負的淨負債與公司價值-以美國公司為例

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摘要

本研究根據 Penman (2007)對公司淨負債的定義，探討當公司持有的淨負債為負值，也就是當公司持有金融資產多於金融負債時，對公司價值的影響。本研究以 1998 年至 2008 年為研究期間，針對 2,058 家美國的公司為例進行實證研究。本研究結果指出，公司持有負的淨負債並不一定能提升價值，因此本研究亦將公司規模、公司持有現金的水準、或是公司的投資機會等其他條件納入考慮。在大部份情況下，規模較大或是現金水準高的公司，持有負的淨負債比較有可能為公司創造價值。再者，當根據公司成長機會區分公司為高成長性及低成長性進行研究時，結果顯示成長性高的公司若持有負的淨負債可以創造公司額外價值，且公司規模愈小或現金水準愈高對價值創造愈有利；反之，低成長性的公司並不能藉由持有負的淨負債提升公司價值。總而言之，淨負債為負值並不一定會為公司創造價值，公司規模、現金水準及成長機會對於這類公司的價值創造與否存在重要影響。

關鍵詞：資本結構、負的淨負債、公司價值

Negative Net Debt and Firm Value- Evidence from US

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ABSTRACT

Based on Penman's (2007) definition, this paper examines the value impact of firms with negative net debt. "Negative net debt" here means holding more financial assets than financial liabilities. We use a total of 2,058 US firms to investigate the relationship between firm value and negative net debt holding during the period from 1998 to 2008. Our evidences show that firms with negative net debt may not necessarily have higher firm value. Hence some other firm characteristic, such as, firm size, the level of cash holdings, and the investment opportunities are also considered in this study. The results show that when a firm with negative net debt is large or holding large amount of cash inside, the value of firm would be higher and can create excess value most of the time. We also investigate how the growth opportunities influence the value of firms with negative net debt. The results show that high-growth firms with negative net debt can create excess value, and the smaller the debt-free firm is, the higher value it creates. On the contrary, low-growth firms cannot create excess value by holding negative net debt. In conclusion, negative net debt may not necessarily create value for firms, and firm size, cash holding level and growth opportunities have important influences on the value impact of firms with negative net debt.

Key words: Capital structure, Negative net debt, Firm value

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I. Introduction

Microsoft Corporation is a company holding no long-term debt in its capital structure up to 2008. By reformulating typical balance sheet, Penman finds that Microsoft Corporation is also a firm with significant amounts of financial assets in the form of cash equivalents and other short-term and long-term financial assets[1]. That is, Microsoft is a firm with net financial assets[2], namely, negative net debt. The "net debt" here is calculated as a firm's financial liabilities minus financial assets[3], so holding negative net debt means holding financial assets more than financial liabilities. However, Microsoft is not the only case of holding negative net debt. In fact, the proportion of this kind of negative net debt holding firms (hereafter refer this kind of firm as debt-free firm) has been steadily increasing over time recently. On average, more than 30% of Compustat U.S. firms hold negative net debt in a given year during the 1998-2008.

Generally, we may think that firms with financial assets more than financial liabilities like Microsoft would pay out their excess cash to shareholders in order to avoid the agency problem and hence can increase their value probably. Penman shows us that stock repurchases and dividend payout can increase Microsoft's value in the form of return on common equity (ROCE)[4]. Prior researchers suggest that payout policy is important to lessen agency problem (Easterbrook, 1984; Zwiebel, 1996; Fluck, 1999; Myers, 2000). Some literatures also show that dividend payout or share repurchase may enhance firm value when managerial agency problems exist (Kalcheva & Lins, 2007; Oswald & Young, 2008). Based on this discussion, firms should not hold that large amounts of net financial assets and should pay out their excess financial assets to their shareholders. However, we have observed an increasing trend

[1] Stephen H. Penman, 2007, Financial Statement Analysis and Security Valuation, 3rd edition, pp.311
[2] Stephen H. Penman, 2007, Financial Statement Analysis and Security Valuation, 3rd edition, pp.239
[3] Stephen H. Penman, 2007, Financial Statement Analysis and Security Valuation, 3rd edition, pp. 128& 239
[4] See Box 11.3 of Stephen H. Penman, 2007, Financial Statement Analysis and Security Valuation, 3rd edition, pp.376

of this kind of firms in US market. Then, why would firms like Microsoft want to hold large amounts of financial assets and no debt inside their companies? Don't these companies' care about agency problem? Or, these firms think that holding financial assets much more than financial liabilities still can maximize firm value even if agency problem exists in their companies. So, do firms with negative net debt (or, net financial assets) really have relative high value?

What's the motivation for firm's to hold less debt or even more, no debt in their capital structure? Can capital structure really affect firm value or not? These questions have been asked and discussed since Modigiliani and Miller (1958) argue that capital structure does not matter in a perfect market. In fact, the impact of capital structure on the value of firm has been a puzzling issue in corporate finance since then. Some researchers suggest that firm leverage is positively associated with firm value. The pecking order theory (Myers & Majluf, 1984) states that if companies want to maximize their market value, they prefer internal financing to external financing. And if internal funds cannot afford firm's investment, debt is issued prior to equity. According to Jensen (1986), debt can mitigate the overinvestment problem and reduce the agency costs if managers are forced to pay out excess cash for debt, and thereby can enhance the firm value. There are some other literatures supporting this positive relation between firm value and debt financing (Harris & Raviv, 1990; Stulz, 1990). There are also some suggest that leverage doesn't show significant effect on firm value unless other factors being concerned together (Graham & Harvey, 2001; Hull, 2005; Campello, 2006; Kayhan & Titman, 2007).

However, some literatures indicate that leverage may provide a negative effect on firm value. Jensen and Meckling (1976) find that agency problems may force managers to give up their optimal level of debt and adopt sub-optimal low level instead. Myers (1977) also suggests that a firm with outstanding debt may have incentive to reject projects with positive

net present value, and this underinvestment problem may harm the value of firms, especially for the firms with high growth opportunities. Recently, firms without any long-term debt are steadily increasing so that some literatures examine the motivation of these firms. Some of them suggest that borrowing constraints may be one of the important reasons (Barclay, Morellec, & Smith, 2006; Byoun, Moore, & Xu, 2008; Devos, Dhillon, Jagannathan, & Krishnamurthy, 2009). That is, these firms do not have access to debt market and hardly borrow from the public market. Profitability may also be one of the explanations to maintain lower level of debt. According to the pecking order theory (Myers, 1984; Myers & Majluf, 1984), firms with sufficient profits to cover their investments are likely to become debt-free as they prefer internal funds to external funds. Fama and French (2002) also find that firms with large profits may have less leverage. On the other hand, an unprofitable firm would end up with a relatively high debt ratio. Prior researchers suggest that market timing is another possible reason for firms to become debt-free (Baker & Wurgler, 2002; Welch, 2004; Leary & Roberts, 2004; Alti, 2006). They argue that firms issuing equity is driven by optimistic market valuation, and firms tend to issue equity when stock market is favorable.

Cash holding is important for firms with large amounts of financial assets. Bates, Kahle, and Sutlz (2009) have documented an increasing tendency toward the average cash ratio for U.S. firms. Many firms hold large amounts of cash inside their companies, especially those firms with less debt. Microsoft is a good example for no long-term debt but large cash holding. In fact, zero-debt firms are usually having relatively greater cash holdings than levered firms (Byoun et al., 2008). According to the pecking order theory, firm use internal funds prior to external funds (Myers, 1984). This may because cash provides the lowest cost of financing according to the trade-off theory. Transaction costs of equity issue, cost of financial distress, information cost of outside capital and many other factors may make external financing more expensive than internal financing (Myers, 1984; Opler, Pinkowitz, Stulz, & Williamson,

1999). However, according to Jensen (1986), firms with too much excess cash would lead to the agency problem between firms' managers and shareholders because of the conflicts of interest. Hence, we may want to ask that do large cash holdings actually increase the value of a firm. Prior studies examine the determinants of firm's cash holding, and get the results that firms with large cash holdings generally seek to enhance their firm value. Opler et al. (1999) have found that smaller companies, firms with stronger growth opportunities, and firms with riskier activities tend to hold larger amounts of cash as a percentage of total assets than other firms. On the contrary, firms that have the greatest access to the capital markets, such as large firms and those with high credit ratings, tend to hold lower level of cash inside their companies. Mikkelson and Partch (2003) also suggest that high cash holdings are usually accompanied by greater investment and by greater growth in assets so that companies persistently hold large cash reserves do not hinder corporate performance. Faulkender and Wang (2006) suggest that additional cash is more valuable for firms with low levels of cash holdings, low leverage and borrowing constraints. From prior literatures' viewpoint, holding cash can usually increase the value of firms, especially for smaller firms, firms with low leverage or borrowing constraints. Bates et al. (2009) also tell us that the cash holding is important and should be considered when firms are evaluating their financial condition and making capital structure decisions.

There have been a lot of literatures about the leverage effect on firm value based on our discussion above, but we are interested in the effect of negative net debt on firm value. Traditionally, researchers study firms without any long-term debt and examine the motivation of these firms. In this paper, we will use Penman's definition of net debt and define firms with negative net debt as debt-free firms to investigate the value impact of negative net debt. The purpose of this paper is to examine the relationship between firm value and negative net debtholding, that is, firms with negative net debt and being debt-free may or may not create

value and have a relative higher firm value. From the discussion above, we know that a firm's cash holding plays an important role on financial assets so we use cash and short-term investment to represent financial assets and define the net debt in this study[5]. Moreover, from the view of prior studies, cash holding are highly correlated with its capital structure and may have positive effect on the value of firms, especially those with lower level of debt or credit constraints. Thus, we would also like examine the effect of cash holding on the value of debt-free firm. At the same time, according to Titman and Wessels (1988), firm size is one of the important determinants of capital structure. Prior studies also suggest that firm size can affect firm performance (Cho, 1998; Lee & Chuang, 2009). Since firm size can affect managers' decision on firm's capital structure choices and firm value can also be influenced by size, we would like to investigate the effect of size on the value of debt-free firms. Additionally, prior studies also provide evidences that the value impact of debt can be different because of different growth opportunities. They suggest that debt will create the value of low growth firms but reduce the value of high growth firms (Jung, Kim, & Stulz, 1996; Barclay, Marx, & Smith, 2003). Hence the value impact of growth opportunity on firms with negative net debt will also be examined in this paper.

The remainder of this paper is organized as follows. Section 2 describes the methodology including the sample selection and the research models. Section 3 presents and discusses the results and section 4 provides the summary and conclusions.

II. Data and Methodology

2.1 Data

To investigate the value impact of negative net debt, we construct a sample of U.S. firms for our empirical test. Our sample firms are selected from the annual Compustat files for the period of 1998-2008. We exclude all the financial institutions (SIC codes 6000-6799) and the

[5] The calculation of "net debt" will define clearly later in the Section 2 of this paper.

utilities (SIC codes 4900-4999). We also exclude firms with missing value during this period. There are 2,058 sample firms remaining. All the financial data is coming from Compustat.

According to Penman's definition, net debt is debt the firm holds as liabilities less any debt investments that the firm holds as assets, which equals financial liabilities minus financial assets[6]. Additionally, cash and short-term investment should be categorized as financial assets while total long-term debt is categorized as financial liabilities in accordance with their characteristics[7]. Thus, we define a firm that has cash and short-term investment more than total long-term debt as debt-free in a given year. Table 1 shows the sample of negative net debtholding among all the 2,058 firms by year from 1998 to 2008. The percentage of firms with negative net debt in our sample reaches an average of 41.62%, while the percentage among S&P 500 members also reaches an average of 28.34%. The upward trend is obvious especially before 2007. Panel C shows the percentage of firms holding negative net debt for three consecutive years, and we observe that the percentage is between 29.25% and 35.28% and increasing steadily.

[Insert Table 1]

In addition, we find that firms with negative net debt are concentrated in some specific industries. Among all the 2,058 firms in our sample, the median of firms' debt-free years is three years. Hence we select firms holding negative net debt for more than three years during the period of 1998-2008, and we find that these firms are mainly concentrated in five industries, including industries that with first-two digits of SIC codes are 28 (Chemicals and Allied Products), 35 (Industrial and Commercial Machinery and Computer Equipment), 36 (Electronic, Electrical Equipment & Components), 38 (Measure/Analyze/Control Instruments; Photo/Med/Optical Goods; Watches/Clocks), 73 (Business Services). We find that more than

[6] Stephen H. Penman, 2007, Financial Statement Analysis and Security Valuation, 3rd edition, pp. 128& 239
[7] Exhibit 9.2 in Stephen H. Penman, 2007,Financial Statement Analysis and Security Valuation, 3rd edition, pp. 303

60% of the debt-free firms in our sample belong to these five industries. At the same time, a relatively high percentage of firms with negative net debt is observed among these industries.

2.2 Descriptive Statistics

We use Tobin's Q as the proxy of firm value, which is calculated from the annual accounting data from Compustat. We calculate Tobin's Q as the market value of equity plus the book value of debt (computed as the book value of assets minus the book value of equity) divided by book value of total assets. We do not use the market value of debt and the replacement cost of assets when we estimate the Tobin's Q. This definition of Tobin's Q has been used in many literatures (for example, La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2002; Doidge, Karolyi, & Stulz, 2004). We also use relative Tobin's Q, which is computed as Tobin's Q of each firm over the average industrial Tobin's Q, as another dependent variable to be the proxy of excess value (Gozzi, Levine, & Schmukler, 2008). The average industrial Tobin's Q is the median of Tobin's Q inside an industry with identical first-two digit SIC codes.

In order to investigate the effect of negative net debt on firm value, we set a dummy variable to represent a firm's net debtholding in a given year. If a firm holds negative net debt in a given year, the dummy variable will be one, and zero for otherwise. The definition of negative net debt is that total long-term debt minus cash (including cash equivalents) and short-term investment less than zero.

Prior studies have revealed that firm size, profitability, growth opportunities, return volatility and market condition will affect the value of a firm. In this paper, we use natural log of a firm's assets at the end of a year as the proxy of firm size (Gozzi et al. 2008). ROA is used to measure the profitability of a firm in a given year (Aggarwal & Kyaw, 2006). We use price-to-book ratio as the proxy of growth opportunities (Collins and Kothari, 1989; Chung and Charoenwong, 1991; Graham and Rogers, 2002). In our model, the market premium

calculated as market return minus risk-free rate[8] is used as the proxy of market condition. To measure the return volatility of a firm, we compute the standard deviation of a firm's monthly stock return over the financial year. We also use firms' cash holdings in our study, which is computed as the ratio of cash and cash equivalents to total assets. Natural log of firm's IPO age represents a firm's life. The measurements of all variables used in this paper are showed in Table 2.

[Insert Table 2]

Among all our 2,058 sample firms during the period of 1998-2008, we have 22,638 firm-year observations totally. Separating our firm-year observations into negative net debtholding and positive net debtholding, we find that Tobin's Q of firms with negative net debt is absolutely higher than firms with positive net debt, no matter measured by mean (3.2036 vs. 2.5154) or by median (1.9311 vs. 1.3744). Negative net debtholding firms also seem to create more excess value than the other group (1.4652 vs. 0.9586). Moreover, firms with negative net debt seem to have higher Tobin's Q than average Tobin's Q among all sample firms (3.2036 vs. 2.8044) and create more excess value (1.4625 vs. 1.1713). In addition, firms with negative net debt tend to have larger cash holding, smaller firm size, more profitability and higher price-to-book ratio. All details of descriptive statistics data are reported in Table 3.

[Insert Table 3]

2.3 Methodology and Hypothesis

The panel regression model is applied to investigate the value impact of holding negative net debt. First, we use Tobin's Q as one dependent variable to observe the relation between Tobin's Q and dummy variable of negative net debt (may refer as debt-free dummy variable hereafter). Since firm's manager would make the decisions to maximize firm value most of

[8] This data is coming from Kenneth R. French-Data Library.

the time, we suppose that becoming debt-free may have positive relation to firm value.

From the point of prior studies, borrowing constrained is a very important reason when firms choose to hold less debt or zero-debt. However, firms with large scale of assets are usually less borrowing constrained and can easily borrow from the public market (Opler et al., 1999). If large firms choose to hold negative net debt and become debt-free, maybe because their profitability can afford their investment, or perhaps they find debt-free strategy can maximize their firm value. Thus, we also select firms with asset size more than US$100 million to view the value impact of negative net debt. We may suppose that large debt-free firm may produce high value based on prior literatures. S&P 500 members usually are the first 500 big companies, which mean they are with highest market value listed in the stock market. The member companies of S&P 500 are chosen from various industries and can be the representative of US market, so we also observe the firms of S&P 500 members in our sample.

Secondly, in order to examine whether debt-free firms can create excess value or not, we use relative Tobin's Q as another dependent variable to run the regression model. Again, total 2,058 sample firms and firms with asset size more than US$100 million are used to examine whether debt-free can create excess value or not. We guess that firms holding negative net debt may create excess value. Additionally, based on prior literatures, growth opportunities may make the different value impact of capital structure (for example, Barclay et al., 2003), so we also differentiate our sample firms as high-growth group and low-growth group according to their average price-to-book ratio. We use the regression model to investigate the relation between relative Tobin's Q and dummy variable in different growth group. Our hypothesis is that debt-free firms in high-growth group may create excess value while debt-free firms with low-growth opportunities cannot create excess value based on these discussions. Finally, because debt-free firm are concentrated among five specific industries,

we select firms from these industries to investigate the value impact of negative net debt.

In addition, from prior literatures' viewpoint, firm size and cash holding level can be important on firm's capital structure and value creating, so we also examine how these two factors affect value of firms with negative net debt. We introduce an interaction variable, which is debt-free dummy variables interacted with size to examine the size effect on debt-free firm's value. In the meantime, to investigate how cash holding level affect on value impact on debt-free firm, we also introduce another interaction variable, which is debt-free dummy variable interacts with cash holding.

III. Results Analysis

3.1 Univariate Analysis

We begin our empirical analysis by examine some important characteristics between firms with negative net debtholding and with positive net debtholding. We compare Tobin's Q, excess value, firm size, cash holding and price-to-book ratio between these two groups. Table 4 shows the results of the two-sample t-test for differences in means with unequal variances. Compared to firms holding positive net debt, the mean of Tobin's Q in the group of firms with negative net debt is significantly higher (3.2036 vs. 2.5154). From the view of excess value of firms, we also get the result that debt-free firms create more excess value (1.4652 vs. 0.9586) significantly. The results tell us that debt-free firms may have higher firm value and can create more excess value.

We also examine the firm size between these two groups, and we find that the size in the group of negative net debt is significantly smaller (4.6205 vs. 5.955) than the other group. This result is consistent with prior studies, which indicate that small firms may be less leveraged than large firms (Warner, 1977; Ang, Chua, & McConnell, 1982). On the other hand, firms with negative net debt have significant larger cash holding (36.64% vs. 6.60%) inside their companies. Prior literature suggests that growth opportunities may affect the

choice of capital structure of a firm, so we also examine the price-to-book ratio to investigate if there exists different growth opportunities between these two kind of firms. We find that firms in the group of negative net debtholding face the higher growth opportunities (4.8891 vs. 3.5614) although the difference is not significant.

[Insert Table 4]

3.2 Tobin's Q and Negative Net Debt

We use Tobin's Q as the proxy of firm value to investigate the relationship between firm value and negative net debt. The regression results on Tobin's Q are shown in Table 5. We first report the regression results of our whole 22,638 observations to investigate the value impact. We use the dummy variable to represent firm's holding of negative net debt, and examine the correlation between the debt-free dummy and Tobin's Q. From the result, we find no significant relation between Tobin's Q and the debt-free dummy if only the dummy variable is considered (column (1) of Table 5). This is consistent with prior studies indicating that debt financing can be good and bad for firm value (for example, Campello, 2006). If we take firm size and cash holding level into account, we find that for debt-free firm, size and cash holding both have significant positive relation to Tobin's Q (column (2)~(4) of Table 5). The results tell us that debt-free firms are not necessarily with high firm value, but if they have larger asset size or hold larger level of cash in hand, they may have higher firm value.

While we select firms with asset scales more than one hundred millions to examine the value impact (column (5) & (6) of Table 5), we find that debt-free dummy has significant positive relation between Tobin's Q if only debt-free dummy being considered. From the results, we find that large-scaled firms with negative net debt may have higher firm value, and this is consistent with our hypothesis that large firms may want to maximize its value by holding negative net debt. Taking into account the firm size and cash holding, we observe a positive effect of firm size and cash holding on debt-free firms' value, this result is the same

as that we examine the whole sample firms. Observing the results of S&P 500 firms (column (7) & (8) of Table 5), we find a significant positive relation between Tobin's Q and the debt-free dummy variable. Being debt-free among these S&P 500 firms, the higher the percentage of cash, the higher the firm value is. Different result with the full sample is that S&P 500 firms with negative net debt display an outcome that size is negatively related to debt-free firm value. Thus, debt-free firms among S&P 500 produce higher firm value, and the value can increase as these firms' cash holding increase but decrease as their firm size increase.

[Insert Table 5]

3.3 Excess value and Negative Net Debt

We use the relative Tobin's Q, which is computed as a firm's Tobin's Q minus its industrial average Tobin's Q, as the proxy of the excess value. Table 6 shows the regress results on excess value. In panel A, we investigate the full sample firms and firms with asset size larger than one hundred millions, and we obtain almost the same results as that we use a firm's Tobin's Q as dependent variable. That is, firms with negative net debt may not necessarily create excess value for them, but if they are accompanied with large asset scale or large cash holding, they will create excess value possibly.

In panel B of table 6, we differentiate our sample firms as high-growth and low-growth by their average price-to-book ratio. In high-growth group, we find a significant positive relation between excess value and the debt-free dummy variable, which means that holding negative net debt may create excess value while firms face high growth opportunities. We also find that in the high-growth group, the relative Tobin's Q decrease significantly as debt-free firms' size increase. On the other hand, debt-free firms holding high percentage of cash may lead to high relative Tobin's Q but not significant. Comparatively, in the group with low-growth opportunity, the debt-free dummy variable has significant negative correlation with the

relative Tobin's Q. We also obtain significant positive relationship between relative Tobin's Q and the dummy variable interacted with size in the low-growth group. In sum, when facing high growth opportunity, firms with negative net debt can create excess value and tend to have higher firm value. This result is consistent with trade-off theory indicating that growth companies would face higher costs of financial distress and thus borrow less. Moreover, our evidences show that the excess value created by debt-free firm with high-growth opportunities would be reduced by firm size. Prior literatures suggest that when a firm's asset scale is greater, the firm may already reach a mature stage, and the opportunity for future growth would be relatively lower (Agrawal & Knoeber, 1996; Barnhart & Rosenstein, 1998; Cho, 1998). Based on prior researchers' viewpoint, perhaps we can speculate that firms with large asset scale in the high-growth group may have relatively lower growth opportunities than smaller firms in the same group. If these large firms do not have much investment opportunities and still hold cash more than their debt in their capital structure, firms may generate the agency problem and decrease firm value. Blanchard, Lopez-de-Salinas, and Shleifer (1994) find that firms having experienced cash windfalls may tend to make investments that the value is estimated to be low. However, with low growth opportunity, holding negative net debt cannot create excess value. But if the low-growth firm is with large scale of assets, perhaps it could create excess value by holding negative net debt. This may because large firms is relative high profitable compared with small firms in the low-growth category. We also observe that high cash holding may create excess value for high-growth debt-free firms but not for low-growth debt-free firm, this result may support prior researchers that state financial slack is valuable and especially to firms with plenty of growth opportunities[9].

[Insert Table 6]

[9] See Brealey, Myers and Allen, 2008,Principles of Corporate Finance,9th edition, pp. 521

Since we have found that debt-free firms are concentrated in some specific industries, we especially select firms among these industries from our sample to examine that debt-free firm may or may not create excess value. Table 7 shows the results of firms in these five industries[10]. In panel A, we find that the debt-free dummy shows a significant positive relation to excess value. We also get the results that excess value has significant positive relation to the dummy variable interacted with cash and significant negative relation to dummy variable interacted with size. The results seem to be similar to the results in the group with high-growth in panel B of Table 6, and this may because firms in these five industries tend to have higher growth opportunities compared to our whole sample firms. We also classify these firms into two groups: high-growth and low-growth. The regression results are presented in panel B of Table 7. In the high-growth group, the debt-free dummy variable has significant positive correlation with the excess value, yet firm size is showed a significant negative relation to firm value for debt-free. In the group with low-growth opportunity, the excess value has significant negative relation to the dummy variable and significant positive relation to the dummy variable interacted with size. No matter in which group, it shows a positive relation between excess value and debt-free dummy variable interacted with cash but only significant in the high-growth group. We can conclude that debt-free firms among these industries may create excess value by holding negative net debt, especially when they are with high growth opportunities. If firms confront lower growth opportunities, only larger firms can create excess value by holding negative net debt. Again, we find that for debt-free firms, large cash holding may produce excess value, and especially for firms with high-growth opportunities.

[Insert Table 7]

[10] In this part, we also take firms' IPO age into consideration. Because we have only 1,009 firms with IPO age data in Compustat database, we ignore this variable in the model shown in Table 5 and Table 6. Since we select firms with IPO age data to run a new regression model with IPOAGE variable separately and obtain the similar results to our initial results in Table 5 and Table 6, we don't report another result tables in our paper.

In our study, there are a few outliers among our sample data, which may lead to incorrect results. To avoid being misled by those outliers, we use the Winsorize method to deal with outliers among our data and compare the new results to our initial ones. However, after checking the results, we find that the new regression results are similar to our initial results without dealing with outliers. That means that outliers may not affect the results in our study. Therefore, we still report our initial regression results and not show the new ones in this paper.

IV. Conclusions

This paper examines the value impact of capital structure of firms. Unlike most prior literatures that investigate how debt financing or leverage level affect firm value, we are interested in value impact on debt-free firms. Unlike prior literatures usually define debt-free firm as firms with zero long-term debt, we use negative net debt by Penman's definition in the study. We find that firms with negative net debt is smaller, with larger cash holding level and higher growth opportunities than those with positive net debt, this result is consistent with the finding of prior studies. Our purpose is to find out that firms with negative net debt may or may not create value and have a relative higher firm value. The evidences show us that firms with negative net debt may not necessarily have higher firm value and produce excess value. Some other firm characteristics, such as, firm size, the level of cash holdings and growth opportunities may influence the value impact on debt-free firm. Generally, large-scaled firms can generate higher firm value and create excess value by holding negative net debt. Our results also show that if the debt-free firm holds more cash holding, the value of firm will be higher and can create more excess value.

Prior literatures suggest that growth opportunities may make different value impact of firms' capital structure. In our study, we also take growth opportunities into consideration, and we find that holding negative net debt would be value enhancing for high growth firm and

value reducing for low growth firms. Our evidences show that in the high-growth group, small debt-free firms can create more excess value than large ones. On the contrary, in the low-growth group, large debt-free firms tend to have higher value than small firms. What's more, large cash holding can let debt-free firms create more excess value, especially for high-growth firms.

Holding negative net debt may improve and hurt firm value depending on other factors, such as firm size, cash holding level, and growth opportunities. That suggests that firms' managers choose to hold negative net debt do not necessarily want to maximize their firm value, but probably because of some other reasons, such as borrowing constraints and market timing suggested by prior literatures. In addition, if a firm's managers want to create firm value by considering the strategy of holding negative net debt, they may have to consider other determinants, for example, the investment opportunities, the market situation, or their own financial characteristics and constraints at the same time.

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Table 1 Sample of Negative Net Debt by Year

This table shows the sample of firms holding negative net debt by year from 1998 to 2008. Panel A shows the sample of all 2058 sample firms. Panel B shows the sample of firms of S&P 500 members, containing 308 firms. Panel C reports the sample of firms with negative net debt for three consecutive years from 2000 to 2008 among all our sample firms.

Panel A: Negative net debtholding among all 2058 sample firms											
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
No. Firms	816	782	807	810	811	879	942	943	925	929	861
% Firms	37.59%	36.02%	39.21%	39.36%	39.41%	42.71%	45.77%	45.82%	44.95%	45.14%	41.84%
Panel B: Negative net debtholding among S&P 500 firms (308 firms remaining)											
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
No. Firms	79	74	74	77	81	87	102	107	101	94	84
% Firms	25.65%	24.03%	24.03%	25.00%	26.30%	28.25%	33.12%	34.74%	32.79%	30.52%	27.27%
Panel C:Negative net debtholding for three consecutive years among all 2058 sample firms											
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008		
No. Firms	604	602	624	665	699	711	726	717	703		
% Firms	29.35%	29.25%	30.32%	32.31%	33.97%	34.55%	35.28%	34.84%	34.16%		

Table 2 Description of Variables

This table presents descriptions of variables used in this study. The full sample period is from 1998 to 2008. All the financial data computed for the variables are from Compustat (NA). The market premium is coming from the Kenneth R. French-Data Library.

Variables	Proxy for	Definition
TOBINQ	Tobin's Q (firm value)	(Book value of total assets－book value of equity＋Market value of equity)/book value of total assets
Relative TOBINQ	Excess Value	Tobin's Q of each firm over the average industrial Tobin's Q
SIZE	Firm Size	Natural log of Total Assets
CASH	Cash holding	The ratio of cash and cash equivalents to total assets
ROA	Profitability	Income before extraordinary items/total assets
PB	Growth	The ratio of price to book
STD	Risk	The standard deviation of monthly stock return over the financial year
IPOAGE	Life	Natural log of a firm's IPO age
MARKET	Market premium	Rm-Rf, the value-weight return on all NYSE, AMEX, and NASDAQ stocks minus the one-month Treasury bill rate
DUMMY	Dummy of negative net debt	1 for net debt≦0; 0 for otherwise , where the definition of net debt is" total long-term debt minus cash (including cash equivalents) and short-term investments”

Table 3 Descriptive Statistics

Panel A presents the mean, median and other descriptive statistics of our variables. The total number of observation in Panel A is 22,638, except the number of observations of firms IPO age is only 11,099. Panel B shows the means and medians of the firms with negative net debt in our sample. The total number of observations in Panel B is 9,505. Panel C shows the means and medians of the firms with positive net debt in our sample. The total number of observations in Panel C is 13,133.

Panel A: all sample firms (No. of observations: 22,638)

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
TOBINQ	2.8044	1.5331	790.7428	0.0443	9.3479
Relative TOBINQ	1.1713	0.0000	788.9103	-2.1861	9.3173
SIZE	5.3947	5.4846	13.5896	-5.5215	2.4737
CASH(%)	19.2171	9.5378	100.0000	0.0000	22.7504
ROA(%)	-15.6755	3.4220	1934.2060	-9071.4280	133.9610
PB	4.1189	1.9160	7483.2330	-10935.1300	128.9110
STD	19.2330	13.3812	22346.6100	0.0000	167.6338
IPOAGE	2.3037	2.3979	3.7136	0.0000	0.5029
MARKET(%)	0.2618	3.2100	30.7400	-38.3900	20.1430

Panel B: Observations with negative net debt in a given year (No. of observations: 9,505)

	TOBINQ	Rel. TOBINQ	SIZE	CASH(%)	ROA(%)	PB	STD
Mean	3.2036	1.4652	4.6205	36.6480	-14.2157	4.8891	19.7326
Median	1.9311	0.2395	4.6077	31.0606	3.8505	2.3439	15.0009

Panel C: Observations with positive net debt in a given year (No. of observations: 13,133)

	TOBINQ	Rel. TOBINQ	SIZE	CASH(%)	ROA(%)	PB	STD
Mean	2.5154	0.9586	5.9550	6.6015	-16.7321	3.5614	18.8714
Median	1.3744	-0.0817	6.2579	3.4976	3.2698	1.6991	12.3097

Table 4 Two Sample t-test of Important Variables

The data consists of 22,638 firm-year observations (firms of negative net debt=9,505; firms of positive net debt=13,133) for the period of 1998 to 2008. Firms with negative net debt are firms with cash and short-term investments more than total interest-bearing debt, and firms with positive net debt are firms with cash less than total debt. The Tobin's Q here is (Total assets－Book value of equity＋Market value of equity) divided by book value of total assets. The excess value is Tobin's Q of each firm over the average industrial Tobin's Q. The average industrial Tobin's Q is the median of Tobin's Q inside an industry with identical first-two digit SIC codes. The size is natural log of firms' total assets. Cash is cash and cash equivalents divided by total assets. PB ratio is the price-to-book ratio of a firm. P-value represents p-values from t-tests for difference in means with unequal variances.

	Tobin's Q	Excess Value	Size	Cash	PB ratio
Negative net debtholding	3.2036	1.4652	4.6205	36.64%	4.8891
Positive net debtholding	2.5154	0.9586	5.9550	6.60%	3.5614
p-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.2424)

Table 5 Regression on Tobin's Q

This table reports panel regressions results. The dependent variable is Tobin's Q. The dummy equals one if a firm holds negative net debt at any point and zero for otherwise. The SIZE is natural log of firms' total assets. CASH is cash and cash equivalents divided by total assets. STD is the standard deviation of monthly stock return over the financial year. PB is the price-to-book ratio of a firm. MARKET is the market premium defined by Rm-Rf. Column (1)~(4) shows the results of all firms, column (5) & (6) show the results of firms with average asset size more than 100 million U.S. dollars, and column (7) & (8) show the results of S&P 500 members. *,**, and *** are significance at the 10%, 5%, and 1% respectively. The values of t-statistics are in parentheses.

	All 2058 sample firms				Assets≧ 100 million		S&P 500 members	
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	1.3499***	1.5150***	1.5977***	1.6726***	0.4828***	1.2582***	3.3383***	1.1904***
	(10.0807)	(25.3657)	(12.2258)	(29.0718)	(5.5163)	(39.7365)	(9.0556)	(11.9244)
DUMMY	0.1725	-0.8293***	0.5360***	-0.3193	0.2977***	-0.7474***	0.4305***	4.9914***
	(1.4665)	(-4.1565)	(3.9591)	(-1.4618)	(6.4671)	(-5.4805)	(3.1999)	(8.1440)
SIZE	0.0308		0.0129		0.0819***		-0.2631***	
	(1.5874)		(0.6672)		(7.7907)		(-7.1623)	
DUMMY×SIZE		0.1906***		0.1566***		0.1416***		-0.5232***
		(6.0460)		(4.9241)		(7.4311)		(-7.7686)
CASH	0.0222***	0.0249***			0.0306***		0.0483***	
	(8.6106)	(9.5472)			(25.3764)		(12.2840)	
DUMMY×CASH			0.0077***	0.0108***		0.0277***		0.0359***
			(2.7271)	(3.7641)		(19.9825)		(7.7049)
ROA	-0.0494***	-0.0495***	-0.0497***	-0.0498***	0.0105***	0.0092***	0.0249***	0.0234***
	(-144.2023)	(-150.0131)	(-145.5882)	(-152.0757)	(12.6680)	(11.0917)	(7.7139)	(7.1621)
PB	0.0014***	0.0014***	0.0014***	0.0014***	0.0007***	0.0008***	0.0017***	0.0017***
	(4.0796)	(4.0158)	(4.2048)	(4.1374)	(4.9877)	(5.0780)	(3.1267)	(3.0760)
STD	0.0001	0.0001	0.0001	0.0002	0.0284***	0.0278***	0.0678***	0.0774***
	(0.4921)	(0.5284)	(0.5172)	(0.5787)	(14.4443)	(14.4560)	(8.1576)	(9.4337)
MARKET	0.0244***	0.0246***	0.0246***	0.0248***	0.0130***	0.0130***	0.0178***	0.0189***
	(11.3149)	(11.4124)	(11.3666)	(11.4703)	(16.2347)	(16.1847)	(8.0560)	(8.4896)
Adj. R-square	51.16%	51.23%	51.01%	51.07%	13.56%	12.00%	21.67%	20.06%
Observations	22638	22638	22638	22638	14575	14575	3388	3388
Firms	2058	2058	2058	2058	1325	1325	308	308

Table 6 Regression on Excess Value

This table reports panel regressions results. The dependent variable is relative Tobin's Q, which is computed as every firm's Tobin's Q minus the industrial average Tobin's Q. The industrial average Tobin's Q is the median of Tobin's Q in the industry which the first-two SIC codes are the same as the firm. The dummy equals one if a firm holds negative net debt at any point and zero for otherwise. The SIZE is natural log of firms' total assets. CASH is cash and cash equivalents divided by total assets. STD is the standard deviation of monthly stock return over the financial year. PB is the price-to-book ratio of a firm. MARKET is the market premium defined by Rm-Rf. Panel A shows the results of all firms (column (1)~(4)) and firms with average asset size more than 100 million U.S dollars (model (5)~(8)). Panel B shows the results that differentiated firms as high-growth (column (1)~(4)) and low-growth (column (5)~(8)) by firms average price-to-book ratio. Firms with average P/B ratio higher than the median of price-to-book ratio among all sample firms are classified as high-growth. Firms with average P/B ratio lower than the median of price-to-book ratio among all sample firms are classified as low-growth. *,**, and *** are significance at the 10%, 5%, and 1% respectively. The values of t-statistics are in parentheses.

Panel A: Regression of all sample firms and firms with asset size more than 100 million dollars

	All Firms				Asset Size more than 100 million dollars			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.2325*	-0.0012	-0.0287	0.1204**	-0.9525***	-0.3990***	-0.8218***	-0.2600***
	(-1.7346)	(-0.0201)	(-0.2196)	(2.0920)	(-10.9962)	(-12.7094)	(-9.4609)	(-8.3247)
DUMMY	0.1669	-0.8343***	0.5523***	-0.3036	0.2672***	-0.6448***	0.2072***	-0.7132***
	(1.4170)	(-4.1775)	(4.0777)	(-1.3892)	(5.8658)	(-5.0369)	(3.7977)	(-5.3012)
SIZE	0.0415**		0.0252		0.0750***		0.0756***	
	(2.1358)		(1.2990)		(7.2118)		(7.2199)	
DUMMY×SIZE		0.1889***		0.1552***		0.1335***		0.1331***
		(5.9861)		(4.8781)		(7.1670)		(7.0843)
CASH	0.0168***	0.0192***			0.0248***	0.0254***		
	(6.5124)	(7.3775)			(20.7687)	(21.2013)		
DUMMY×CASH			0.0027	0.0056*			0.0219***	0.0228***
			(0.9559)	(1.9380)			(16.1627)	(16.6694)
ROA	-0.0493***	-0.0493***	-0.0495***	-0.0496***	0.0109***	0.0110***	0.0098***	0.0099***
	(-143.6573)	(-149.269)	(-144.9543)	(-151.2071)	(13.322)	(13.4848)	(11.9369)	(12.0885)
PB	0.0014***	0.0013***	0.0014***	0.0014***	0.0007***	0.0007***	0.0007***	0.0007***
	(4.0549)	(3.9980)	(4.1802)	(4.1205)	(4.9533)	(4.9550)	(5.0320)	(5.0306)
STD	0.0001	0.0001	0.0001	0.0001	0.0284***	0.0265***	0.0296***	0.0277***
	(0.4699)	(0.4735)	(0.4988)	(0.5234)	(14.5928)	(14.0326)	(15.1603)	(14.5958)
MARKET	0.0245***	0.0247***	0.0247***	0.0248***	0.0130***	0.0128***	0.0133***	0.0130***
	(11.3600)	(11.43544)	(11.4103)	(11.4892)	(16.4531)	(16.1977)	(16.6773)	(16.4163)
Adj. R-square	50.74%	50.81%	50.65%	50.70%	10.93%	10.93%	9.91%	9.90%
Observations	22638	22638	22638	22638	14575	14575	14575	14575
Firms	2058	2058	2058	2058	1325	1325	1325	1325

Panel B: Regression of firms differentiated as high-growth and low-growth

	High Growth				Low Growth			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	2.0242***	0.6024***	2.1903***	0.7142***	-1.2945***	-0.4895***	-1.0549***	-0.3848***
	(10.9427)	(7.2838)	(12.1456)	(8.9783)	(-6.8476)	(-6.0120)	(-5.7579)	(-4.9173)
DUMMY	0.2446	1.0227***	0.4461***	1.3529***	-0.2349	-1.5177***	0.2842	-0.7082**
	(1.6357)	(4.0888)	(2.5980)	(4.9447)	(-1.3699)	(-4.8469)	(1.4334)	(-2.0449)
SIZE	-0.2156***		-0.2265***		0.1432***		0.1179***	
	(-8.6855)		(-9.1337)		(4.9136)		(4.0703)	
DUMMY×SIZE		-0.1070***		-0.1277***		0.2507***		0.1818***
		(-2.9418)		(-3.4844)		(4.4664)		(3.1904)
CASH	0.0131***	0.01527***			0.0180***	0.0192***		
	(4.2092)	(4.8579)			(4.3849)	(4.6050)		
DUMMY×CASH			0.0050	0.0065*			-0.0021	-0.0001
			(1.4971)	(1.9142)			(-0.4684)	(-0.0205)
ROA	-0.0277***	-0.0289***	-0.0279***	-0.0291***	-0.0580***	-0.0575***	-0.0582***	-0.0578***
	(-48.0960)	(-51.4758)	(-48.5755)	(-52.1271)	(-140.13)	(-145.1384)	(-141.3511)	(-147.4237)
STD	-0.0001	0.0000	-0.0001	0.0000	0.0022**	0.0020**	0.0024***	0.0022**
	(-0.2784)	(0.1829)	(-0.3014)	(0.1754)	(2.5659)	(2.3498)	(2.7752)	(2.5630)
MARKET	0.0265***	0.02735***	0.0266***	0.0274***	0.0218***	0.0217***	0.0220***	0.0218***
	(9.5246)	(9.8113)	(9.5423)	(9.8345)	(7.0855)	(7.0380)	(7.1410)	(7.0890)
Adj. R-square	22.18%	21.72%	22.07%	21.58%	66.11%	66.10%	66.05%	66.03%
Observations	11330	11330	11330	11330	11308	11308	11308	11308
Firms	1030	1030	1030	1030	1028	1028	1028	1028

Table 7 Regression on Excess Value among the 5 specific industries

This table reports cross-section fixed effect panel regressions results. The dependent variable is relative Tobin's Q, which is computed as every firm's Tobin's Q minus the industrial average Tobin's Q. The industrial average Tobin's Q is the median of Tobin's Q in the industry which the first-two SIC codes are the same as the firm. The dummy equals one if a firm holds negative net debt at any point and zero for otherwise. The SIZE is natural log of firms' total assets. CASH is cash and cash equivalents divided by total assets. STD is the standard deviation of monthly stock return over the financial year. PB is the price-to-book ratio of a firm. IPOAGE is calculated as natural log of firms' IPO age and MARKET is the market premium defined by Rm-Rf. Panel A shows the results of all firms among the five specific industries. Panel B shows the results that differentiated firms as high-growth (column (1)~(4)) and low-growth (column (5)~(8)) by firms average price-to-book ratio. Firms with average P/B ratio higher than the median of price-to-book ratio among all sample firms are classified as high-growth. Firms with average P/B ratio lower than the median of price-to-book ratio among all sample firms are classified as low-growth. *,**, and *** are significance at the 10%, 5%, and 1% respectively. The values of t-statistics are in parentheses.

Panel A: Regression of all firms among the five specific industries

Variables	(1)	(2)	(3)	(4)
Intercept	5.0459***	-1.3766**	5.4778***	-1.0060*
	(6.9603)	(-2.3842)	(7.6618)	(-1.7683)
DUMMY	-0.0981	1.0447**	-0.3890	0.9067*
	(-0.3989)	(2.1974)	(-1.3243)	(1.7959)
SIZE	-1.6754***		-1.6993***	
	(-13.5933)		(-13.7827)	
DUMMY×SIZE		-0.2604***		-0.2774***
		(-2.8318)		(-3.0188)
CASH	0.0273***	0.0283***		
	(5.0139)	(5.0919)		
DUMMY×CASH			0.0233***	0.0215***
			(4.2176)	(3.8267)
ROA	-0.0229***	-0.0259***	-0.0229***	-0.0258***
	(-35.5357)	(-41.8662)	(-35.4475)	(-41.7365)
PB	0.0010***	0.0009**	0.0010***	0.0009**
	(2.6293)	(2.2770)	(2.5846)	(2.2440)
STD	0.0396***	0.0491***	0.0392***	0.0488***
	(7.6253)	(9.3869)	(7.5507)	(9.3256)
IPOAGE	0.8332***	0.1640	0.8763***	0.1999
	(3.8517)	(0.7600)	(4.0433)	(0.9248)
MARKET	0.0310***	0.0347***	0.0312***	0.0350***
	(8.3623)	(9.2479)	(8.4200)	(9.3261)
Adj. R-square	53.33%	51.81%	53.26%	51.72%
Observations	6006	6006	6006	6006
Firms	546	546	546	546

Panel B: Regression of firms among the main five industries separated by growth

	High Growth				Low Growth			
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	6.6845***	-0.3377	7.1464***	0.0317	0.0113	-4.3495***	0.4930	-3.9829***
	(8.5195)	(-0.5172)	(9.2223)	(0.0493)	(0.0078)	(-4.2381)	(0.3480)	(-3.9261)
DUMMY	0.0762	3.5949***	-0.1961	3.4378***	-0.4460	-1.9924**	-0.5451	-2.0273**
	(0.2810)	(6.5822)	(-0.6076)	(6.0051)	(-0.9904)	(-2.3753)	(-1.0010)	(-2.1890)
SIZE	-1.7912***		-1.8009***		-1.1452***		-1.1934***	
	(-13.5655)		(-13.6230)		(-4.5400)		(-4.7333)	
DUMMY×SIZE		-0.7313***		-0.7532***		0.3781**		0.3719**
		(-7.3693)		(-7.5988)		(2.0707)		(2.0214)
CASH	0.0288***	0.0266***			0.0245**	0.0297***		
	(4.9881)	(4.5255)			(2.2957)	(2.7606)		
DUMMY×CASH			0.0228***	0.0213***			0.0171	0.0187
			(3.9774)	(3.6516)			(1.5035)	(1.6217)
ROA	-0.0100***	-0.0129***	-0.0100***	-0.0129***	-0.0329***	-0.0347***	-0.0328***	-0.0347***
	(-11.945)	(-15.6613)	(-11.9196)	(-15.6386)	(-32.5963)	(-37.7874)	(-32.5353)	(-37.6241)
STD	0.0572***	0.0669***	0.0571***	0.0669***	0.0337***	0.0393***	0.0329***	0.0386***
	(9.0510)	(10.4642)	(9.0203)	(10.4432)	(4.0085)	(4.7146)	(3.9212)	(4.6328)
IPOAGE	0.6494***	-0.2264	0.6857***	-0.1876	1.3999***	1.2070***	1.4253***	1.2323***
	(2.6391)	(-0.9522)	(2.7812)	(-0.7879)	(3.5785)	(3.0342)	(3.6330)	(3.0914)
MARKET	0.0325***	0.0365***	0.0328***	0.0368***	0.0302***	0.0314***	0.0304***	0.0317***
	(8.1185)	(8.9994)	(8.1967)	(9.0667)	(4.3169)	(4.4740)	(4.3366)	(4.5094)
Adj. R-square	38.97%	36.74%	38.81%	36.61%	66.10%	65.81%	66.04%	65.72%
Observations	3861	3861	3861	3861	2145	2145	2145	2145
Firms	351	351	351	351	195	195	195	195