variable only described the wealth allocation of the parent company rather than the wealth allocation of the decision-maker in the parent company.
10. In section V, we discuss the reason of excluding unlimited liability firms in more details.
11. Truncation of extreme values on this measure is at 5%.
12. We discuss the definition of these variables in the next section.
13. Winsorization sets outliers to a specified percentile of the data.
14. All tables are presented in Appendix I. In the original version of this paper, we include some additional control variables, such as firm or owner delinquencies, court judgment against firm or owner, owners' ethnic background and age, credit scores from D&B, whether firms pay corporate tax or not, and two-digit SIC codes, as a robustness check. Our main result remains unchanged that when we include these additional control variables. To save space, we do not report the estimation result with the above additional control variables. They are available upon request.
15. In the case of privately owned firms, market value of leverage is unavailable. Moreover, Graham and Harvey (2001) find that managers make the financial structure decisions based on book values rather than market values. Their survey also shows that CEOs state that they do not rebalance their firms' debt policy in response to the market equity price. This is likely to be even more profound for very small privately held firms.
16. We discuss the difference between unlimited liability firms and limited liability firms that use personal guarantees in section V.
17. The market-to-book ratio, which is the popular proxy for growth options, is not available because all of the sample firms are privately owned. Following Cole (2008), our measure of growth options is a dummy variable that is equal to 1 if firms' numbers of employees increase in 2003 and 0 otherwise. We also use a dummy variable that is equal to 1 if firms' sales increase in 2003 and 0 otherwise as an alternative measure for growth options.
18. Our measure for tangible assets is the sum of inventory and book value of land divided by total assets. We exclude building and equipment because SSBF 2003 does not differentiate them from intangible assets.
19. The intuition of using log transformation is that we expect one-year difference in entrepreneurs' experience to be more important to less experienced entrepreneurs than it to more experienced entrepreneurs.
20. VIF represents the inflation in the variance of the parameter due to collinearity. See Neter, Wasserman, and Kutner (1985).
21. We do not show the VIF values in this version of the paper to save space. However, these statistics are available upon request.

22. Mueller (2008) uses entrepreneurs' age and gender as instrumental variables for their wealth allocations. However, using her data, we find that age appears to be directly correlated with firm's leverage, suggesting that it might not be a good instrumental variable for *DIV*.
23. Goetzmann and Kumar (2008) show that the less-educated investors hold less-diversified portfolios. Thus we use a dummy variable that equals 1 if education level is a college degree or above and 0 otherwise.
24. The coefficient of education is not statistically different than zero when we include education in regression 1 but positive and significant at better than 5% levels when we regress leverage on education and other control variables. We obtain the fitted value and regress leverage on it and other control variables. The coefficient of the fitted value is not statistically different than zero. We do not report these statistics in this version of the paper due to the limited space. They are available upon request.

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