

Simultaneous Determination of Insider Ownership and Leverage: The Case of Small Businesses

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Abstract: Using two nationally representative data sets in 1998 and 2003, the paper employs Two Stage Least Squares (2SLS) (in a simultaneous equation framework) to determine the relationship between two policy choice variables (debt and insider ownership) for privately held firms. We find a significant negative relation between debt and insider ownership with the causality in both directions. We attribute this two-way inverse relation between debt and insider ownership to the fact that they are substitute devices aimed at mitigating agency costs. Our result is consistent with that documented for public companies by Jensen, Solberg, and Zorn (1992), and Chen and Steiner (1999). In addition, the study documents an inverse relation between debt and profitability, a direct relation between investment activities and debt, and that large firms tend to have low percentage of insider ownership.

Key words: debt, insider ownership, policy choice variables, privately held firms/companies

JEL classification: G30, G32.

1.0 Introduction

The Jensen and Meckling (1976) “theory of the firm” analysis suggests that the percentage of equity owned by corporate insiders affect a firm’s financial policies. Lending support to this assertion, Leland and Pyle (1977) document that the types and amounts of securities a firm issue are related to the proportion of owners’ equity. In this regard, most corporate finance texts underscore the importance of a firm’s financial policy choices (insider ownership, debt, and dividend) to the value maximization goal of financial management. Considering the implications these policy choice variables have on the success of a firm,

extensive research on their determinants has been done for public companies.¹ In contrast very little has been done on privately held firms.

According to the U.S. Small Business Administration (SBA), privately held firms create a little over half of all private sector jobs, account for more than half of the total of non-farm private gross domestic product (GDP), and are responsible for nearly two-thirds of net job growth between 1993 and 2008.² Despite the critical role small businesses play in the U.S. economy, studies on the relationships among these important policy choice variables (debt, insider ownership, and dividend) are nonexistent. Therefore, this paper tries to fill this void.

As noted in Jensen, Solberg, and Zorn (1992), most studies on these policy choice variables assume insider ownership determines the level of debt in a firm's capital structure. For example, Kim and Sorensen (1986) find that higher insider ownership firms have higher debt ratios. However, there is a possibility of the causality going the other way – from debt to insider ownership. This is evident in Jensen and Meckling (1976), who contend that the use of debt capital reduces the need for outside equity capital and thus increases the percentage of insider ownership. Contrary to this positive relationship between debt and insider ownership, Chen and Steiner (1999) argue that the risk of bankruptcy increases with excessive use of debt and accordingly reduces managerial ownership. Echoing this negative relationship between debt and insider ownership is Jensen et al. (1992). Both Jensen et al. (1992), and Chen and Steiner (1999) employ a simultaneous equation approach since in their view insider ownership and debt are both endogenous variables. However, Kim and Sorensen (1986) utilize single equation estimation in their analysis. The different estimation techniques may help explain the difference in their findings on these policy choice variables.

Utilizing two nationally representative data sets comprising 2,554 firms in 2003 and 1,961 firms in 1998, we follow a methodology similar to that of Jensen et al. (1992) and apply a two stage least squares estimation technique to a system of equations involving one equation for each of the policy choice variables, debt and insider ownership. In addition, we include control variables thought to be determinants of debt and insider ownership.

We find a significant negative relationship (with the causality going both ways) between debt and insider ownership for both sets of data. An explanation of this two-way inverse relation between debt and insider ownership is that they serve as substitute mechanisms aimed at minimizing agency costs. This result is consistent with that of Jensen et al. (1992) and Chen and Steiner (1999), but it is inconsistent with that of Kim and Sorensen (1986). Our study also reveals an inverse relation between profitability and debt, and a direct relation between investment activities and debt. Further, our results indicate that large firms tend to have a low percentage of insider ownership and that the higher the risk inherent in a firm, the higher the insider ownership.

This study contributes to the literature by documenting the relationship between debt and insider ownership (which are important policy choice variables to the well-being of the firm)³ for private companies. Our result on privately held firms also adds support to the existing findings on public companies for these policy variables.

¹ See for example Jensen, Solberg, and Zorn (1992), and Chen and Steiner (1999).

² See <http://www.sba.gov/advocacy/7495>.

³ Jensen et al. (1992) note that firms can reduce cost arising from misalignment of incentives and asymmetric information by optimizing jointly over debt and insider ownership policies.

The rest of the paper proceeds as follows: Section 2 discusses the testable hypotheses and a review on the determinants of the policy choice variables in question, Section 3 describes data and methodology, Section 4 presents results, and section 5 concludes the study.

2.0 Hypotheses and Determinants of Debt and Insider Ownership

2.1 *Relationship between Insider Ownership and Debt Policies*

Signaling and agency theories suggest that a firm's debt and insider ownership levels are not only related to specific firm attributes, but are also related directly to each other.⁴ Several studies argue that debt can be used as a pre-commitment tool for mitigating agency costs (Grossman and Hart (1982); Jensen (1986); and Stulz (1988)). In addition, the Jensen and Meckling (1976) "Theory of the Firm" paper suggests that higher managerial ownership reduces agency costs. Therefore, debt and insider ownership can be thought of as substitute mechanisms aimed at mitigating the effects of agency costs. If debt and insider ownership serve as substitute mechanisms geared at reducing agency costs, then lower levels of debt should lead to higher levels of insider ownership, and vice versa. This brings us to our first hypothesis:

Hypothesis 1: Since debt and insider ownership are substitute devices aimed at minimizing the effects of agency costs, we predict that for privately held firms, lower levels of debt lead to higher insider ownership and vice versa. In other words, there is a two-way negative relationship between insider ownership and debt.

2.2 *Debt Policy*

We consider three determinants of debt policy: profitability, risk, and investment. Myers and Majluf (1984) document in their pecking order theory of capital structure that firms prefer the use of internally generated sources of funds to external sources like debt and equity. An implication of this assertion is that more profitable firms will reduce their amount of debt since internally generated funds will be available to finance their investment projects. In view of this, our second hypothesis becomes:

Hypothesis 2: For privately held companies there exists a negative relation between profitability and debt.

A firm's ability to obtain credit depends in part on the level of its credit risk. Higher credit risk firms find it harder to obtain credit than lower credit risk firms. As a result, high risk firms should have low levels of debt. Supporting this line of reasoning, Jensen et al. (1992) argue that high business risk firms should have low levels of debt at any given interest rate. Therefore, our third hypothesis becomes:

⁴ Leland and Pyle (1977) note that the willingness of a manager to invest in his/her own project signals a project of high quality. Thus, an increase in the manager's (insider) ownership affects the level of debt, which is a source of external financing. On the other hand, Jensen and Meckling (1976) purport that an increase in external financing (debt and outside equity) affects the level of insider ownership.

Hypothesis 3: We propose an inverse relation between debt and risk for privately held firms.

Investing activities affect a firm's debt policy. When firms exhaust internally generated funds, they turn to external sources of funds to finance their investment projects. Following the Myers and Majluf (1984) pecking order of capital structure analysis, debt is preferred to equity as a source of external financing. Therefore, an increase in investing activities should lead to more borrowing since privately held firms cannot raise funds in public equity markets.

Hypothesis 4: We predict a direct relation between debt and investing activities.

2.3 *Insider Ownership*

Similarly, we consider three determinants of insider ownership: profitability, firm size, and risk. According to Demsetz and Lehn (1985) firm-unique risk increases the level of insider ownership. They argue that the riskier the operating environment of the firm, the more difficult it is for potential investors to measure management performance. As a result, external investors feel reluctant to supply funds to the firm leading to a drop in external ownership. Hence the hypothesis on the relationship between insider ownership and risk follows.

Hypothesis 5: For privately held companies, there exists a direct relationship between insider ownership and risk.

Demsetz and Lehn (1985) argue that all things being equal, the larger a firm, the larger its capital resources, and the higher the value of a given fraction of ownership. According to them, the higher price of a percentage of ownership should lead to a diffused ownership concentration. In addition, Demsetz and Lehn note that for a small group of insiders to retain their controlling and ownership interest in a large firm with large capital needs, they will have to commit more funds to the firm. The cost of mal-diversification coupled with the increased cost of capital associated with providing more wealth to this single entity serves as a disincentive for insiders of large firms to increase their ownership. Therefore, the hypothesis on firm size and insider ownership follows.

Hypothesis 6: We predict an inverse relation between insider ownership and firm size for privately held firms.

Leland and Pyle (1977) show that the desire of management to invest in their own projects serves as a positive signal of profitable projects. Consequently, an increase in managerial ownership leads to an increase in firm value. Consistent with this view, Anderson and Reeb (2003) document a positive relationship between firm performance and insider ownership. We will assume managers of privately held firms behave in a similar manner, and so our hypothesized relationship between insider ownership and profitability follows.

Hypothesis 7: For privately held firms, there exists a direct relationship between insider ownership and profitability.

3.0 Data and Methodology

3.1 Data

The data consists of two nationally representative data sets from the 1998 and 2003 Survey of Small Business Finances (SSBF) database and covers seven industries classified according to their two-digit SIC codes. As it is normal with most survey data, we use a filtering technique to minimize data errors and the effect of outliers. For both the 1998 and 2003 data, we include a firm in our sample if its return on assets, computed as total profit divided by total assets (ROA), and debt ratio (total liabilities divided total assets) satisfy the following inequalities respectively:

$$|ROA| \leq 1 \text{ and } DEBT \text{ RATIO} \leq 1.$$

This cleaning procedure results in a sample size of 2,554 firms for the 2003 data and 1,961 firms for the 1998 data.

3.2 Summary Statistics

Tables 1 and 2 respectively report summary statistics on the policy choice variables (debt and insider ownership) for the 2003 and 1998 data. Clearly these averages reveal inter-industry differences in insider ownership and debt for small businesses. The F-values from ANOVAs (not reported here) are highly significant, adding support to the observed differences in means on these endogenous variables across industries. There is also some degree of consistency on the level of debt for some industries in the two data samples.

3.3 Method

Earlier studies employ single equation estimation techniques to determine the relationship between debt and insider ownership. However, as signaling and agency theories suggest, debt and insider ownership are endogenous. As a result of the endogeneity of these policy choice variables, a system of simultaneous equations is a logical tool to employ. We follow a methodology similar to that of Jensen, Solberg, and Zorn (1992) and apply two stage least squares (2SLS) to a system of two equations that includes one equation for each of the two policy choice variables (debt and insider ownership). The system of equations estimated in the study follows.

$$DEBT = \alpha_0 + \alpha_1 INSI + \alpha_2 PROF + \alpha_3 RISK + \alpha_4 INV \text{ ----- (1)}$$

$$INSI = \beta_0 + \beta_1 DEBT + \beta_2 PROF + \beta_3 RISK + \beta_4 SIZE \text{ ----- (2)}$$

Table 1: Summary Statistics for the Endogenous Variables (2003)

This table depicts the mean of the endogenous variables grouped by industry for all firms in our 2003 sample. Clearly, these averages reveal inter-industry differences between debt and insider ownership. The statistics at the bottom of the table are based on all firms in our 2003 sample.

Industry (2-digit SIC code)	Number of Firms	Debt Ratio (%)	Insider Ownership (%)
Mining (10-14)	6	63.41	22.91
Construction (15-19)	258	37.84	25.85
Manufacturing (20-39)	375	43.09	18.71
Transportation/Public Utilities (40-49)	104	40.93	27.88
Wholesale Trade (50-51)	191	44.93	27.75
Retail Trade (52-59)	524	37.30	25.71
Finance, Insurance & Real Estate (60-69)	126	32.86	46.21
Services (70-89)	970	31.42	38.72
TOTAL	2554	36.53	30.88

Table 2: Summary Statistics for the Endogenous Variables (1998)

This table depicts the mean of the endogenous variables grouped by industry for all firms in our 1998 sample. Clearly, these averages reveal inter-industry differences between debt and insider ownership. The statistics at the bottom of the table are based on all firms in our 1998 sample.

Industry (2-digit SIC code)	Number of Firms	Debt Ratio (%)	Insider Ownership (%)
Mining (10-14)	10	23.73	26.63
Construction (15-19)	180	43.59	30.44
Manufacturing (20-39)	265	43.19	22.52
Transportation/Public Utilities (40-49)	80	54.29	26.81
Wholesale Trade (50-51)	161	40.40	34.01
Retail Trade (52-59)	434	36.70	34.08
Finance, Insurance & Real Estate (60-69)	98	40.91	42.62
Services (70-89)	733	30.62	43.21
TOTAL	1961	37.10	35.68

3.4 Definitions and Measurement of Variables

In order to test the hypotheses discussed in the study, we define the following variables:

DEBT: We measure 'debt' by computing the debt ratio, which is total liabilities divided by total assets. This endogenous variable should have a negative relation with insider ownership (INSI).

INSI: INSI depicts ‘insider ownership.’ We use the ratio of owners that are also employees to total number of employees, as a proxy for insider ownership. It is hypothesized to have a negative relation with debt.

PROF: PROF is short for ‘profitability.’ The ratio of total profit to total assets (ROA) is used as a proxy for this variable. It is predicted to have a negative relation with debt and a direct relationship with insider ownership.

RISK: This is the risk measure inherent in each firm. We use the Dun and Bradstreet credit score to proxy for the riskiness of each firm. This variable is expected to have an inverse relation with debt, but a positive relation with insider ownership.

INV: INV denotes the firm’s ‘investments,’ which we proxy by the ratio of (other investments⁵ + book value of land + net book value of depreciable assets) to total assets. INV is expected to have a positive relation with debt.

SIZE: SIZE represents the size of the firm. As it is common in the literature, we use the natural logarithm of total assets to proxy for this variable. As hypothesized in hypothesis 6, we expect an inverse relation between firm size and insider ownership.

4.0 Results

4.1 The Debt equation

Table 3A depicts the 2SLS regression results for the 2003 subsample in which DEBT is the dependent variable. The coefficient on the insider ownership variable (INSI) is negative and highly significant at the 0.01 level. This result, together with the negatively significant coefficient on debt in the insider ownership equation of Table 3B, supports our first hypothesis, which proposes a two-way negative relation between debt and insider ownership. A possible explanation is that debt and insider ownership are substitute mechanisms aimed at reducing the effects of agency costs. As a result, higher levels of one leads to lower levels of the other, and vice versa. Our result is consistent with Friend and Lang (1988), Jensen et al. (1992), and Firth (1995), but inconsistent with Kim and Sorensen (1986), who document a positive relationship between debt and insider ownership.

Next, the coefficient on the profitability variable is negative and significant at the 0.01 level, indicating that more profitable firms carry less debt. This result supports our second hypothesis of an inverse relation between debt and profitability. Jensen et al. (1992), and Frank and Goyal (2009) find support for this inverse relationship between debt and profitability in their study of publicly traded American firms. Furthermore, our result is supported by Cole (2010) who documents a negative relation between debt and firm performance for privately held firms. The coefficient on the investment variable is positive and significant, which is consistent with our fourth hypothesis. Thus firms with a high degree of investing activities tend to have high levels of debt. Further, the coefficient on the risk variable is positive and significant. Clearly, this result does not support our third hypothesis of an inverse relation

⁵ The ‘Survey of Small Business Finances Public Data Dictionary’ defines OTHER INVESTMENTS as “the total dollar amount of other investments held by the business, such as (all loans to shareholders/partners, and) real estate loans (mortgages) owed to the business.”

between risk and debt. However, it supports Kim and Sorensen (1986), who document that firms with high operating risk use more debt.

Table 3A: Regression Results for the Debt Equation (2003)

The table reports the Two Stage Least Squares regression results for the 2003 data, where the dependent variable, DEBT, is regressed on an endogenous variable, INSI, together with other explanatory variables of interest.

Variables	Coefficients	t-Values
Constant	0.344	11.25**
INSI	- 0.520	- 18.07**
PROF	- 0.066	- 3.86**
INV	0.670	3.68**
RISK	0.045	5.58**
N = 2554		R ² = 12.6%

**indicates significance at the 1% level.

Table 3B: Regression Results for the Insider (Ownership) Equation (2003)

This table reports the Two Stage Least Squares regression results for the 2003 data, where the dependent variable, INSI, is regressed on an endogenous variable, DEBT, together with other explanatory variables of interest.

Variables	Coefficients	t-Values
Constant	1.349	29.43**
DEBT	- 0.254	- 8.83**
PROF	- 0.032	- 2.13*
SIZE	- 0.081	- 29.18**
RISK	0.027	3.72**
N = 2554		R ² = 39.9%

**indicates significance at the 1% level.

*indicates significance at the 5% level.

Table 4A shows the 2SLS regression results for the 1998 data, which has DEBT as the dependent variable. The results from this table nearly mimic that of table 3A. The only exception is the negative, but not significant coefficient on the INV variable. In addition, the PROF variable has its expected sign, but not statistically significant.

Table 4A: Regression Results for the Debt Equation (1998)

The table reports the Two Stage Least Squares regression results for the 1998 data, where the dependent variable, DEBT, is regressed on an endogenous variable, INSI, together with other explanatory variables of interest.

Variables	Coefficients	t-Values
Constant	0.481	19.36**
INSI	- 0.529	- 13.48**
PROF	- 0.021	- 1.54
INV	- 0.007	- 0.302
RISK	0.087	4.37**
N = 1961		R ² = 8.7%

**indicates significance at the 1% level.

4.2 *The Insider Ownership Equation*

Table 3B reports the results of the 2SLS regression for the 2003 data in which INSI (insider ownership) is the dependent variable. The coefficient on DEBT is negative and highly significant at the 0.01 level, lending support to our first hypothesis of an inverse relation between insider ownership and debt. Next, the coefficient on the RISK variable is positive and significant. This supports our predicted direct relation between insider ownership and risk. The SIZE variable has its expected sign, and it is highly significant. This is consistent with our sixth hypothesis of an inverse relation between firm size and insider ownership. The coefficient on profitability (PROF) is negative and inconsistent with our hypothesized positive relationship. This result might not be surprising since some studies document a positive (negative) relation between managerial ownership and firm performance for low (high) values of insider ownership.⁶ The fact that Tables 1 and 2 report a relatively high percentage of insider ownership might have contributed to the negative relationship between profitability and insider ownership.

⁶ See for example see Morck, Shleifer, and Vishny (1988); Stulz (1988); and Kole (1996).

Table 4B depicts the 2SLS regression results for the 1998 data, which has INSI (insider ownership) as the dependent variable. The results are indistinguishable from that of Table 3B. However, the coefficient on the profitability variable is not significant.

Table 4B: Regression Results for the Insider (Ownership) Equation (1998)

This table reports the Two Stage Least Squares regression results for the 1998 data, where the dependent variable, INSI, is regressed on an endogenous variable, DEBT, together with other explanatory variables of interest.

Variables	Coefficients	t-Values
Constant	1.410	33.84**
DEBT	- 0.258	- 8.41**
PROF	- 0.016	- 1.53
SIZE	- 0.079	- 25.10**
RISK	0.031	1.98*
N = 1961		R ² = 38.0%

**indicates significance at the 1% level.

*indicates significance at the 5% level.

5.0 Conclusion

Using two nationally representative data sets comprising 2,554 firms in 2003 and 1,961 firms in 1998, the paper employs a simultaneous equation framework and examines the relationship between two policy choice variables - debt and insider ownership - for privately held companies. We document a significant negative relationship (with the causality in both directions) between debt and insider ownership for both data sets. A possible explanation is that debt and insider ownership are substitute devices geared toward reducing the effects of agency costs. As a result, higher levels of one leads lower levels of the other, and vice versa. This result is consistent with that documented for public companies by Jensen et al. (1992) and Chen and Steiner (1999), but inconsistent with that of Kim and Sorensen (1986). Our study also reveals an inverse relation between profitability and debt, and a direct relation between investment activities and debt. Further, the study indicates that large firms tend to have low percentages of insider ownership, and that high risk firms have high insider ownership.

As mentioned earlier, the relationship between debt, insider ownership, and dividend policy has been documented for public firms, but not for small businesses. However, since small businesses play a crucial role in generating jobs and contributing immensely to the Gross Domestic Product of the United States economy, this paper contributes to the literature by

documenting a relationship between debt and insider ownership for small businesses. These policy choice variables (debt and insider ownership) are important to the firm since they serve as substitute mechanisms aimed at mitigating agency costs.

Tax treatment for the corporate form of business is different from that of proprietorship and partnership. A possible extension of this study could be to investigate the relationship between insider ownership and debt for only partnerships and proprietorships.

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