Seoul Journal of Business
Volume 14, Number 2 (December 2008)

Do Tangible Assets Support Long-Term Debt? New Evidence from Unsecured Debt Financing by Small Firms

Joong Ho Han*
KDI School of Public Policy and Management
Seoul, Korea

Abstract

Higher liquidation value is believed to support longer-term debt. In contrast, more recent theories argue that extreme asset liquidity can indeed shorten the optimal maturity to mitigate asset substitution problems. Using industry-and region-specific tangibility suggested by Shleifer and Vishny (1992), we attempt to test these seemingly conflicting predictions. We find that the maturity of unsecured credit lines is a nonmonotonic function of liquidity, supporting Myers and Rajan (1998). Specifically, extreme asset liquidity reduces the maturity of unsecured credit lines, whereas there is no such effect for fixed asset loans, which restrict the disposition of assets financed with the loans.

Keywords: asset liquidity, debt maturity, asset substitution

INTRODUCTION

How should financial contracts be structured when enforcing them is costly and ineffective? An extensive theoretical literature in financial contracting shows that risky debt contracts, which transfer control to investors when borrowers default, emerge as optimal under limited contract enforceability. The literature emphasizes the important role of asset liquidity in mitigating

* Assistant Professor, KDI School of Public Policy and Management (joonghan@kdischool.ac.kr).

frictions in the credit market. Despite this perceived importance, the predictions regarding the effects of asset liquidity on financial contracting are mixed and remain largely untested. This paper attempts to fill the gap.

In the traditional view, firms with higher liquidation values are easier to finance, and they can issue debt with longer maturity (Hart 1995; Williamson 1988; Shleifer and Vishny 1992; Hart and Moore 1994). In particular, Shleifer and Vishny (1992) show that a higher liquidation value reduces the costs of debt by lowering the potential losses from liquidation, while maintaining the benefits of debt in constraining opportunistic behavior by borrowers. Therefore, firms with greater liquidation values, such as firms with more tangible assets, tend to have debt with longer maturity (Hart and Moore 1994).

In contrast, Myers and Rajan (1998) posit that higher liquidity can reduce the availability of long-term debt. Firms with highly liquid assets can easily engage in "asset transformations" that transfer wealth from creditors to shareholders, particularly when the firms are financed by longer-term debt. This theory suggests that, for borrowers with highly liquid assets, it can be optimal to shorten the loan maturity to mitigate asset substitution problems. In a similar vein, Morellec (2001) predicts that debt maturity is negatively associated with liquidation value when there are no restrictive covenants on the disposition of assets.

This paper tests Myers and Rajan's (1998) and Morellec's (2001) prediction that high asset liquidity can reduce debt maturity. As pointed out by Morellec (2001), the role of asset tangibility may change depending on the level of difficulty in transforming assets from creditors to shareholders. Unsecured loans, by definition, do not restrict the disposition of a firm's assets. Therefore, additional unsecured loans to firms with highly liquid assets are more likely to provide the firms with the greater ability to transform their liquid assets without detection. Thus, the incremental flexibility provided by unsecured debt can undermine the creditor's ability to recover their investment at default (e.g., DeAngelo, DeAngelo, and Wruck (2002)). By contrast, the value of secured debt is supported by nonredeployable collateral, indicating that a higher liquidation value of collateral strengthens creditor protection. For instance, fixed asset loans such as equipment loans, mortgage loans, and

motor vehicle loans typically require acquisition of certain types of assets and lock up the assets as collateral. By exploiting cross-sectional variation in contractual restrictions on asset dispositions by borrowers, we test the idea that highly liquid assets (proxied by asset tangibility) under limited contract enforceability can shorten debt maturity in the spirit of Myers and Rajan (1998).

Using a unique data set of 1,648 loans to informationally difficult small firms for the period of 1993 to 2003, we find that the maturity of unsecured lines of credit is significantly linked with the liquidation value of a borrowing firm in a *nonmonotonic* way. Our findings support the notion that extreme tangibility of assets can decrease the maturity of unsecured debt. As pointed out by Almeida and Campello (2007), firm-level asset liquidity can be endogenously determined by a firm's investment opportunity and anticipated financial constraint, inducing a spurious correlation between asset liquidity and maturity. To avoid this potential bias, we use the variation of tangibility resulting from the exogenous demand for a firm's assets. More precisely, we use industry- and region-specific asset tangibility as a proxy for asset liquidity in the spirit of Shleifer and Vishny (1992). Our findings indicate that the maturity of unsecured lines of credit decreases with the liquidation value of a firm with highly liquid assets. By stark contrast, for (secured) fixed asset loans, the type of assets financed by a loan largely explains the variation of debt maturity. We find some evidence that extreme liquidity increases with the maturity of fixed asset loans, consistent with the claim by Morellec (2001).

This paper establishes the first evidence of the interactive effect of asset tangibility and investment flexibility on debt maturity. Prior research focused on the effect of asset liquidity on secured loans that limit the use of funds to acquire certain capital assets. Benmelech (2007) analyzes the impact of resalability of assets held by U.S. railroads in the 19th century and shows that longer debt maturity is associated with more redeployable assets.[1)] Benmelech, Garmaise, and Moskowitz (2005) also show that the maturity of a mortgage loan is positively associated with the

1) Although Benmelech (2007) examines the average debt maturity of a firm' assets, he points out that most loans for U.S. railroads in the 19th century were secured loans.

estimated demand for real estate purchased through mortgage loans. Despite this recent evidence, to my knowledge, there has been no prior research that empirically investigates the flip side of asset tangibility, especially when borrowers have incremental discretion in using funds and thereby more easily divert liquid assets for their own interests. Our findings are consistent with the notion that there *do* exist both costs and benefits of holding tangible assets.[2)]

The remainder of the paper is organized as follows. Section 2 explains the hypotheses of this study. Section 3 describes data and measures of asset tangibility and presents our empirical specifications. Section 4 discusses the results, and section 5 concludes the paper.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Asset Tangibility and Debt Maturity

Incomplete contract theory predicts that firms with more liquid assets are able to obtain more loans under better conditions. In particular, Hart and Moore (1994) present a model of debt maturity in which a borrower can threaten to renege on her debt payments. Upon default, a creditor can seize the firm's assets, but the borrower's firm-specific skills accumulated over the normal course of business cannot be separated from the existing firm, making the value of such specific assets substantially lower than the best secondary user. In this case, both repayment of debt and debt maturity are the outcomes of bargaining between the creditor and the borrower. When the liquidation value of a firm's assets is high, a threat by creditors to foreclose on collateral becomes more credible, thereby supporting longer-term financing.

On the other hand, Shleifer and Vishny (1992) show that the liquidity of a firm's assets is endogenously determined by the redeployability of its assets, and the redeployability is largely

2) Notably, although our approach is well suited to test the extant theories, loans to small business are intrinsically different from loans to publicly traded firms. Therefore, the results may not be applicable to loans to publicly traded firms. We thank one of our referees for this insightful comment.

industry- and region-specific.

Benmelech (2007) and Benmelech, Garmaise, and Moskowitz (2005) focus on the role of asset liquidity when debt contracts are secured by collateral, providing evidence supporting the incomplete contract view. Our approach is different from previous research. In this paper, we focus instead on the effect that the liquidation value of a firm's assets has on the maturity of unsecured debt.

> **H1:** Higher liquidity of a firm's assets supports longer-term debt.

The Dark Side of Asset Liquidity

Myers (1977) originally proposed that the high value of a firm's assets in the secondary market can limit debt capacity. More recently, Myers and Rajan (1998) presented a rigorous theoretical analysis of the costs as well as the benefits of asset liquidity in a unified framework. They showed that higher liquidation value can facilitate asset transformation from creditors to opportunistic management (or shareholders), thereby decreasing the value of debt. Of course, the value of debt depends on the firm value at maturity: the higher the liquidation value, the higher the present value of debt, particularly when the incentive to divert liquid assets is minimal. The observed value of debt, therefore, is likely to be determined by the trade-off between the benefits and costs of asset liquidity. When asset liquidity is low, an increase in liquidation value will generate more benefits than costs. However, when assets are extremely liquid and the liquidity increases up to a certain threshold point, the agency costs of holding liquid assets can dominate the benefits of asset liquidity. Consequently, higher liquidity can actually limit the availability of long-term debt instead of boosting it. In sum, Myers and Rajan (1998) predicted that debt maturity is a nonmonotonic function of asset liquidity.

Morellec (2004) also analyzed a similar relationship and predicted that, depending on whether loans have restrictive covenants or not, the costs or the benefits of holding liquid assets become dominant over the others. Particularly, the costs of liquid assets will dominate the benefits when a loan is

unsecured by collateral. To my knowledge, there has been no empirical evidence to back up this prediction.

> **H2a:** Extreme liquidity of a firm's assets shortens debt maturity when a borrower cannot credibly commit against asset diversion.
>
> **H2b:** There is a nonmonotonic relationship between loan maturity and asset liquidity when a loan is unsecured by collateral.

DATA AND EMPIRICAL SPECIFICATION

Data and Sample Selection

Our primary data source is the National Survey of Small Business Finances (NSSBF), which is conducted every five years by the Board of Governors of the Federal Reserve. We use the 1993, 1998, and 2003 NSSBFs to obtain information on the most recent loans made by commercial banks to small businesses with fewer than 500 employees in the U.S. The NSSBFs include detailed information on firm characteristics, credit market conditions, and loan contracts, but the public version of the NSSBFs does not provide information on lender and borrower identities. Noteworthily, the NSSBFs oversample the firms in rural areas since simple random sampling may include only the firms that are located in metropolitan areas. This sampling procedure requires all the estimates for population parameters to be adjusted for sampling weights.

To ensure the variation in investment flexibility induced by debt contracting, we limit our attention to two distinct types of loan contracts which are most likely to provide the highest and the lowest flexibility in use of funds financed by banks: unsecured lines of credit and (secured) fixed asset loans, which include equipment loans, mortgage loans, capital leases, and car loans. Fixed asset loans commonly require that borrowers purchase a certain type of capital goods and provide the acquired capital goods as collateral for the loans at the same time. Unlike fixed asset loans, unsecured lines of credit do not limit the use of funds or require explicit collateral. These distinct types of loans

Table 1. Summary Statistics

Panel A: Unsecured vs. Fixed asset loans	Unsecured lines of credit	Fixed asset loans
Firm age (Unit: Months)	17.02	18.65
Total assets (Unit: Dollars)	5,275,470	3,591,040
ROA (Unit: Percentage points)	0.99	0.44
Outside debt to total assets (Unit: Percentage points)	0.58	0.65
ln(1+banking relationship duration) (Unit: Months)	3.89	4.45
Unique lender(=1: Yes, = 0: No)	0.43	0.54
Formal financial records(=1: Yes, -= 0: No)	0.52	0.39
Market competition (=1: HHI > 18,00, = 0: HHI < 18,00)	0.44	0.47
Firm delinquency on obligations (=1: Yes, -= 0: No)	0.18	0.14
Guarantee required(= 1: Yes, = 0: No)	0.62	0.57
Loan amount (Unit: Dollars)	1,126,310	430,803
Num. of obs.	638	1,046

Panel B: Type of fixed asset loans	Capital Leases	Mortgage Loans	Vehicle Loans	Equipment Loans
Firm age (Unit: Months)	18.89	16.32	19.47	18.75
Total assets (Unit: Dollars)	1,617,439	3,840,184	2,068,779	4,127,785
ROA (Unit: Percentage points)	0.17	0.72	0.43	0.76
Outside debt to total assets (Unit: Percentage points)	0.42	0.74	0.71	0.52
Ln(1+banking relationship duration)	4.33	4.16	4.37	4.34
Unique lender (=1: Yes, =0: No)	0.29	0.47	0.60	0.51
Formal Financial records (= 1: Yes, = 0: No)	0.26	0.48	0.41	0.42
Market competition (=1: high (HHI>1,800), = 0: low(HHI<1,800))	0.69	0.47	0.39	0.48
Firm delinquency on obligations (= 1: Yes, = 0: no)	0.14	0.14	0.15	0.16
Guarantee required(=1: Yes, = 0: No)	0.875	0.59	0.46	0.59
Loan amount(Unit: Dollars)	137,144	607,720	187,689	453,334
Num. of obs.	35	334	245	432

For "Guarantee required" and "loan amount," 179 additional observations are excluded.

appear to be natural candidates to capture the effects of different levels of flexibility driven by debt contracting.

In addition, to avoid a potential reverse causality problem addressed by Cole, Goldberg and White (2003), we eliminate the loans that are granted before the end of a fiscal year. Our final data set includes 1,684 approved loans.

Panel A of table 1 shows the mean characteristics of firms, credit markets, and loan contracts separately for unsecured lines of credit and fixed asset loans. The firms that use unsecured lines of credit tend to be larger, more profitable, informationally transparent, and riskier than the other firms in the sample, consistent with Sufi (2007).

Panel B of table 1 provides more detailed information on subsamples based on loan type. Consistent with the results of Panel A, the firms that use fixed asset loans are smaller and less profitable than the firms that have unsecured lines of credit. There are significant variations in profitability and firm size. The firms that have capital leases and car loans are much smaller and less profitable than other borrowers.

Figure 1 shows substantial variation in debt maturity across different types of loans. The mean maturity of lines of credit to small businesses is 22.67 months, which is less than half of the maturity time of the other types of loans. A mortgage loan has a maturity that is on average five times greater than the maturity of a line of credit. Figure 1 is broadly consistent with Hart's

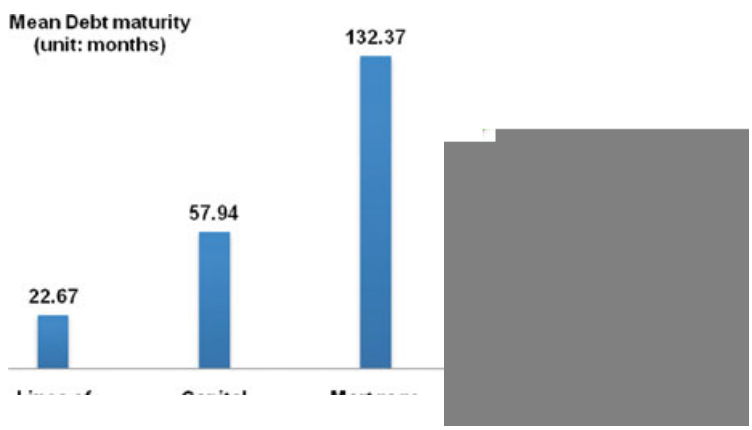

Figure 1. Loan Types and Debt Maturity

Distress: The Collapse of L. A. Gear," *Journal of Financial Economics*, 64, 3-34.

Flannery, Mark J. (1986), "Asymmetric Information and Risky Debt Maturity Choice," *Journal of Finance*, 41, 19-37.

Hart, Oliver (1995). *Firms, Contracts, and Financial Structure*. Oxford University Press.

_____ and John Moore (1994), "A Theory of Debt Based on the Inalienability of Human Capital," *Quarterly Journal of Economics*, 109, 841-879.

Holod, Dmytro and Joe Peek (2007), "The Value to Banks of Small Business Lending," Working Paper, University of Kentucky.

Johnson, Shane A. (2003), "Debt Maturity and the Effects of Growth Opportunities and Liquidity Risk on Leverage," *Review of Financial Studies*, 16, 209-236.

Kirschenmann, Karolin, and Lars Norden (2008), "The Relation between Borrower Risk and Loan Maturity in Small Business Lending," Working Paper, University of Mannheim.

Mørck, R., A. Shleifer, and R. Vishny (1988), "Management Ownership and Market Valuation," *Journal of Financial Economics*, 20, 293-315.

Morellec, Erwan (2001), "Asset Liquidity, Capital Structure, and Secured Debt," *Journal of Financial Economics*, 61, 173-206.

Myers, Stewart (1977), "The Determinants of Corporate Borrowing," *Journal of Financial Economics*, 5, 147-175.

_____ and Raghuram Rajan (1998), "The Paradox of Liquidity," *Quarterly Journal of Economics*, 113, 733-771.

Petersen, Mitchell, and Raghuram Rajan (1994), "The Effect of Credit Market Competition on Lending Relationships," *Quarterly Journal of Economics*, 110, 407-443.

_____ and Raghuram Rajan (2002), "Does Distance Still Matter? The Revolution in Small Business Lending," *Journal of Finance*, 57, 2533-2570.

Rajan, R. G. (1992), "Insiders and Outsiders — The Choice between Informed and Arms-Length Debt," *Journal of Finance*, 47, 1367-1400.

Shleifer, Andrei and Robert Vishny (1992), "Liquidation Values and Debt Capacity: a Market Equilibrium Approach," *Journal of Finance*, 47, 1343-1366.

Sufi, Amir (2007), "Bank Lines of Credit in Corporate Finance: An Empirical Analysis," Review of Financial Studies.

White, H. (1980), "A Heteroscedasticity-Consistent Covariance Matrix and a Direct Test for Heteroscedasticity," *Econometrica*, 48, 285-314.

Williamson, Oliver E. (1988), "Corporate Finance and Corporate Governance," *Journal of Finance*, 43, 567-591.

Wooldridge, Jeffrey M. (2002), *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT press.

Received March 18, 2008
Revision received July 14, 2008
Accepted August 25, 2008