MODELING FINANCIAL ASSET DEMANDS OF SMALL AGRIBUSINESS FIRMS: A PORTFOLIO THEORY APPROACH[1]

by

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ABSTRACT

This study derives a demand model for small firm finances using a portfolio allocation theory. The assumption of the manager versus the firm as the primary financial decision-maker of small firm is tested. We employ empirical techniques that allow for indirect utility estimation in a discrete-continuous choice model.

Key words: Multinomial sample selectivity model, portfolio holdings, and capital structure

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Introduction

Small Businesses have been credited with spurring economic growth throughout the1990's. These businesses have represented 53% of the nation's private workforce, 99.7% of all employers, 55% of the innovations and 51% of private sector output. The agribusiness sector represents one of the few sectors in which the majority of firms can be categorized as small according to the definition of the Small Business Administration.

Financial decisions of small businesses are viewed as one of the primary determinants of the vitality of the firm. Alan Greenspan, the Federal Reserve board, major companies such as American Express and academic researchers have related concerns about the availability of financial credit for the small business given recent mergers and acquisition activity of banks. Research has shown that banks as well as other sources of finance should be readily available for the small business owner.

Our research shall examine the determinants of the demand for financial assets. By developing a model for small business demand for financial assets, we will be able to forecast the demand for financial instruments and thereby determine if the corresponding supply will be available.

Prior research on financial demand has used the three modern theories of determinants of capital structure (the asymmetric information theory, the tax theory and the contracting theory) to identify factors that influence firm decision-making. The firm is noted as the primary decision-maker with the objective to maximize profits. However, as noted by Osteryoung, Newman and Davis (1997), the primary decision making unit for the small business is an individual and the objective of the owner is to maximize his/her personal wealth. In this case, the owner will invest in his/her own business based upon personal risk preferences and characteristics. Given these assumptions, our study employs a portfolio theory framework.

In this study, we will test the hypothesis that the manager is the primary decision making by incorporating owner's personal characteristics into our model as well as the firm. We will identify the firm and manager characteristics that influence the demand for financial assets/liabilities. We use an empirical method that provides for estimation of conditional demand systems, thereby allowing comparative statics to be conducted. With the use of comparative statics, we can examine how changes in firm equity and manager characteristics influence the number and level of asset/liability holdings. The empirical method will also allow us to test the traditional assumptions of demand theory to ensure appropriate empirical regularities.

Literature Review

Financial literature attributes Modigliani and Miller (1958) as raising one of the most prevailing issues in corporate finance – what determines capital structure. Modigliani and Miller introduced the notion that capital structure does not influence firm value in a perfect capital market. It only a reflection of the trade-off between risk and return. Other subsequent studies (including one by Miller,1977) have empirically proven this notion to be too simplistic. Recent theories have demonstrated that firm value is affected by capital structure due to capital market imperfections such as tax asymmetries, information asymmetries and transaction costs (These theories are known as the asymmetric information theory, the tax theory and contracting theory[1]). The theories further suggest that these market imperfections lead to varying preferences among financing alternatives and holdings of firms (Emery and Finnerty, 1997).

The primary objective for firms in financial literature is to maximize shareholder's wealth. Economic theory adopts the profit maximization assumption as the primary objective in lieu of the fact that corporations behave as profit maximizers. Small business owners and entrepreneurs, however, face varying constraints than that of a large corporation. Due to the fact that firm liabilities are usually incurred personally by the owner/s of small firms, the risk preferences and socio-economic characteristics of the owner can influence the financial strategy of the firm. Gentry and Hubbard (2000) and Heaton and Lucas (2000) have documented that entrepreneurs include their business assets as a part of their personal portfolios when making household financial decisions.

Collins (1985), Barry and Baker (1984) and Robinson and Barry (1987) introduced the portfolio model as an alternative financial structure model that allows policy makers to examine how small agribusiness owners risk preferences impact the decision to hold debt versus equity. The model was developed in an expected utility framework in congruence with economic theory. In this paper we shall combine the underpinnings of the Barry – Collins model with that of traditional household portfolio models. We shall also follow the theoretical methodology suggested by prior studies for adapting the portfolio model to economic framework.

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[1] The asymmetric information hypothesis states that managers and insiders of a firm are better informed about the current and future prospects of the firm than outside investors. Capital markets are thus not able to operate efficiently by supplying the needed finances because of moral hazard problems. The differential tax hypothesis states that firms "organize" their debt and equity in a way to minimize taxes. The contracting hypothesis views the firm as a nexus of contracts among the stakeholders, management, creditors, suppliers and customers. Financing policies are determined in a way to minimize the total contracting costs and potential conflicts between these parties.

Portfolio Model

Using the approach of Dalal (1983) and Perraudin and Sorensen (2000), we start with the initial wealth vector (**A**) of the entrepreneur at the beginning of our one period model. This initial wealth is divided between a vector of risk free assets $(\mathbf{a}_{on})$ and risky assets $(\mathbf{a}_{1n})$ where $\mathbf{A} = \sum_{n=1}^{N} \mathbf{a}_{0n} + \sum_{n=1}^{N} \mathbf{a}_{1n}$.

We then define the vector of returns as $\boldsymbol{\theta}_{0n}$ where θ is equal to $1 + \mathbf{r}_{0n}$(n = 1,…N), the positive rate of return for the safe asset, and $\boldsymbol{\theta}_{1n}$ which is equal to the stochastic return of $1 + \mathbf{r}_{1n}$ (n = 1,…N) for risky assets. The vector of returns satisfy the conditions, $r_{0n} > 0$ and $r_{1n} \geq -1$. We depict the vector $\mathbf{r}_{1n}$ as $\mathbf{r}_{1n} = \bar{r}_{1n} + \beta_i \varepsilon_i$ where $Er = \bar{r}$, $E\varepsilon = 0$, and β_i is a shift parameter that is initially assumed to be 1. By adapting this notation, we can examine the effect of changes in the mean and changes in the mean preserving spread β or riskiness of the random returns. Final wealth is thus expressed as a linear equation:

$$Y = \sum_{n=1}^{N} \mathbf{a}_{0n}(\boldsymbol{\theta}_{0n}) + \sum_{n=1}^{N} \mathbf{a}_{1n}(\boldsymbol{\theta}_{1n}) \tag{1}$$

It is assumed that the business owner seeks to maximize his expected utility of final wealth, Y, where final wealth consists of the return on the portfolio holdings of the firm and personal financial assets held by the owner. This can be depicted as:

$$\max_{Y}\left[EU\left(\sum_{n=0}^{N} \mathbf{a}_n (1+r)\right)\right] \text{ subject to } Y = \sum_{n=1}^{N} \mathbf{a}_{0n}(\boldsymbol{\theta}_{0n}) + \sum_{n=1}^{N} \mathbf{a}_{1n}(\boldsymbol{\theta}_{1n}) \tag{2}$$

For the purposes of this study, we invoke the notion of weak separability from consumer demand theory and assume that the marginal rate of substitution for firm assets is independent of the level of holdings for personal assets.

The business owner thus possesses a twice differentiable utility function, $U(Y)$, that is strictly concave and increasing in Y, $(U'(Y)>0), U''(Y)<0$ so that he is risk averse. The first order conditions are:

$$\boldsymbol{\theta}_0 EU'(Y^*) = EU'(Y^*)(1+\bar{r}+\beta_i\varepsilon_i) = \lambda^* \quad (3)$$

where Y^* is the optimal level of random future wealth and λ^* is the Lagrange multiplier. The first order conditions are assumed as implicit functions of λ and the asset demands a^*_{nn}. Because the utility function U is strictly concave and equation (1) is linear in all of its arguments, it can be implied that expected utility, EU, is also strictly concave. The second order conditions are thus met and the asset demand equations can be expressed as functions of its parameters.

Continuing with Perraudin and Sorensen, we invoke the implicit function theorem to obtain the optimal demands for our financial assets a^*_{nn}. The optimal levels of wealth, $Y^* = \sum_{n=0}^{N} a^*_{nn}$, are then placed into the objective function $EU(.)$ to derive the indirect utility function $V = V(Y^*, \theta^*_{nn})$. We then invoke the envelope theorem to obtain:

$$\frac{\partial V}{\partial \theta_{nn}} = E\{U'(Y^*)\theta^*_{nn}\}\frac{\mathbf{a}_{nn}}{\theta_{nn}} \quad \text{and} \quad \frac{\partial V}{\partial Y} = E\{U'(Y^*)\theta^*_{nn}\} = \lambda^* \quad (4)$$

These equations can be combined to obtain a relation analogous to Roy's identity:

$$\frac{\partial V/\partial\theta_{nn}}{\partial V/\partial Y} = \frac{\mathbf{a}_{nn}}{\boldsymbol{\theta}_{nn}} \quad n = 1,\ldots,N. \quad (5)$$

We can thereby obtain the optimal asset demands a^*_{nn} from the Indirect Utility Function.

Empirical Implications

To apply our theoretical model, we must consider the notion of incomplete portfolio holdings. Berger and Udell (1998) note that the majority of small businesses do not disclose their financial statements. This information opaqueness constrains the owner to private forms of debt and equity. Furthermore, small corporate firms may have access to public sources of debt and equity but transaction and fixed costs associated with issuance may prohibit the owner from holding these types of instruments within their portfolio. These corporate business owners along with owners of private firms that financially qualify for IPO's may also exert preferences towards maintained self/family control of the business. These factors can explain zero holdings of certain financial assets.

Zero holdings can have a spillover effect on the demand for the remaining assets and liabilities and thus increase the probability of the owner holding a particular financial portfolio or capital structure. This introduces the potential problem of sample-selectivity bias. Sample selection bias is generally corrected by regarding the portfolio decision into a two-step decision-making process. A discrete choice model is used to depict the decision of whether or not to hold a particular financial asset/liability. The second decision regarding the level of assets to hold is modeled by a continuous equation.

In Holmes and Park (2000), we follow the conceptual model of King and Leape (1998) to estimate asset demand equations for categories of financial assets/liabilities while comparing the Heckman's two step limited likelihood method (LIML) and the Two-Part model as alternative method for correcting the potential sample selection bias.

The results of the Heckman model did not detect a bias in the data and yielded statistically insignificant estimates. The Two-part model or OLS outperformed the Heckman model by yielding estimates that could explain the cross-sectional variation in the data.

Kennedy (1998) states that under certain conditions, the Heckman procedure does not perform well.[2] Leung and Yu (2000) support this by comparing the Two-part model with the Heckman sample selection model via monte carlo simulations. The Two-part model outperformed the sample selection model even when the sample selection model was the true model. This was attributed to the supposition that LIML estimators are poor estimators when high degree of censoring is present; that is when the proportion of uncensored observations is smaller than the proportion of censored observations. Furthermore, Manski (1989) notes that the Heckman method is sensitive to misspecification especially when the regressands used in the choice equation are kept in the level equation. Both of these conditions were present in our prior study.

In this study, we develop different portfolio combinations as indicated by Perraudin and Sorensen. A random utility model is employed where the owner/manager compares his maximum utility level per portfolio and selects the alternative that yields the greatest utility. We deviate econometrically from the suggested Dubin-McFadden approach for correction of sample selection and use that of Lee (1983).

Lee's two-stage method starts with the estimation of the multinomial logit. The model's underlying implications are based on expected utility framework. Each owner

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[2] Kennedy cites empirical studies proving that the Heckman procedure performs poorly when the errors are not distributed normally, the sample size is small, the amount of censoring is small, the correlation between the errors of regression and selection equations is small, and the degree of collinearity between the explanatory variables in the regression and selection equations is high.

must select between four mutually exclusive alternatives of portfolio holdings. We define the value function for each alternative as V_k^m for firm k when it holds portfolio m where m consists of the regime $m = port_n \;\; n = 1...4$ (see Table 1a). Again, following Perraudin and Sorensen, the indirect utility function is expressed as:

$$V_k = \max\{V_k^{port1}, V_k^{port2}, V_k^{port3}, V_k^{port4}\} \tag{9}$$

where $V_k^m \equiv V_k^m(\boldsymbol{\theta}, Y, \mathbf{S}, \mathbf{Z})$ or the level of utility depends on final wealth, Y, a vector of personal characteristics of the owner, $\mathbf{S}$ and demographic and strategy characteristics of the firm, $\mathbf{Z}$. The equation for estimation can be decomposed into 2 components:

$$V_k^m = \gamma_k^m + \mu_k^m \quad k = 1,....,N \tag{10}$$

where γ_k^m is non-stochastic and is a function of observed variables in vectors $Y, S,$ and Z. μ_k^m is the stochastic error term and is a function of unobserved variables.

We normalize the unidentified parameters and depict the demand functions for each portfolio regime as:

$$\Phi_{tk}^m = \alpha_{tk}^m + X_i^{'}\beta^m\left(Y_i + y_0^m\right)^\rho + w_{ty}^m Y_i \tag{11}$$

where t represents our aggregated assets and liabilities and m represents the portfolio combinations as listed in Table 1a. Since our data is cross-sectional, there is no variation in returns, therefore w^m are considered as fixed parameters for estimation.

The probability that portfolio m is selected by firm k is given by

$$\Pr \; \{V_k^m > V_k^j \;\; \text{for all} \;\; m \neq j \;\}, \;\; \text{or}$$

$$\Pr \; \{\gamma_k^m - \gamma_k^j \geq \mu_k^j - \mu_k^m \;\; \text{for all} \;\; m \neq j \;\} \tag{12}$$

This states that the probability that an individual will choose to hold a particular portfolio is represented by the probability that the utility of that portfolio is greater than the maximum utility of the remaining portfolios. By stated that the choices are mutually excusive, we can assume that the error terms, μ^m are iid and $E(\mu|X,S,Z)=0$. The difference between the error terms $\left(\mu_k^j-\mu_k^m\right)$ is assumed to have Weibull or Type I extreme value distributions, thus yielding a strict utility model that can be considered as multinomial logit. The drawback of the multinomial logit is its restriction on allowing some portfolios to be closer substitutes compared to others and its assumption of iid. An alternative model would be the multinomial probit. In the past, this model has was not used due to computational burdens. Wu and Babock (1998) noted that recent methods developed by Greene (1998) and Dorfman (1996) ease the computational burdens; but have not included correction for potential sample-selectivity.

Lee demonstrates that the error term, μ_k^j in equation (10) is

$$E(\mu_m|\ I=s\ )=-\rho_m\sigma_m\ \frac{\phi\left[\Theta^{-1}(P_k)\right]}{P_k} \tag{13}$$

where $\sigma_k=\mathrm{var}(v_k)$, ρ_k is the correlation coefficient between v_k and the transformation e_k, $\varphi(\cdot)$ represents the p.d.f. of the standard normal distribution, and $\Theta^{-1}(\cdot)$ is the inverse of the standard normal distribution function. The bias is corrected by calculating a term $\hat{\psi}\equiv\ \theta\left[\Theta^{-1}\left(\hat{P}_k\right)\right]/\hat{P}_k$, $k=1,....,N$ in the multinomial logit model. OLS is then used in the second step using the aforementioned term:

$$V_k^m\ =\gamma_k^m+\mu_k^m-\eta\hat{\psi}+\xi_k \qquad k=1,....,N \tag{14}$$

where $E(\xi_k) = 0$. Selectivity is present if $\eta_s = 0$. The coefficients are therefore unbiased, however, the variances must be corrected for heteroscedasticity.

The coefficients are therefore unbiased, however, the variances must be corrected for heteroscedasticity. The variances are corrected using an asymptotic covariance matrix as designated by Greene in the LIMDEP program:

$$(\mathbf{H}_k'\mathbf{H}_k)^{-1} \left[\sigma_k^{\ 2}\mathbf{H}_k'\left(\mathbf{I} - \rho_k^{\ 2}\Delta_k\right)\mathbf{H}_j + \theta_k^{\ 2}\mathbf{Q}_k\Sigma\mathbf{Q}_k'\right] (\mathbf{H}_k'\mathbf{H}_k)^{-1} \tag{15}$$

where $\mathbf{H}_k$ is a $N_k x(S_1 + 1)$ matrix of regressors used in (14) that includes the $\hat{\psi}$, $\mathbf{I}$ is the identity matrix, Δ_k represents a diagonal matrix using $\hat{\delta} = \left[\hat{\psi}_{ki}^2 + \Phi^{-1}(P_{ki})\hat{\psi}_{ki}\right]$ on the diagonal of the ith row, $\mathbf{F}_k$ represents a matrix of the vectors $\mathbf{H}_k'\mathbf{Q}_k$ where $\mathbf{Q}_k$ is a vector of derivatives of $(\psi_{ji},...,\psi_{kN_k})$ with respect to $\alpha = (\alpha_1...,\alpha_m)$ and N_k is the number of estimating equations k in (14). Consistent estimates of σ_k^2 are obtained with the following:

$$\hat{\sigma}_k^2 = \frac{\varepsilon_k^{'}\varepsilon}{N_k} + \eta_k^2\left[\frac{1}{N_k}\sum_{i=1}^{N_k}\hat{\delta}_{ki}\right] \tag{16}$$

$\hat{\rho}$ can now be estimated using the value for $\hat{\sigma}_k$ as follows:

$$\hat{\rho} = \frac{\hat{\eta}_k}{\hat{\sigma}_k} \tag{17}$$

Data Description and Variable Specification

The data we use are taken from the 1993 National Survey of Small Business Finances. The survey was selected because it provided comprehensive cross-sectional data regarding the types of financial products used by small firms. The database also includes demographic information of the owners and characteristics of the small firms that would aid in determining portfolio decisions.

The survey was conducted during 1994-1995 on behalf of the Board of Governors and the US Small Business Administration (SBA). Information was collected via questionnaires and telephone interviews with non-farm, non-financial, and for-profit firms. The sample of 4,637 firms are representative of 4.99 million small U.S. businesses listed in 1993 on the Dun's Market Identifier file. Financial information includes balance sheet and income data for the 1992 fiscal year with an inventory of financial assets and liabilities including savings account, credit lines, credit cards, capital leases, equipment loans and other selected financial products. Information regarding the suppliers of the financial services such as banks and individuals was also reported along with the credit history and 3 year accounts of applications for credit by each firm.

We selected businesses within the SIC Codes satisfying the classification of an agribusiness firm. This yielded a sample of 848 or 18% of firms within the original sample. For the preliminary results presented in this paper, we use all 4,637 observations. The assets and liabilities are divided into the following 12 categories: cash, current checking account balance, current savings account balance, credit card balance, line of credit, leases, mortgage loans, vehicle loans, equipment loans, regular loans, other loans and equity. We further aggregated the assets and liabilities into 4 different categories according to the level of riskiness in order to measure the effect of owner's risk preferences for the holdings.

Definitions and descriptive statistics for all variables used in our study are presented in Table 1a and 1b. The aggregate categories are: near cash (NRCASH) which consisted of assets that were liquid, secured debt (DEBTC) which consists of debts secured by business or personal collateral or guarantees, unsecured debt (UNSECDT) which consists of loans without collateral and equity (EQUITY). We evaluate the impact of various portfolio combinations on these categories of assets. Portfolio combinations are also presented in Table 1a.

We chose our independent variables according to the literature regarding determinants of capital structure and portfolio decisions. Both firm and owner characteristics are included. Our ultimate objective is to estimate demand equations for these four aggregate assets/liabilities, which will be later included. In the next section, we start by discussing the variables that potentially influence portfolio choice. We then present the marginal effects of our independent variables on portfolio choice.

Results and Discussion

Factors influencing Portfolio Choice

Uhler and Cragg (1971) and Brennan (1975) document that transaction costs and other factors can have an influence portfolio choice as well as the level of holdings. Firm owners may seek to reduce risk by diversification amongst an increased number of assets. Furthermore, it is noted that different factors can influence the choice versus level decisions (Using different independent variables also alleviate the aforementioned empirical complications.)

Table Ib presents the independent variables used in both the level and choice equations. Marginal probabilities are presented in Table 2. Berger and Udell show that younger firms require use more liquid assets and equity due to the moral hazard and adverse selection problems as hypothesized by asymmetric theory. Younger firms do not have business collateral to offer banks for debt or an assured credit history with their lenders, thereby limiting the access to debt. Cavalluzzo and Cavalluzzo(1998), Brewer et al (1996) and Peterson and Rajan (1994) also provide empirical evidence that younger firms use more non-debt versus debt financing. Our results show that the marginal effect of firm age on portfolio combinations consisting mostly of debt (P=1) is – 0.0429; thus older firms have a lower probability of using debt. This seemingly inconsistency can be due to a number of reasons. Avery et al (1998), using the 1993 NSSBF survey, found that the probability of using debt increases between the third through fifth year and then declines. This could not be captured using the linear variable FIRMAGE. Another explanation is offered by the pecking order hypothesis of Myers (1984). This hypothesis states that firms prefer to first finance projects with internally available funds, such as retained earnings, followed by debt and finally external equity. Because a positive relationship exists between profits of firms and years in business, older firms tend to hold more equity than debt thereby supporting the evidence that firm owners are less likely to hold debt. Small business owners seeking to sustain control over the firm may also chose to hold more equity versus debt (Wiwattanakantang, 1999).

The variable ORG represents organization structure serves as a proxy for tax structure. The tax hypothesis states that corporations will increase the amount of leverage or debt due to the deductibility of interest expense (DeAngelo and Masulis, 1980). It is therefore expected ORG1 and ORG2, representing proprietorships and partnerships respectively, will have significant negative probabilities. The variable ORG3, representing the S-corporation, will have a significant positive marginal probability. Our results support this hypothesis with a significant negative probability of –0.0429 for ORG1 and –0.0531 marginal probability for ORG2 with portfolio combinations P=1. Results for portfolio combinations of both debt and equity (P=2) were mixed. Though ORG2 maintained a significant negative probability (-0.0691), ORG3 was also significantly negative at the 10% level with a marginal probability of –0.0307.

Cavalluzzo, Cavalluzzo and Wolken (1999) Berger and Udell, and Avery et al find that the demand for debt is sensitive to size. These studies, however, measured size according to dollar amount of assets. Avery et al also used the number of employees as an alternative measure for size. They find that firms are more likely to use collateralized debt as firm size increases according to the number of sales but are less likely to use debt as employee size increases. Our results show that the marginal probability of a small firm owner holding portfolios with just liquid assets and equity (P=0) is positively related to firm size (0.0325). Avery states that industry affects can better explain the variations in debt levels among small firms.

We thus develop a measure of the diversity of the size distribution of small businesses for different industry groups. The diversity measure is defined as the index of qualitative variation and is based on the proportions of firms that are classified in each size category listed in the NSSBF. The diversity index D is defined as

$$D = 1 - \sum_{i=1}^{k} p_i^2 \tag{18}$$

where p_i represents the proportion of firms in the i^{th} size category. Agresti and Agresti (1978) note that the index measures the probability that two or more firms selected at random from the population of small businesses would be in different size categories.

If all firms in a given industry appear in the same size category, then $p_i = 1$ and the minimum possible value of D is zero. The most diverse size distribution occurs when firms are evenly allocated across the k categories so that D = (k-1)/k.

The NSSBF classifies small businesses into six size categories based on number of employees. We use six industry groups from the Standard Industrial Classification and examine the D measure of size diversity for each industry group.

The diversity measure reveals that the size distribution of small businesses is related to the type of industry in which the firm operates. The D measures are lowest for the construction, services, and Finance, Insurance, and Real Estate groups (FIRE) indicating that small businesses are less diverse in the firm size. The manufacturing and transportation, communication, and utilities (TCU) industries support the most diverse size distribution of firms.

Our results indicate that industry affects has the strongest positive significant impact on the probability of holding portfolios that contain debt and equity (0.1776). Our findings are consistent with the findings of Leeth and Scott (1989), Cavalluzzo and Cavalluzzo and Avery et al. Our findings furthermore offer insight into Dhawan (2001) examination of the higher profit rates that exist among smaller firms. Smaller firms in capital intensive industries are able survive the increase in business risk due to their portfolio holdings with lesser financial risk (P=0 consists of portfolio combinations with only equity and liquid assets).

Total capital (CAPITAL) was found to be significant in 3 of the four portfolio combinations. These results will be discussed along with our demand equation estimates.

Summary and Conclusions

Our study demonstrates that portfolio theory can be used as an alternative method for explaining financial structure of small firms. Our results are consistent with the stylized facts of capital structure while implementing the practicality of the portfolio method. We also show that portfolio theory withholds the necessary assumptions needed to estimate demand equations consistent with economic theory. The findings of this study can be used to assist small agribusiness owners with financial decision making.

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Table 1a. Variable Descriptions

Variables[a]	Description	MEAN	STD	Choice Equation	Level Equation
Dependent Variables					
PORT1[c]	Portfolio combination consisting of Near cash assets (binary: 1 = yes, 0 = no)	4.33		X	
PORT12	Portfolio combination consisting of near cash assets and unsecured debt (binary: 1 = yes, 0 = no)	4.76		X	
PORT13	Portfolio combination consisting of near cash assets and secured debt. (binary: 1=yes, 0=no)	1.50		X	
PORT14	Portfolio combination consisting of near Cash and equity. (binary: 1=yes, 0=no)	24.06		X	
PORT123	Portfolio combination consisting of near cash assets, unsecured debt and secured debt. (binary: 1 = yes, 0 = no)	4.33		X	
PORT124	Portfolio combination consisting of near Cash assets, unsecured debt and equity. (binary: 1=yes, 0=no)	27.38		X	
PORT134	Portfolio combination consisting of near Cash assets, secured debt and equity. (binary: 1=yes, 0=no)	9.62		X	
PORT1234	Portfolio combination consisting of near cash assets, unsecured debt, secured debt and equity. (binary: 1 = yes, 0 = no)	23.59			X
NRCASH[b]	Includes cash, checking account balance and savings Account balance. (in 000's)	253.64	746.78		
UNSECDT	Includes credit card balance, lines of credit, loans and other loans (in 000's).	399.81	2626.22		X X
DEBTC	Collateralized debt such as lease, mortgage loans, vehicle and equipment loans (000's).	188.12	1365.96		X
EQUITY	Equity (Total assets minus total debt in 000's)	722.24	3049.11		X

[a]N = 4637 [b]Dollar amount for each category. [c]Percentage for each category.

Table 1b. Variable Descriptions

Variables[ab]	Description	MEAN[a]	STD	Choice Equation	Level Equation
Independent Variables					
Firm characteristics					
ORG[c]	Proxy variable for tax structure			X	X
	ORG1 = Proprietorship	32.17			
	ORG2 = Partnership	7.26			
	ORG3 = S-Corporation	24.23			
	ORG4 = C-Corporation	36.83			
FIRMAGE	age of the firm (yrs)	15.31	13.61	X	X
SICSTRUC	Variable representing industry risk (2 digit)*	D measure	Number	X	X
	Minerals	0.61	25		
	Construction	0.42	526		
	Manufacturing	0.72	579		
	TCU	0.68	181		
	Wholesale	0.57	437		
	Retail	0.56	1004		
	FIRE	0.48	315		
	Services	0.44	1569		
CAPITAL	Capital of the firm calculated as |Debt| + Equity	1309.03	4437.51	X	X
SIZE	Firms under 2 employees (1=yes, 0=no)	64.50		X	X
Owner's characteristics					
EDUC[c]	Categorical Variable for amount of education				X
	EDUC1 = 8th grade or less	0.02			
	EDUC2 = 8th grade to 11th grade	0.02			
	EDUC3 = HS graduate or equivalent	0.20			
	EDUC4 = Technical/some college	0.24			
	EDUC5 = Graduate of 4yr college	0.31			
	EDUC6 = Post graduate (MBA, MD, etc.)	0.21			
AGE	Age of owner (in years)	50.17	11.35		X
RACE[c]	Categorical variable for race of owner				X
	RACE1 = Non-minority/Caucasian	9.53			
	RACE2 = Minority/African-American	6.64			
	RACE3 = Minority/Hispanic	6.53			

[a]N = 4637 [b]Dollar amount for each category [c]Percentage for each category [*]See data description for detailed explanation.

Table 2. Marginal Probabilities for Portfolio Combinations

Variable	P=0	P=1	P=2	P=3
Constant	-0.0969*	0.0214	0.1801*	-0.6187**
	(0.0382)	(0.0261)	(0.0425)	(0.0372)
FIRMAGE	$0.1270 \times 10^{-2*}$	0.1950×10^{-2}*	0.1938×10^{-3}	0.4856×10^{-3}
	(0.4897×10^{-3})	(0.4344×10^{-3})	(0.5485×10^{-3})	(0.4719×10^{-3})
ORG1	0.0300**	-0.0429*	-0.2103×10^{-2}	0.1493
	(0.0172)	(0.0117)	(0.0189)	(0.0169)
ORG2	0.0788*	-0.0531*	-0.6914*	0.0433**
	(0.0262)	(0.0206)	(0.0305)	(0.0253)
ORG3	0.0115	0.1232×10^{-2}	-0.0307**	0.0179
	(0.0175)	(0.0111)	(0.0191)	(0.0169)
SIZE	0.0325*	-0.9830×10^{-2}	0.1875×10^{-2}	-0.0246***
	(0.0159)	0.0105	0.0173	(0.0154)
CAPITAL	$-0.3306 \times 10^{-4*}$	-0.8983×10^{-6}	0.1859×10^{-4}*	0.1556×10^{-4}*
	(0.4381×10^{-5})	(0.2082×10^{-5})	(0.2802×10^{-5})	(0.1961×10^{-5})
SIZESTRUC	0.1776*	0.0510	0.1286**	0.2004×10^{-2}
	(0.0667)	(0.0462)	(0.0743)	(0.0654)
N^{++}	1328 (569)	493 (0)	1718 (4044)	1094 (10)

Note: * Indicates statistical significance at the 5% level. ** Indicates statistical significance at the 10% level. ***Indicates statistical significance at the 15% level. ++Indicates number of actual outcomes, predicted outcomes in parenthesis.

Portfolios

0 - represents liquid and equity portfolio combinations.
1 - represents liquid and debt portfolio combinations.
2 - represents debt and equity portfolio combinations.
3 - represents liquid, debt and equity holdings.