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Abstract

This study attempts to reconcile the two strands of research on the impacts of financial leverage on firm valuation. The prior literature has shown that financial leverage has a polysemous effect. In other words, it provides two opposing signals of firm performance (i.e., financial distress vs. a driver of positive change in a firm's prospects). Given that the effects of financial leverage are contradictory, we specify how these divergent signals appear and propose that there is a non-monotonic effect of financial leverage on firm valuation. The study also shows that marketing activities can be strategically implemented to tame these polysemous signals. Marketing activities are costly actions for a firm, especially one in an adverse environment with high leverage, and are rewarded in terms of firm valuation. Therefore, marketing activities can help reinforce the driver signal and alleviate the distress signal of financial leverage, thus increasing firm valuation. This study finds a U-shaped relationship between financial leverage and Tobin's q and a positive moderating effect of marketing intensity on the curvilinear relationship.

Keywords: Firm Financial Leverage; Marketing Intensity; Firm Valuation; Signaling

1. INTRODUCTION

Since the seminal work on debt by Modigliani and Miller (1958), debt, as a means to finance, has been studied in terms of how it can affect the capital structure of a firm (Myers 1984; Kraus and Litzenberger 1973; Frank and Goyal 2003). Basically, Modigliani and Miller (1958) theorized that capital structure does not affect the market value of a firm. However, since the conception of corporate income tax was added to the capital-structure-irrelevance thesis, the role of debt has been extensively explored and its monetary benefits and costs have been specified (Myers 1984; Kraus and Litzenberger 1973; Frank and Goyal 2005; Graham 2003). For example, Kraus and Litzenberger (1973) argued that debt is beneficial in that it can shield earnings from corporate income taxes, but that it can also lead firms to the danger of bankruptcy. That is, as the level of debt increases, the marginal benefit of debt declines, while the marginal cost increases. A firm that is optimizing its overall value will focus on this trade-off when choosing how much debt and equity to use for financing (Frank and Goyal 2005). Thus, the conflict between benefit and cost of debt can yield a curvilinear relationship between debt and performance (specifically, an inverted U-shaped relationship).

While the trade-off theory has provided theoretical contributions to our understanding of capital structure, its empirical relevance has often been questioned. In addition, our knowledge of the impact of debt, characterized by multiple meanings within a firm, on firm performance, has not been fully specified. The empirical findings reported have been inconclusive. Some scholars have found a positive relationship between debt and firm performance (Jensen 1986; McConnell and Servaes 1990), while others have found a negative relationship (Goddard, Tavakoli, and Wilson 2005; Myers 1977; Margaritis and Psillaki 2010; Yazdanfar and Ohman 2015). Stulz (1990) found both a positive and a negative effect of debt based on Myers (1977) and Jensen (1986). Scholars have not reached an agreement about the relationship between financial distress and corporate performance (Opler and Titman 1994) and the empirical evidence based on the agency costs hypothesis is mixed (Campello 2006; Mesquita and Lara 2003; Titman 2000; Myers 2001; Harris and Raviv 1991; Weill 2008). See Table 1 for a summary of previous literature.

Various conclusions exist in the literature regarding the relationship between financial leverage and firm performance. Considering potential causes for these inconsistent results, such as different sample periods, sample regions, model specifications, and hypothesized relationships between various researches, we attempt to reconcile these findings through the use of a very comprehensive data set that covers a time span of 30 years under a non-linear model specification that properly accounts for other firm and industry effects. Furthermore, we provide an explanation for the divergent effects of debt that can be supported by underlying theories of financial leverage and firm performance.

In this study, we attempt to fill the empirical gap in the trade-off theory regarding the role of financial leverage[1] in firm performance. In particular, we acknowledge that debt can be a substitute for internal financing as well as external financing (Myers 1984), and claim that such a dual role of debt in a firm's capital structure can create multiple signals of the debt financing. These different signals of debt, which can be also called polysemous signals of debt, in turn reveal differential impacts (or effects) of debt on firm performance.

Based on this argument, we also explore how firms can use marketing intensity to address the polysemous signals of debt. Focusing on the costly signaling roles of marketing in boosting firm valuation and firm financial performance, we argue that marketing intensity will positively moderate the non-linear relationship between financial leverage and firm valuation. Marketing intensity includes activities for facilitating communication with stakeholders (including investors and customers), and framing any issues concerning the firm (Keller and Lehmann 2006; Joshi and Hanssens 2008). Such marketing activities, however, are costly for firms and spending on these marketing activities is discretionary (Mizik and Jacobson 2007). Since investors cannot distinguish good-quality firms from bad-quality firms, they use firms' 'costly actions' as a signal of good quality (Myers and Majluf 1984). Thus, firms spending a greater amount on marketing activities, especially under leveraged situations, may signal to investors that they are the firms with good quality. In addition, "proactive marketing" helps a firm boosts its financial performance in an adverse environment such as a leveraged situation (Grewal and Tansuhuj 2001). Marketing actions can reinforce the growth signal while mitigating the distress signal by helping investors cancel out their aversion to the bankruptcy risk. Therefore, marketing activities could be used strategically to tame the polysemous signal of debt.

To test these ideas, we collected financial and accounting data of 1,481 firms between 1970 and 2011, from COMPUSTAT and CRSP. With the data, we illustrate that financial leverage has a non-linear relationship with firm valuation, represented by Tobin's *q* and Buy-and-Hold Abnormal Returns (BHARs). Financial leverage, derived from the level of debt, is one of the important financial indicators for investors because it can show a firm's capital structure. Marketing spending makes a firm and its products more salient, or more visible, and helps investors understand about the firm's capability in its investment and financial stability. Therefore, marketing intensity could work as another important financial indicator for investors. In this study, we use these indicators to specify the role of debt in firm valuation. Also, we examine whether the quadratic relationship between financial leverage and firm valuation is influenced by marketing intensity.

[1] Financial leverage refers to the proportion of debt as part of total assets. We use debt and financial leverage interchangeably, as financial leverage is proportional to the level of debt.

The remainder of the paper is structured as follows. Theories and hypotheses are presented in Section 2. Section 3 presents the data, variable operationalization, and model specification. Section 4 presents the results. Robustness checks and alternative explanations are discussed in Section 5. Section 6 discusses the results. Section 7 presents conclusion of the paper.

Insert Table 1 about here.

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2. THEORY AND HYPOTHESES

2.1. Signaling Process of Debt

The trade-off theory of debt suggests that the two opposite effects of debt constitute an inverted U-shaped relationship with firm performance (Frank and Goyal 2005). However, since the trade-off relationship is heavily dependent on the definitions of taxes and bankruptcy costs, both of which have little consistency in their specifications (Myers 1984), the trade-off theory has often been questioned in terms of its empirical relevance (Frank and Goyal 2005). Specifically, Graham (2003) argued that the tax effect is more complicated than the theory predicts because it depends on the various features of the tax system. This indicates that the benefits of debt financing can vary depending on how we define the tax code. Meanwhile, Haugen and Senbet (1978) argued that bankruptcy costs must be deadweight costs. That is, bankruptcy costs are derived not directly from debt financing, but from the disequilibrium between benefits and costs of debt financing. Also, since bankruptcy is a rare event, it is less likely to provide a good estimate of the cost of (tentative) bankruptcy. In sum, there exist discrepancies between the actual performance implications and the trade-off theory's prediction of an inverted U-shaped relationship between debt and firm performance.

We identify two reasons for these discrepancies: accounting-based measurement and information asymmetry. First, the trade-off theory is based on the monetary calculation of benefits and costs. The monetary calculation should be inconclusive, as the benefits and costs of debt are dependent on how they are defined and measured in the statement. Different calculation schemes under different accounting perspectives will entail different performance implications (Eckstein 2004). Thus, we suspect that the impact of debt on firm value may be inconsistent depending on the measures used. The second reason for the discrepancies is that the trade-off theory assumes all information treated by a firm and its investors to be symmetrically shared. That is, the theory assumes that decision makers in a firm and investors share identical information. However, in a firm, there exists a substantial amount of internal information, which leads to many different interpretations that investors can make. This information asymmetry can be

reinforced when a piece of information has multiple meanings. Because there are multiple meanings of debt, the meaning a firm intends to present may not be well conveyed to the stakeholders. In fact, debt is considered to have polysemous meanings in a firm. While it defines a firm's capital structure (Myers and Majluf 1984; Modigliani and Miller 1958; Miller 1977), debt is strategically dealt with using asymmetric information (Stulz 1990; Ross 1977; Leland and Pyle 1977). These different interpretations of debt on the part of the investors lead to differing implications for firm performance.

To reconcile the limitations of the trade-off theory, we utilize the signal theory to take into account the multiple meanings of debt in the firm valuation process. The signal theory concerns the process by which one party sends information about itself to another (Spence 1973). Since the utilization/interpretation of the information differs between a sender and a receiver, debt, as asymmetrically treated information, can be used to *signal* a firm's strength rather than to reveal it (Ross 1977).

The prior literature identifies the two different signals that debt can transmit. First, debt can convey a driver signal: a positive relationship with firm performance (Debt-financing effect). The driver signal of increased debt can increase the value of the firm because investors will perceive that the firm is likely to grow in the future (Jensen 1986). Specifically, debt financing implies that the firm's stock is undervalued, so investors will be likely to perceive that the firm is performing well. In fact, Jensen (1986) found that debt could increase efficiency in appropriating free cash flow (p. 324). That is, the greater the debt, the greater the firm valuation.

On the other hand, debt also sends a distress signal: a negative relationship with firm performance (Bankruptcy effect). The distress signal of increased financial leverage can impair the anticipatory perception of the stakeholders, leading to a decreased market value of the firm. Debt is seen as inherently costly because it impairs access to credit and raises the costs of the stakeholder relationships by making firms engage in actions that are harmful to debt-holders and non-financial stakeholders (i.e., customers, suppliers, and employees) (Opler and Titman 1994). Studies suggest that higher debt and greater financial distress, in sum, negatively affect firm performance. That is, carrying a greater amount of debt can be a problem because it increases the perceived risk associated with businesses, making firms unattractive to the investors and thus reducing their ability to raise additional capital in the future (Smith and Watts 1992).

2.2. Two Roles of Debt in Capital Structure

While we acknowledge that the two signals are engaged in firm valuation, we cannot distinguish the impact of the distress signal on firm valuation from the impact of the driver signal by simply juxtaposing the opposing signals. To identify how the different signals of debt affect firm valuation, we

focus on how a firm's capital structure is constructed. As an alternative theory to the trade-off theory that may explain the U-shaped relationship between debt and firm performance, the pecking order theory provides meaningful implications for the debt-signaling processes. This alternative theory specifies a firm's hierarchical structure of capital investment rather than comparing the elements of capital structure (Myers 1984). The main idea of the pecking order theory is that there exists a priority for selecting means of financing. According to Myers and Majluf (1984), among financing sources, such as internal funds, debt, and equity, firms prioritize internal funds unless any external financing (i.e. debt and equity) is necessary. If external financing must be employed, firms prefer debt to equity. Equity is lastly pursued if additional financing is required after raising internal funds and debt. Firms take equity with the lowest priority because equity brings external ownership into the company, and endowing ownership to outsiders confers additional risks. Thus, the pecking order of financing sources is as follows: internal funds first, followed by debt, and then equity.

This implies that debt can play two roles in a firm's capital structure: it can be a substitute for either internal financing or external financing. First, debt can be considered as a financing alternative to cash holdings or retained earnings (Guney, Ozkan, and Ozkan 2007). In fact, risk-free debt, which reduces the uncertainty entailed in any risky debt, avoids the need to consider timing and method of debt repayment (Frank and Goyal 2005). This particular type of debt has the same functionality as internal financing sources, and thus can provide an alternative to internal sources. Even when debt is not risk-free, the pecking order theory implies that firms select debt as a substitute for internal financing (Frank and Goyal 2005). In particular, when firms are unable to internally utilize their own financial resources for their projects, debt is the most prioritized financing source. Hence, debt can be involved in the internal financing processes. On the other hand, the issuance of debt can compete with that of equity for external financing. Firms can externally finance with either debt or equity. In this sense, the debt-to-equity ratio of a firm has been understood as a representative indicator of the soundness of its capital structure (Myers 1984). The ratio assumes that the relative dominance between debt and equity constitutes a firm's capital structure. Once firms need to pay more attention to external financing than internal financing, they will choose between debt and equity; in this phase, debt increases at the expense of equity and *vice versa*.

Figure 1 summarizes the dual role of debt in the financing schemes.

Insert Figure 1 about here.

2.3. Non-monotonic Impacts of Financial Leverage on Firm Valuation

The different roles of debt in corporate financing can convey different meanings to the investors. Such differential meanings can provide a further understanding of how the bifurcated signals of debt (i.e.,

driver vs. distress) affect firm valuation. In terms of competition with internal financing, lower levels of debt in a firm can indicate that the firm has sufficient internal resources to carry out its projects. This signifies that the firm may be able to avoid financial distress. That is, a firm receives more positive valuation from the investors if the level of debt is lower. Given that the pecking order of financing goes sequentially from internal resources to external resources, this can be translated in reverse: when a firm, which has used up its internal finance, attempts to finance externally and increases its debt level, potential investors may understand the firm's debt issuance as a signal of financial distress, where internal resources for a project are not sufficient. As a result, in the phase of competition between debt and internal financing, a higher level of debt may have a detrimental effect on firm valuation.

However, as the debt issuance approaches its maximum capacity (i.e. debt issuance increases), equity is considered as a next alternative source of financing; this is the phase of external financing. This leads to a state in which external financing means (debt and equity) are dominated within a firm's capital. Actually, firms that externally finance tend to disclose favorable information about their growth opportunities (Titman and Trueman 1986; Hyytinen and Pajarinen 2005). The active use of the external financial resources relative to the internal financing, accordingly, can make investors more likely to perceive the firm's value as positive. In the external financing phase, debt issuance relative to stock issuance means that the firm is undervalued, so that it will take more opportunities for its growth (Myers 1984, Jensen 1986). In other words, the debt issuance, rather than the stock issuance, indicates that the firm has more leeway to increase its value (Myers 1984). Thus, investors may interpret the higher level of debt as a driver of growth, thus enhancing firm valuation.

Given the roles of debt in both the internal and the external financing phases, we therefore hypothesize a U-shaped relationship between financial leverage and firm valuation.

HYPOTHESIS 1*: Debt has a U-shaped relationship with firm valuation.*

2.4. The roles of marketing in the relationship between financial leverage and firm valuation

2.4.1. Marketing as a Means of Taming the Polysemous Signals of Debt

Marketing activity plays two strategic roles in increasing firm valuation: 1) signaling good investment quality to the investors and 2) improving firm performance as a result of proactive marketing in an adverse environment.

The true state of the firm, whether it is facing financial crisis or expecting a healthier financial outlook in the future, is not readily observable in the market. Thus, in order to inform and persuade the market about its advantageous prospects, a firm can manage the signal it sends to the market about its state, either true or desired. Since "marketing expenditure" is discretionary spending (Mizik and Jacobson, 2007) and the investors cannot discern the true state of the firm, whether the firm is of good quality or bad

quality, investors can use marketing spending as an indicator of the firms' financial status.

Marketing, in this sense, can help the firms signal their future profitability (Srivastava, Shervani, and Fahey 1998; Srivastava, Fahey, and Christensen 2001; Joshi and Hanssens 2008). In the stock market, the investors can benefit from marketing activities. Marketing actions can affect the shareholders' value by increasing the stock price and reducing the firm's cash needs (Rao and Bharadwaj 2008). By using marketing data, investors can more accurately form an expectation about the risk of future cash flows (Srivastava, Shervani, and Fahey 1999; Joshi and Hanssens 2010). Erickson and Jacobson (1992) found that increased advertising spending is positively associated with stock returns because investors interpret the increase in advertising spending as a signal of higher future profitability. Also, as McAlister, Srinivasan, and Kim (2007) argued, marketing spending helps build brand equity, which can serve as a high-quality information channel, leading to greater liquidity and increased breadth of investor ownership. Marketing can also help a firm boosts its financial valuation, especially in an adverse environment. According to Srinivasan et al. (2005), "proactive marketing, which represents the strategic response of a firm to a recession, or more generally, to an adverse environment," can improve firm performance because it can be interpreted as the firm trying to capitalize on the opportunities found in a recessionary period. We can argue that a firm with high financial leverage is under adverse environmental pressure, since a highly leveraged firm has a constrained ability to acquire funds, increased rigidity, and limited strategic options available (Grewal and Tansuhuj 2001). Therefore, a highly leveraged firm's marketing spending can signal to investors that the firm is strategically and proactively reacting to the adverse situation in order to increase firm financial performance.

The positive financial consequences derived from marketing actions can cancel out investors' aversion toward the bankruptcy risk, which is naturally involved in the distress signal. In a similar vein, Fornell et al. (2006) posited that highly satisfied customers, led by marketing activities, tend to be less associated with the firm's higher risk. Hence, marketing activities can mitigate the risk derived from the distress signal of debt.

Furthermore, marketing activities can also create a reinforced growth signal (Gruca and Rego 2005). Since marketing activities have positive impacts on firm financial outcomes (e.g., enhanced financial outlook, acceleration and stabilization of firm's cash flow, reduced vulnerability to the cash flow variability), they can create shareholder's value by securing the growth and the stability of the firm (Gruca and Rego 2005). Also, what Srinivasan et al. (2005) termed "marketing proactivity," which represents the strategic response of a firm to an adverse environment, can improve the firm's performance. Therefore, marketing activities can potentially strengthen the driver signal of debt.

Since debt can convey contradicting signals to the market, based on the literature concerning marketing's impact on firm financial performance, we can conjecture that marketing activities can be

strategically directed to alleviate the distress signal and reinforce the driver signal of debt. In other words, firms can strategically employ marketing actions as a treatment for the contradicting signals that debt conveys to the stock market. In sum, the involvement of marketing activities in firms, by alleviating the distress signal and reinforcing the driver signal of debt, will enable stakeholders to generate a positive evaluation of the firms. Thus, we hypothesize the following:

HYPOTHESIS 2: *Marketing intensity positively moderates the relationship between financial leverage and firm valuation.*

3. Methodology

3.1. Data

The sample used to analyze our hypotheses was constructed from the COMPUSTAT and the CRSP databases. Standard & Poor's COMPUSTAT database covers firms that are publically traded in the U.S. and contains firms' financial and accounting information, such as total assets, total debt amount, total sales, and various forms of capital spending, i.e. advertising and R&D expenditures. The COMPUSTAT database was used to calculate our main dependent variable, firm valuation (Tobin's *q*), and moderator (Marketing Intensity), as well as control variables that represent the firm characteristics. The CRSP (Center for Research in Security Prices) monthly database provides information pertaining to the stock value on a monthly basis, i.e. stock price, returns, outstanding shares, etc. We used monthly stock returns to calculate a proposed alternative dependent variable, investor's buy-and-hold abnormal return (*BHAR*). The compiled database for our empirical analysis included 14,887 firm-year observations, with 1,481 firms spanning the years 1970 to 2011.

3.2. Variable Operationalization

3.2.1. Dependent Variables: Tobin's *q* as a measure of firm valuation and buy-and-hold abnormal returns (BHAR) as an alternative performance measure

Our primary dependent variable, Tobin's *q*, is used to measure firm valuation. The *q* ratio tells us whether a firm's investments have resulted in an improvement in investors' perception of the firm's assets. Thus, Tobin's *q* has been commonly used in the financial literature to represent firm performance and how the market perceives the value of the firm (Kaplan and Zingales 1997; Gompers, Ishii, and Metrick 2003; Brown and Caylor 2006). Specifically, using the COMPUSTAT data items, Tobin's *q* is defined as follows: (Total Asset (Data item 6) + Market Value of Equity (Data item 24*Data item 25)-Book Value of Equity (Data item 216+Data item50+Data item51-Data item56))/Total Asset (Data item 6). A higher

value of Tobin's q indicates that the firm's capital investments have been successfully converted into a higher market value.

The alternative performance measure adopts the use of a company's monthly stock returns. As suggested by Barber and Lyon (1997), since CARs (Cumulative Abnormal Returns) are a biased predictor of long-run buy-and-hold abnormal returns and are weak on providing a conceptual layout of economic interpretation, we compute BHARs (Buy-and-Hold Abnormal Returns) and include them in our analyses. We use the firms' monthly stock returns from the CRSP monthly stock files less the market returns to compute the abnormal returns, where the market return is the value-weighted return of all CRSP firms in the U.S. that are listed on the NYSE, AMEX, or NASDAQ. The calculated returns can be viewed as the annual total stock returns after accounting for the market's general performance from the investor perspective.

3.2.2. Independent Variables.

Financial Leverage. Financial leverage ratio is defined as the proportion of debt to the firm's total assets. Debt is composed of long-term debt (Data item 9) and debt in current liabilities (Data item 34). Specifically, our leverage variable is defined as follows:

$$Leverage_{i,t} = \frac{DLC_{i,t} + DLTT_{i,t}}{Total\ Asset_{i,t}}$$

Firms with higher financial leverage ratio utilize more debt than other sources for financing projects and operations. On the other hand, firms with lower financial leverage ratio indicate that they are financed either through internal funding or equity financing. Thus, this ratio would be a direct measure of how much a firm is financed through debt financing. To be consistent with our conjecture that financial leverage has a non-monotonic effect on firm valuation, we also include the second-order term of leverage in the analysis. In addition, as Campello (2006) argued, we use long-term book leverage because it reduces the reverse causality problem that could possibly arise between performance and capital structure.

Marketing Intensity. Marketing managers, in general, consider amount of sales to decide the firms' advertising and marketing budget (Lynch and Hooley 1990). Scholars in the management area have used the ratio of SG&A to sales to measure recoverable slack (Bromiley 1991; Bourgeois Iii and Singh 1983) and marketing scholars have used it as a measure of marketing expenditure (Sheth and Sharma 2001; Foster and Gupta 1994) or to measure firms' efficiency of utilizing marketing resources (Morgan and Rego 2009). Therefore, even though some scholars have operationalized marketing intensity as the difference between R&D expense (Data item 46) and SG&A expenses (Data item 132) to asset ratio (Mizik 2010; Mizik and Jacobson 2007; Luo 2008), we use sales as a measure of revenue. This is because,

according to the percentage of sales method, marketing managers look at sales, not assets, when determining the advertising budget. Therefore, instead of following the use of the asset ratio, we incorporate the total sales ratio to examine the effect of sales-based marketing intensity. Specifically, marketing intensity is defined as follows:

$$Marketing\ Intensity_{i,t} = \frac{XSGA_{i,t} - XRD_{i,t}}{SALES_{i,t}}$$

The sales-based measure is preferred due to its lower likelihood of distortion, as the asset-based measure is influenced by new investments from which profits have not been gained (Geringer, Beamish, and DaCosta 1989).

3.2.3. Control Variables.

Our set of control variables includes size, capital expenditure, sales, market-to-book ratio, industry average assets, industry concentration, industry-adjusted market share, age, and firm's previous valuation. These controls are known to have effects on firm performance and using them as our controls ensures that our findings will not be due to the differences in these characteristics or to an industry effect. Size is defined as the log of a firm's total assets (Data item 120). Studies have shown that larger firms are less subject to financial distress due to higher diversification (Titman and Wessels 1988), while smaller firms have higher external financing costs and thus have higher constraints than larger firms (Whited 1992; Fazzari and Petersen 1993). Capital expenditure is defined as the amount of money spent to acquire and maintain the physical assets of a company. More active investment activities that can result in increased future earnings are expected when the capital expenditure is higher. Capital expenditure (Data item 128) is scaled by sales (Data item 117). Sales are the direct indicator of the firm's performance, measured in dollar terms. Market-to-book ratio is measured by the year-end market value of equity divided by the book value of equity. The market-to-book ratio is known to capture the value risk factor (Fama and French 1993) and studies have documented that value stocks tend to outperform the market. We also control for firm's age because longer existence in the market can reflect solid market share for the firm's product as well as value through the built reputation and stability of the business.

To control for industry effects, we also use industry average assets and industry concentration ratio as our control variables. Industry average assets have been viewed as a barrier to exit in studies of diversification strategies (Robins and Wiersema 1995), but they also influence a firm's performance when the firm perceives the industry-level assets as a sunk investment. We measure this by averaging the total assets for firms with a given 2-digit SIC code. Industry concentration is defined as the sum of squared market shares of each firm in the industry, where the market share is calculated by dividing a firm's sales by the total sales in the industry. According to Domowitz, Hubbard, and Petersen (1986), industry

concentration enhances market power, which can influence Tobin's Q. Thus, we include this variable in our model. Market share is the final control variable. Market share, calculated as the proportion of an individual firm's sales to the total sales in the industry, indicates that the higher the share, the greater the impact of innovations on the firm value (Tsai 2006).

3.3. Model Specification

This section introduces the model that we employ to test our hypotheses. To examine our first hypothesis that financial leverage has a U-shaped relationship with the firm valuation, we estimate the following panel regression (1):

$$\begin{aligned} Firm.Valuation_{i,t+1} = {} & \beta_0 + \beta_1 Leverage_{it} + \beta_3 Leverage_{it}^2 + \beta_3 Size_{it} + \beta_4 Firm.Valuation_{it} + \beta_5 CAPEX_{it} \\ & + \beta_6 Sales_{it} + \beta_7 MTB_{it} + \beta_8 Avg.Ind.Asset_{it} + \beta_9 IC_{it} + \beta_{10} Ind.Adj.MktShare_{it} \\ & + \beta_{11} Age_{it} + \beta_{12,t} Year_t + \beta_{13,n} Firm_n + \varepsilon_{it} \end{aligned} \quad (1)$$

where firm valuation is measured by Tobin's *q*. We also include firm and year fixed effects to account for possible unobserved heterogeneity. We anticipate that the positive coefficient on the second-order term of leverage will be consistent with our prediction of a U-shaped relationship between financial leverage and firm valuation. All of the independent variables are lagged by one year to predict future firm valuation and also to avoid the issue of reverse causality.

To test for our second hypothesis that marketing intensity moderates the relationship between financial leverage and firm valuation, we estimate the following regression (2):

$$\begin{aligned} Firm.Valuation_{i,t+1} = {} & \beta_0 + \beta_1 Leverage_{it} + \beta_3 Leverage_{it}^2 + \beta_3 Marketing_{it} + \beta_4 Leverage_{it} * Marketing_{it} \\ & + \beta_5 Leverage_{it}^2 * Marketing_{it} + \beta_6 Size_{it} + \beta_7 Firm.Valuation_{it} + \beta_8 CAPEX_{it} \\ & + \beta_9 Sales_{it} + \beta_{10} MTB_{it} + \beta_{11} Avg.Ind.Asset_{it} + \beta_{12} IC_{it} + \beta_{13} Ind.Adj.MktShare_{it} \\ & + \beta_{14} Age_{it} + \beta_{15,t} Year_t + \beta_{16,n} Firm_n + \zeta_{it} \end{aligned} \quad (2)$$

where we introduce the interaction terms of leverage and marketing intensity. We expect to see a positive effect of marketing expenditure, with a reserving effect from marketing moderation. Specifically, we expect to see a negative moderating effect of marketing following an initial positive moderating effect. We will discuss our empirical test results in detail in the following section.

4. RESULTS

Tables 2 and 3 present the descriptive statistics and the correlations for the analyses predicting the impact of financial leverage on Tobin's *q* and the moderating effect of marketing intensity on the relationship between financial leverage and Tobin's *q*. We have observations for 14,887 firm-years and 1,481 firms. Our main independent variables, financial leverage and marketing intensity, have a mean of 19.1% and 36.5%, respectively. A financial leverage ratio of 19.1% shows that the firms, on average, take debt that constitutes as much as of 19.1% of their total assets. A marketing intensity of 36.5% indicates that the dollar amount of a firms' marketing expenditure is 36.5% of their sales. Size, capital expenditure and sales are expressed in dollar terms. The average life span of the firms in our sample is 13 years.

Insert Table 2 about here.

Contemporaneous correlations between financial leverage and marketing intensity with control variables are reported in Table 3. The financial leverage ratio is negatively correlated with marketing intensity. This is reasonable, as we can expect that a firm will lower its marketing expenses when it is highly leveraged. Financial leverage also has a significantly positive correlation with sales and age; this in turn predicts that the performance of leveraged firms in terms of sales will be more likely to outperform that of the less-leveraged firms. The positive correlation of leverage with age is consistent with the idea that the more mature firms in the market will be able to finance through debt rather than through costly equity financing.

Insert Table 3 about here.

Marketing intensity is negatively associated with size, sales, and age. Smaller-sized firms and those in their early stages may incur larger spending on marketing for growth purposes. As capital expenditure is defined as the amount of money spent to obtain and sustain a firm's physical assets, a positive correlation between capital expenditure and marketing intensity provides a consistent link of firm's actions towards its growth. Increased marketing intensity can also be translated into a higher market value of the firm's equity.

4.1. Financial Leverage and Firm Valuation

Table 4 presents the maximum likelihood estimation of firm valuation. Model 1 presents the control variables. Model 2 tests the non-monotonic effect of financial leverage on Tobin's *q*. We find a U-shaped relationship between financial leverage and Tobin's *q*, as the linear effect of financial leverage on firm valuation is negative (β = -0.727; p < .050) and the quadratic effect of financial leverage on firm valuation is positive (β = 1.557; p < .001). That is, at lower levels of financial leverage, Tobin's *q*

decreases with financial leverage; however, above a certain level of financial leverage, Tobin's *q* increases with financial leverage. This result supports Hypothesis 1. Figure 2 is a graph of the quadratic relationship between financial leverage and firm valuation. Here, we find that firm valuation decreases with increased financial leverage until the proportion of debt as the part of total assets reaches about 30%. However, after the 30%, firm valuation is "leveraged" by financial leverage.

Insert Figure 2 about here.

4.2. Moderation of Marketing Intensity

Hypothesis 2 predicts that the impact of financial leverage on firm valuation will be greater with increased marketing intensity. Findings from Models 3 and 4 find support Hypothesis 2, which states that marketing intensity moderates the curvilinear relationship between financial leverage and Tobin's *q*. Specifically, Model 4 shows a negative effect of financial leverage on Tobin's *q* (β = -1.122; p < .001) and a positive effect of its quadratic terms (β = 1.922; p < .001). In turn, the interaction effect of marketing intensity and financial leverage on Tobin's *q* is positive (β = 1.185; p < .001), whereas the interaction between marketing intensity and the quadratic term of financial leverage is negative (β = -1.348; p < .001). These results show that marketing intensity raises firm valuation with increased financial leverage.

Insert Table 4 about here.

Figure 3 depicts the predicted firm valuation with respect to financial leverage and marketing intensity. Since financial leverage is, by definition, identified as having non-negative values, only the shaded area in Figure 3 is empirically feasible.

Insert Figure 3 about here.

We can understand these relationships more specifically by looking at Figure 4. In Figure 4, the solid line shows only the relationship between financial leverage and Tobin's *q*; the broken red line shows the relationship between firm valuation and financial leverage when the level of marketing activities is low; and the dotted blue line indicates the moderating effect of higher marketing intensity. A comparison between the broken line (low marketing intensity) and the dotted line (high marketing intensity) in Figure

4 demonstrates that firm valuation can be increased with higher moderation by marketing. The minimum value of Tobin's q at the inflection point is increased as marketing's moderating effect is further intensified. Also, the shape of the quadratic relationship becomes flatter with increased marketing intensity. This means that marketing activities can alleviate the negative impact of low internal resources on firm valuation and can simultaneously enable the firm to reap the benefits of financial leverage (through debt financing).

In addition, in Figure 4, we see that firm valuation is more sensitive to the effect of marketing activities at modest levels of financial leverage. That is, the difference in Tobin's q according to marketing activities increases when the financial leverage remains moderate, i.e. neither too small nor too large. This indicates that the advantages of marketing intensity can be maximized when the financial leverage is modest. When the financial leverage is too low, which means that the focal firm is signaled as suffering from financing itself (struggles between internal financing and external financing), marketing intensity may exacerbate the firm's financial distress. On the other hand, when financial leverage is too high, which means the focal firm is signaled as growing (i.e. it is choosing between debt and equity financing), the signal of high financial leverage itself can explain the focal firm's status as prosperous. With the information on financial leverage, investors will be able to determine whether the focal firm is doing well. In this situation, marketing activities may be redundant. Meanwhile, the intermediate level of financial leverage represents an ambivalent state of its signal. The negative meaning (i.e. financial distress) and the positive meaning (i.e. growth opportunities) are confounded under the modest level of financial leverage. In this situation, marketing activities can play a critical role in reinforcing the positive meaning of financial leverage and thus persuading investors to value the firm's activities.

Insert Figure 4 about here.

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5. Robustness Checks and Alternative Explanations

We undertook additional tests to check the robustness of our results. We considered endogeneity and alternative specifications of our measures. First, we explored questions of causality and endogeneity. In addition, in order to check the endogeneity issue more systematically, we applied a Hausman test, where we first obtained residuals from the estimation of financial leverage at t-1 with respect to Tobin's *q* at t-2, and then included these as independent variables in the main models. If the residuals from the

former are significantly related to the dependent variables of the main models, we can conclude that there are endogeneity issues (Wooldridge 2010). Our result from the aforementioned Hausman test indicates that we are free from the issue of endogeneity.

Additionally, our constructs are validated using alternative measures. First, for marketing intensity, we use selling expenditures relative to R&D expenditure. In fact, advertising is a more direct activity to deal with signals. Since firms do not publicly report marketing expenditures, most studies on the link between firm value and marketing have considered advertising spending as a proxy for marketing expenditure. However, there is a weak evidence for the profit contribution of advertising spending (Hanssens, Parsons, and Schultz 2003). Our results are validated based on the advertising expenditures. The results of this robustness check are shown in Model 2 in Table 5.[2] Pertaining to Model 2, the negative coefficient of an interaction term of advertising intensity and financial leverage on Tobin's q (β = -0.213; p < .001) and the positive coefficient of the interaction term of advertising intensity and the quadratic term of financial leverage (β = 0.691; p < .001) support the positive moderating effect of advertising spending on firm valuation.

Insert Table 5 about here.

We also consider alternative measures for firm valuation. Model 3 and 4 in Table 5 present the respective relationships between financial leverage and the alternative measure of firm valuation and the marketing moderation effects. BHARs (Buy-and-Hold Abnormal Returns) are used to represent the firm performance in the financial market, where the returns are calculated in excess of market's performance. Consistent coefficients on the terms of financial leverage, marketing intensity and the moderating effect of marketing enable us to conclude that our results are robust to alternative measures of firm valuation. We also find a persistent pattern between our alternative dependent measure of BHARs and advertising intensity, which is the alternative measure for marketing intensity.[3]

To further check whether the curvilinear relationship between financial leverage and Tobin's *q* as well as the moderation effect of marketing intensity are robust, we use distinctive but legitimate alternative independent variables. For our first set of alternative variables, we adjust financial leverage and marketing intensity by the industry mean using Standard Industrial Classification (SIC) codes. The results based on the industry-adjusted variables are reported in Model 2 in Table 6. We also use the debt-

[2] Model 2 in Table 4 runs the full model specification with advertising intensity as the alternative measure of marketing intensity.

[3] Models 3 through 4 in Table 4 estimate the full model specification, with the alternative dependent measure of BHARs for firm performance used for the robustness check.

to-equity ratio to test the proposed relationship. Since this ratio represents the capital structure of the firm and directly measures how much debt is used in comparison to the equity, we expect to see results that are consistent with the financial leverage, which is the debt-to-asset ratio. The results are reported in Model 3 in Table 6. Both of the alternative independent variable approaches confirm our hypotheses.

Insert Table 6 about here.

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6. DISCUSSION

6.1. Substantial Cost vs. Strategic Signal

Our empirical test shows a U-shaped relationship between the debt-and-equity ratio and Tobin's *q*, which is not consistent with the trade-off theory. In essence, our empirical findings paradoxically reveal that a lower level of debt can impair firm valuation, whereas a higher level of debt can enhance it. Based on our results, we maintain that this empirical irrelevance of the trade-off theory would be a result of the cost-based understanding of debt. Certainly debt has multiple meanings, which are simultaneously situated within each level of debt. To deal with such a polysemous concept of debt, the cost-based understanding of debt is not sufficient. Instead, we argue that favorable interpretations of the strategic signal of debt will enable firms to enhance their valuation.

Although stakeholders (e.g. investors, customers, etc.) do analyze a firm's cost structure when evaluating the financial soundness and performance of the firm, the stakeholders' interpretations, which depend on the information the firm asymmetrically provides, can affect the firm's outcomes. In other words, firm valuation can vary depending on which interpretation of the multiple signals of debt is dominant among stakeholders. This notion also indicates that the effects of debt should be focused on firm valuation rather than profitability. In fact, we ran our model using ROA (Return on Assets) and ROI (Return on Investment) as dependent variables. The results revealed no significant relationship between financial leverage and these performance variables. These findings reinforce our argument that the impact of financial leverage on a firm's outcome is involved in the interpretation of debt rather than in its substantiality. Thus, the contribution of this work is that we empirically reveal how the level of debt can signal the firm's growth potential to investors instead of conveying the soundness of its capital structure. This further contributes to the managerial implication of the capital structure. The interpretative process of asymmetric information with the use of debt endows managers with the flexibility towards capital structure management. It could also allow managers to implement opportunistic debt financing to enhance firm valuation.

6.2. Marketing's Role in Influencing Firm Valuation

The implication of debt signaling is that firms can strategically determine their level of debt in order to influence how investors or other stakeholders evaluate the firm's status. Ross (1977) argued that one firm could issue more debt than another. That means that increasing debt can be costly (or beneficial) for certain firms. If debt is understood solely as a cost, the strategic use of debt might not make sense, as it would not be imaginable for a firm to issue a large amount of debt. It means that firms can strategically choose to retain higher levels of debt to enhance their valuation. To make the strategic retention of debt more effective, marketing activities can play a critical role. As discussed above, the effect of financial leverage should be understood as a signaling process, which is dominantly interpretative. Given that marketing activities can affect whether stakeholders perceive a firm to be of good quality and can increase a firm's financial performance in an adverse situation, these activities can be strategically used to enhance the signaling process of debt. Specifically, firms can increase their value with marketing activities if leverage is considered as a growth signal and can decrease investors' aversion to bankruptcy risk if leverage is considered as a distress signal.

The contribution of this work to the literature examining the impact of marketing activities on firm valuation is that we specifically look at the role of marketing intensity in relation to various levels of financial leverage. The positive moderating effect of marketing confirms that marketing activity can be used as a strategic tool to enhance firm valuation.

7. CONCLUSION

This study has attempted to reconcile the empirical inconsistency in the literature regarding the theoretical formulations of financial leverage. By incorporating signal theory into pecking order theory, we posited that debt plays a dual role in a firm's capital structure. According to the pecking order theory, a firm can expand financial resources by utilizing retained earnings first, followed by debt and equity. In such a capital structure, we can find a dual role of debt: 1) debt can compete with retained earnings in the implementation of internal financing, and 2) debt can compete with equity when a firm requires external financing. The two roles entail two different signals, which in turn lead to a non-monotonic effect on firm valuation. Furthermore, recognizing that the debt signaling process is inherently interpretative, we illustrate that the curvilinear relationship between financial leverage and firm valuation is moderated by marketing intensity. In particular, marketing intensity helps increase firm valuation by signaling good quality, especially in an adverse environment with a leveraged situation.

This study has managerial implications. It provides the perspective that debt is polysemous, such that the effect of debt on a firm's outcome should be treated as an interpretative process. In particular, marketing activities, which mainly enable firms to communicate with stakeholders (including investors), can be critically involved in the interpretative process of debt. That is, the marketing activities can be used strategically enhance firm valuation. Considering the effect of debt and marketing intensity on firm valuation, firms can better understand how to strategically implement marketing expenditure.

REFERENCES

Barber, Brad M., and John D. Lyon. 1997. "Detecting long-run abnormal stock returns: The empirical power and specification of test statistics." *Journal of Financial Economics* 43 (3): 341-72.

Bolton, Patrick, and David S. Scharfstein. 1990. "A theory of predation based on agency problems in financial contracting." *American Economic Review* 80 (1): 93-106.

Bourgeois Iii, L. J., and Jitendra V. Singh. 1983. "Organizational Slack and Political Behavior Among Top Management Teams." *Academy of Management Proceedings*: 43-7.

Bromiley, Philip. 1991. "Testing a causal model of corporate risk taking and performance." *Academy of Management Journal* 34 (1): 37-59.

Brown, Lawrence D., and Marcus L. Caylor. 2006. "Corporate governance and firm valuation." *Journal of Accounting & Public Policy* 25 (4): 409-34.

Campello, Murillo. 2006. "Asset tangibility and corporate performance under external financing." *Cornell University*, Working paper.

Campello, Murillo. 2006. "Debt financing: Does it boost or hurt firm performance?" *Journal of Financial Economics* 82 (1): 135-72.

Chevalier, Judith A. 1995. "Capital structure and product-market competition: Empirical evidence from the supermarket industry." *American Economic Review* 85 (3): 415-35.

Domowitz, Ian, R Glenn Hubbard, and Bruce C Petersen. 1986. "Business cycles and the relationship between concentration and price-cost margins." *RAND Journal of Economics* 17 (1): 1-17.

Eckstein, Claire. 2004. "The measurement and recognition of intangible assets: then and now." *Accounting Forum* 28 (2): 139-58.

Erickson, Gary, and Robert Jacobson. 1992. "Gaining comparative advantage through discretionary expenditures: The returns to R&D and advertising." *Management Science* 38 (9): 1264-79.

Fama, Eugene F, and Kenneth R French. 1993. "Common risk factors in the returns on stocks and bonds." *Journal of Financial Economics* 33 (1): 3-56.

Fazzari, Steven M, and Bruce C Petersen. 1993. "Working capital and fixed investment: new evidence on financing constraints." *RAND Journal of Economics* 24 (3): 328-42.

Fornell, Claes, Sunil Mithas, Forrest V Morgeson III, and Mayuram S Krishnan. 2006. "Customer satisfaction and stock prices: High returns, low risk." *Journal of Marketing* 70 (1): 3-14.

Foster, George, and Mahendra Gupta. 1994. "Marketing, cost management and management accounting." *Journal of Management Accounting Research* 6 (3): 43-77.

Frank, M.Z., and V. K. Goyal. 2003. "Testing the pecking order theory of capital structure." *Journal of Financial Economics* 67 (2): 217-48.

Frank, Murray Z., and Vidhan K. Goyal. 2005. "Tradeoff and pecking order theories of debt." In *Handbook of Corporate finance: Empirical corporate finance*, edited by Espen Eckbo. Elsevier (Chapter 12).

Geringer, Michael J, Paul W Beamish, and Richard C DaCosta. 1989. "Diversification strategy and internationalization: Implications for MNE performance." *Strategic Management Journal* 10 (2): 109-19.

Goddard, John, Manouche Tavakoli, and John O. S. Wilson. 2005. "Determinants of profitability in European manufacturing and service: Evidence from a dynamic panel model." *Applied Financial Economics* 15 (18): 1269-82.

Gompers, Paul, Joy Ishii, and Andrew Metrick. 2003. "Corporate Governance and Equity Prices." *The Quarterly Journal of Economics* 118 (1): 107-55.

Graham, John R. 2003. "Taxes and corporate finance: A review." *Review of Financial Studies* 16 (4): 1075-129.

Grewal, Rajdeep and Patriya Tansuhaj. 2001. "Building organizational capabilities for managing economic crisis: The role of market orientation and strategic flexibility." *Journal of Marketing* 65 (2): 67-80.

Gruca, Thomas S, and Lopo L Rego. 2005. "Customer satisfaction, cash flow, and shareholder value." *Journal of Marketing* 69 (3): 115-30.

Grullon, Gustavo, George Kanatas, and Piyush Kumar. 2006. "The Impact of Capital Structure on Advertising Competition: An Empirical Study." *Journal of Business* 79 (6): 3101-24.

Guney, Yilmaz, Aydin Ozkan, and Neslihan Ozkan. 2007. "International evidence on the non-linear impact of leverage on corporate cash holdings." *Journal of Multinational Financial Management* 17 (1): 45-60.

Hanssens, Dominique M, Leonard J Parsons, and Randall L Schultz. 2003. *Market response models: Econometric and time series analysis*. Vol. 12: Springer Science & Business Media.

Harris, Milton, and Artur Raviv. 1991. "The theory of capital structure." *Journal of Finance* 46 (1): 297-355.

Haugen, Robert A, and Lemma W Senbet. 1978. "The insignificance of bankruptcy costs to the theory of optimal capital structure." *Journal of Finance* 33 (2): 383-93.

Hyytinen, Ari, and Mika Pajarinen. 2005. "External finance, firm growth and the benefits of information disclosure: Evidence from Finland." *European Journal of Law and Economics* 19 (1): 69-93.

Jensen, Michael C. 1986. "The agency cost of free cash flow: Corporate finance and takeovers." *American Economic Review* 76 (2): 323-9.

Joshi, Amit, and Dominique M Hanssens. 2008. "Advertising spending, competition and stock return." *UCLA Marketing Studies Center*, Working paper.

Joshi, Amit, and Dominique M Hanssens. 2010. "The direct and indirect effects of advertising spending on firm value." *Journal of Marketing* 74 (1): 20-33.

Kaplan, Steven N, and Luigi Zingales. 1997. "Do investment-cash flow sensitivities provide useful measures of financing constraints?" *Quarterly Journal of Economics* 112 (1): 169-215.

Keller, Kevin Lane, and Donald R Lehmann. 2006. "Brands and branding: Research findings and future priorities." *Marketing Science* 25 (6): 740-59.

Kraus, Alan, and Robert H. Litzenberger. 1973. "A state-preference model of optimal financial leverage." *Journal of Finance* 28 (4): 911-22.

Krishnamurthy, Sandeep. 2001. "A comprehensive analysis of permission marketing." *Journal of Computer-Mediated Communication* 6 (2). doi: 10.1111/j.1083-6101.2001.tb00119.x.

Kumar, V, Xi Zhang, and Anita Luo. 2014. "Modeling customer opt-in and opt-out in a permission-based marketing context." *Journal of Marketing Research* 51 (4): 403-19.

Leland, Hayne E., and David H. Pyle. 1977. "Information asymmetries, financial structure and financial intermediation." *Journal of Finance* 32 (2): 371-87.

Luo, Xueming. 2008. "When marketing strategy first meets Wall Street: Marketing spendings and firms' initial public offerings." *Journal of Marketing* 72 (5): 98-109.
Lynch, James E, and Graham J Hooley. 1990. "Increased sophistication in advertising budget setting." *Journal of Advertising Research* 30 (1): 67-76.
Margaritis, Dimitris, and Maria Psillaki. 2010. "Capital structure, equity ownership and firm performance." *Journal of Banking & Finance* 34 (3): 621-32.
McAlister, Leigh, Raji Srinivasan, and MinChung Kim. 2007. "Advertising, research and development, and systematic risk of the firm." *Journal of Marketing* 71 (1): 35-48.
McConnell, John J, and Henri Servaes. 1990. "Additional evidence on equity ownership and corporate value." *Journal of Financial Economics* 27 (2): 595-612.
Mesquita, Jose Marcos Carvalho and Jose Edson Lara. 2003. "Capital structure and profitability: The Brazilian case." *Academy of Business and Administration Sciences Conference*: 11-13.
Miller, Merton H. 1977. "DEBT AND TAXES*." *the Journal of Finance* 32 (2): 261-75.
Mizik, Natalie 2010. "The theory and practice of myopic management." *Journal of Marketing Research* 47 (4): 594-611.
Mizik, Natalie, and Robert Jacobson. 2007. "Myopic marketing management: Evidence of the phenomenon and its long-term performance consequences in the SEO context." *Marketing Science* 26 (3): 361-79.
Modigliani, Franco, and Merton H. Miller. 1958. "The Cost of Capital, Corporate Finance and the Theory of Investment." *American Economic Review* 48 (3): 261-97.
Morgan, Neil A., and Lopo L. Rego. 2009. "Brand portfolio strategy and firm performance." *Journal of Marketing* 73 (1): 59-74.
Myers, Stewart C. 1977. "Determinants of corporate borrowing." *Journal of Financial Economics* 5 (2): 147-75.
Myers, Stewart C. 2001. "Capital structure." *Journal of Economic perspectives* 15 (2): 81-102.
Myers, Stewart C. 1984. "The capital structure puzzle." *Journal of Finance* 39 (3): 575-92.
Myers, Stewart C., and Nicholas S. Majluf. 1984. "Corporate financing and investment decisions when firms have information that investors do not have." *Journal of Financial Economics* 13 (2): 187-221.
Nash, Edward L. 1993. *Database marketing: The ultimate marketing tool*. New York, New York: McGraw-Hill
Opler, Tim C., and Sheridan Titman. 1994. "Financial distress and corporate performance." *Journal of Finance* 49 (3): 1015-40.
Rao, Ramesh K. S., and Neeraj Bharadwaj. 2008. "Marketing initiatives, expected cash flows, and shareholders' wealth." *Journal of Marketing* 72 (1): 16-25.
Robins, James, and Margarethe F. Wiersema. 1995. "A resource-based approach to the multibusiness firm: empirical analysis of portfolio interrelationship and corporate financial performance." *Strategic Management Journal* 16 (4): 277-99.
Ross, Stephen A. 1977. "The determination of financial structure: the incentive-signalling approach." *Bell Journal of Economics* 8 (1): 23-40.
Sheth, Jagdish N., and Arun Sharma. 2001. "Efficacy of financial measures of marketing: It depends on markets and marketing strategies." *Journal of Targeting, Measurement, & Analysis for Marketing* 9 (4): 341-56.

Smith, Clifford W, and Ross L Watts. 1992. "The investment opportunity set and corporate financing, dividend, and compensation policies." *Journal of Financial Economics* 32 (3): 263-92.

Spence, Michael. 1973. "Job market signaling." *Quarterly Journal of Economics* 87 (3): 355-74.

Srinivasan, Raji, Arvind Rangaswamy, and Gary L Lilien. 2005. "Turning adversity into advantage: Does proactive marketing during a recession pay off?" *International Journal of Research in Marketing* 22 (2): 109-25.

Srivastava, Rajendra K, Tasadduq A Shervani, and Liam Fahey. 1999. "Marketing, business processes, and shareholder value: an organizationally embedded view of marketing activities and the discipline of marketing." *Journal of Marketing* 63 (4): 168-79.

Srivastava, Rajendra K., Liam Fahey, and H. Kurt Christensen. 2001. "The resource-based view and marketing: The role of market-based assets in gaining competitive advantage." *Journal of Management* 27 (6): 777-802.

Srivastava, Rajendra K., Tasadduq A. Shervani, and Liam Fahey. 1998. "Market-based assets and shareholder value: A framework for analysis." *Journal of Marketing* 62 (1): 2-18.

Stulz, Rene M. 1990. "Managerial discretion and optimal financing policies." *Journal of Financial Economics* 26 (1): 3-27.

Titman, S. 2000. "What we know and don't know about capital structure: a selective review." *University of Texas, Austin,* Working paper.

Titman, Sheridan, and Brett Trueman. 1986. "Information quality and the valuation of new issues." *Journal of accounting and economics* 8 (2): 159-72.

Titman, Sheridan, and Roberto Wessels. 1988. "The determinants of capital structure choice." *Journal of Finance* 43 (1): 1-19.

Tsai, Bi-Huei. 2006. "Innovation, Market Share, and Firm Value-Patents in Personal Computer Industry." *National Ching Tung University*, Working paper.

Weill, Laurent. "Leverage and corporate performance: Does institutional environment matter?" *Small Business Economics* 30 (3): 215-65.

Whited, Toni M. 1992. "Debt, liquidity constraints, and corporate investment: Evidence from panel data." *Journal of Finance* 47 (4): 1425-60.

Wooldridge, Jeffrey M. 2010. *Econometric analysis of cross section and panel data*. Cambridge: MIT press.

Yazdanfar, Darush, and Peter Ohman. 2015. "Debt financing and firm performance: An empirical study based on Swedish data." *Journal of Risk Finance* 16 (1): 102-18.

TABLES AND FIGURES

Table 1

Previous Literature on the Inconclusive Relationship between Firm Leverage and Firm Financial Performance

Relationship	Study	Findings	Method	Data	Firm Financial Performance Variables & Capital Structure Variables
Positive	Jensen (1986)	"Debt could increase efficiency in appropriating free cash flow." Thus, the greater the debt, the greater firm valuation.	Theoretical Model	Theoretical Model. Evidence in Oil Industry	Organizational Efficiency
	Kraus and Litzenberger (1973)	Debt is beneficial in that it can shield earnings from corporate income taxes.	Theoretical Model	Theoretical Model (Single-period valuation model in a complete capital market)	The states in which the firm will receive the tax savings attributable to debt financing. V: Total market value of a firm
	McConnell and Servaes (1990)	Consistent with the tax argument (Modigliani and Miller 1963), the leverage-signaling argument (Ross 1977), and the free-cash-flow argument (Jensen 1986), the authors find a positive relationship between debt and firm valuation.	Empirical Analysis (Regression)	1,173 firms for 1976 and 1,093 firms for 1986. All firms are listed on either the NYSE or the AMEX.	Firm Valuation (Tobin's Q). Financial Leverage (Market Value of Debt/Replacement Value of Assets)
Negative	Myers (1977)	Issuing risky debt reduces the present market value of a firm that holds real options. Corporate borrowing is inversely related to the proportion of market value accounted for by real options.	Theoretical Model	Theoretical Model	V: Current equilibrium market value of the firm
	Miller (1977)	The tax advantage entirely disappears.	Theoretical Model	Theoretical Model	G: The gain from leverage for the stockholders in a firm that holds real assets
	Opler and Titman	"Highly leveraged firms lose substantial market share to their more conservatively	Empirical Tests (OLS	105,074 firm-year data during the period	Financial Performance: Sales

	(1994)	financed competitors in industry downturns."	Regression)	1972-1991 from COMPUSTAT	Growth and Stock Return Leverage: Debt/Asset
	Goddard et al. (2005)	The authors examine the determinants of profitability for manufacturing and service firms in Belgium, France, Italy, and the UK. The result shows that there exists a negative relationship between firm financial leverage and profitability.	Empirical Analysis (the system-generalized method of moments)	12,508 firms in 4 European countries from 1993-2001.	Profitability (ROA) Financial Leverage (non-current liabilities + loans/shareholder funds)
	Yazdanfar and Ohman (2015)	The authors examine the relationship between debt level and performance among small and medium-sized enterprises (SMEs) and confirm that debt, both short-term and long-term, is negatively associated with firm profitability.	Empirical Tests (3-stage least squares and fixed-effects models)	15,897 Swedish SMEs in five industry sectors during the period 2009-2012 from Affarsdata	Firm Profitability: ROA (firm's book value of net profit after tax/total assets) Debt: ratio of trade credit (accounts payable) to total assets, short-term debt (total debt repayable within one year/total asset), and long-term debt (total debt repayable beyond one year/total asset)
Mixed	Harris and Raviv (1991)	This paper surveys capital structure theories based on agency costs, asymmetric information, product/input market interactions, and corporate control considerations. The results show a mixed relationship between debt and firm financial performance.	Survey of papers	Previous literature	Benefit of Debt: Managerial ownership, free cash, investors option to liquidate Cost of Debt: Asset substitution, unspecified investigation costs, underinvestment
	Myers (2001)	There is no universal theory regarding the debt-equity choice (e.g., trade-off theory, pecking order theory, free cash flow theory)	Review paper	Review of previous literature	Benefit of Debt: Tax benefit, Cost of Debt: information and agency costs
	Mesquita and Lara (2003)	The authors find that long-term debt is negatively associated with firm profitability while short-term debt is positively associated with firm	Empirical Analysis (OLS Regression)	70 Brazilian industrial and service companies over the	Firm Profitability (the rate of equity capital on rate of return, ROE)

		profitability.		period of 1995-2001	Leverage: Long-term Debt (long-run debt/total liability), Short-term Debt (short-run debt/total liability)
	Campello (2006)	"Debt can boost and hurt firm performance." The authors show a "non-monotonic" relationship between firm debt and financial performance.	Theoretical Model & Empirical Analysis	42,994 firm-year observations from 1971-2000 across 115 industries from COMPUSTAT	Product Market Performance: firm's relative-to-industry sales growth Leverage: Long-term Debt/Total Assets
	Weill (2008)	The author examines the effect of financial leverage on performance in seven European countries. The results show that financial leverage positively impacts firm performance in Spain and Italy, while it negatively impacts firm performance in Germany, France, Belgium, and Norway.	Empirical Analysis (maximum likelihood estimation)	11,836 manufacturing firms in 7 countries from 1998-2000.	Firm Performance (cost efficiency, measured by Stochastic Frontier Approach) Financial Leverage (total liability/total assets)

TABLE 2

Summary Statistics of Financial Leverage and Firm Characteristics

The table below presents descriptive statistics of financial leverage and firm characteristics that are used in our analysis. Each of the following variables is obtained from COMPUSTAT (North American) database. Financial leverage is calculated as $everage = \frac{DLTT+DLC}{AT}$, using data item 9 (DLTT), 34(DLC), and 6 (AT). Marketing intensity is measured as $MKT = \frac{XSGA-XRD}{SALE}$, using data item 132(XSGA), 46(XRD), 117(SALES). CAPEX (data item 128) is also scaled by sales. Size is log of firm's total assets (data item 120). Market-to-Book ratios are measured by market value of equity at year end (data item 24 and 25) divided by book value of equity (data item 216, 50, 51, 56). Age is estimated as the number of years since the first observation of the firm. Industry-level variables are constructed based on 2-digit SIC code.

Variables	Mean	Standard Deviation	Min	Max	N
Leverage	0.191	0.171	0.000	0.937	14193
Marketing	0.365	2.885	-2.524	263.888	14193
Size	5.374	2.278	0.026	13.081	14193
Capital Expenditure	0.090	2.161	0.000	254.632	14193
Sales	2610.478	11006.000	0.009	230860.000	14193
Market-to-Book	3.145	16.170	0.000	174.305	14193
Age	13.215	8.907	2.000	43.000	14193
Market Share(Industry)	0.007	0.047	-0.178	0.870	14193
Average Asset(Industry)	1652.917	3650.000	9.760	77478.000	14193
Industry Concentration	0.067	0.069	0.002	0.786	14193

TABLE 3
Correlation Coefficients between Leverage and Firm Characteristics

The table below presents correlation coefficients of financial leverage and firm characteristics that are used in our analysis. Each of the following variables is obtained from COMPUSTAT (North American) database. Financial leverage is calculated as $leverage = \frac{DLTT+DLC}{AT}$, using data item 9 (DLTT), 34(DLC), and 6 (AT). Marketing intensity is measured as $MKT = \frac{XSGA-XRD}{SALE}$, using data item 132(XSGA), 46(XRD), 117(SALES). CAPEX (data item 128) is also scaled by sales. Size is log of firm's total assets (data item 120). Market-to-Book ratios are measured by market value of equity at year end (data item 24 and 25) divided by book value of equity (data item 216, 50, 51, 56). Age is estimated as the number of years since the first observation of the firm. The p-values are in the parentheses.

Variable	Leverage	Marketing	Size	CAPEX	Sales	MTB	Age	Market Share (Industry)	Average Asset (Industry)	Industry Concentration
Leverage	1.000									
Marketing	-0.037*** (0.000)	1.000								
Size	0.160*** (0.000)	-0.055*** (0.000)	1.000							
CAPEX	0.001 (0.879)	0.310** (0.000)	-0.008 (0.312)	1.000						
Sales	0.090*** (0.000)	-0.014* (0.088)	0.482*** (0.000)	-0.002 (0.789)	1.000					
MTB	0.006 (0.403)	0.022*** (0.006)	-0.016** (0.045)	-0.000 (0.988)	-0.001 (0.822)	1.000				
Age	0.053*** (0.000)	-0.025*** (0.002)	0.389*** (0.000)	-0.009 (0.248)	0.286*** (0.000)	-0.008 (0.294)	1.000			
Market Share(Industry)	0.087*** (0.000)	-0.017*** (0.040)	0.389*** (0.000)	-0.001 (0.811)	0.444*** (0.000)	-0.004 (0.568)	0.147*** (0.000)	1.000		
Average Asset(Industry)	-0.029*** (0.000)	0.110*** (0.000)	0.204*** (0.000)	0.001 (0.868)	0.211*** (0.000)	0.001 (0.873)	0.153*** (0.000)	0.019** (0.020)	1.000	
Industry Concentration	0.116*** (0.000)	-0.006 (0.406)	-0.026*** (0.001)	-0.003 (0.676)	0.048*** (0.000)	-0.000 (0.948)	-0.001 (0.826)	0.255*** (0.000)	0.052*** (0.000)	1.000

***,**,* indicates 1%, 5%, and 10% confidence level respectively.

TABLE 4
Leverage and Marketing on Firm Valuation (Panel Regression Analysis)

The table below presents the panel regression results of the effect of leverage and marketing intensity on the future firm valuation. Each of the following variables is obtained from COMPUSTAT (North American) database. The p-values are reported in the parentheses.

	DV: Tobin's Q_{t+1}			
	Model (1)	Model (2)	Model (3)	Model (4)
Leverage		-0.727**	-0.706**	-1.122***
		(0.010)	(0.012)	(0.000)
Leverage^2		1.557***	1.520***	1.922***
		(0.001)	(0.001)	(0.000)
Marketing			0.009***	0.013***
			(0.000)	(0.000)
Leverage × Marketing				1.185***
				(0.000)
Leverage^2 × Marketing				-1.348***
				(0.007)
Size	-0.613***	-0.615***	-0.612***	-0.598***
	(0.000)	(0.000)	(0.000)	(0.000)
Tobin's Q	0.188***	0.188***	0.187***	0.184***
	(0.000)	(0.000)	(0.000)	(0.000)
Capital Expenditure	-0.005	-0.005	-0.036***	-0.072***
	(0.131)	(0.136)	(0.000)	(0.000)
Sales	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-Book	0.001	0.000	0.000	0.000
	(0.113)	(0.156)	(0.150)	(0.169)
Average Industry Asset	0.000	0.000	0.000	0.000
	(0.371)	(0.401)	(0.317)	(0.000)
Industry Concentration	1.262***	1.268***	1.273***	1.245***
	(0.009)	(0.009)	(0.008)	(0.009)
Industry-Adjusted Market Share	3.30***	3.274***	3.285***	3.104***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.017	-0.016	-0.015	-0.006
	(0.608)	(0.632)	(0.643)	(0.851)
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
No. of Observation (firm-year)	14187	14187	14187	14187
R-Squared	0.580	0.580	0.582	0.586

***,**,* indicates 1%, 5%, and 10% confidence level respectively.

TABLE 5
Robustness Checks for Marketing Intensity

The table below presents the panel regression results of the effect of financial leverage and advertising on the future firm valuation. Each of the following variables is obtained from COMPUSTAT (North American) database. The alternative depend variable of BHAR in Models 3 through 4 is obtained from CRSP (Center for Research Security Prices) database. The p-values are reported in the parentheses.

	DV: Tobin's Q_{t+1}		DV: $BHAR_{t+1}$	
	Model (1)	Model (2)	Model (3)	Model (4)
Leverage	-1.122***	0.002	-0.249	-0.449***
	(0.000)	(0.994)	(0.132)	(0.009)
$Leverage^2$	1.922***	-0.845	0.999***	1.359***
	(0.000)	(0.139)	(0.000)	(4.33)
Marketing	0.013***		0.004***	
	(0.000)		(0.000)	
Advertising		0.079**		-0.029*
		(0.018)		(-1.73)
Leverage×Marketing	1.185***		0.954***	
	(0.000)		(0.000)	
$Leverage^2$×Marketing	-1.348***		-1.669***	
	(0.007)		(0.000)	
Leverage×Advertising		-0.213***		0.154***
		(0.000)		(0.000)
$Leverage^2$×Advertising		0.691***		-0.272***
		(0.000)		(0.000)
Size	-0.598***	-0.614***	-0.370***	-0.371***
	(0.000)	(0.000)	(0.000)	(0.000)
Tobin's Q	0.184***	0.187***	-0.047***	-0.048***
	(0.000)	(0.000)	(0.000)	(0.000)
Capital Expenditure	-0.072***	-0.008	-0.031***	-0.001
	(0.000)	(0.100)	(0.000)	(0.511)
Sales	0.000***	0.000***	0.000**	0.000**
	(0.000)	(0.000)	(0.032)	(0.033)
Market-to-Book	0.000	0.000	0.000	-0.000*
	(0.169)	(0.186)	(0.064)	(0.063)
Average Industry Asset	0.000	0.000	0.000	0.000
	(0.000)	(0.293)	(0.102)	(0.114)
Industry Concentration	1.245***	1.313**	0.197	0.122
	(0.009)	(0.006)	(0.451)	(0.638)
Industry-Adjusted Market	3.104***	3.246***	1.509***	1.502***
Share	(0.000)	(0.000)	(0.004)	(0.004)
Age	-0.006	-0.017	0.102***	0.99***
	(0.851)	(0.605)	(0.000)	(0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes
No. of Observation (firm-year)	14187	14187	11942	11942
R-Squared	0.586	0.467	0.222	0.223

***,**,* indicates 1%, 5%, and 10% confidence level respectively

TABLE 6
Robustness Checks for Financial Leverage

The table below presents the panel regression results of the effect of industry-adjusted leverage, Debt-to-Equity ratio and marketing intensity on the future firm valuation. Each of the following variables is obtained from COMPUSTAT (North American) database. Model 1 is the full model under the financial leverage and marketing intensity as defined in table 3. Model 2 adopts industry-adjusted leverage using 2-digit SIC code. Model 3 reports robustness result from running Debt-to-Equity ratio in place of financial leverage. The p-values are reported in the parentheses.

	DV: Tobin's Q_{t+1}		
	Model (1)	Model (2)	Model (3)
Leverage	-1.122***		
	(0.000)		
Leverage^2	1.922***		
	(0.000)		
Industry-adjusted Leverage		-0.077	
		(0.539)	
Industry-adjusted Leverage^2		2.211***	
		(0.000)	
Debt-Equity Ratio			-0.017***
			(0.000)
Debt-Equity Ratio^2			0.000***
			(0.000)
Marketing	0.013***	0.009***	0.010***
	(0.000)	(0.003)	(0.000)
Leverage×Marketing	1.185***		
	(0.000)		
Leverage^2×Marketing	-1.348***		
	(0.007)		
Industry-adjusted Leverage×Marketing		0.131***	
		(0.000)	
Industry-adjusted Leverage^2×Marketing		0.049***	
		(0.000)	
Debt-Equity Ratio×Marketing			0.057***
			(0.000)
Debt-Equity Ratio^2×Marketing			-0.000***
			(0.005)
Size	-0.598***	-0.605***	-0.604***
	(0.000)	(0.000)	(0.000)
Tobin's Q	0.184***	0.186***	0.187***
	(0.000)	(0.000)	(0.000)
Capital Expenditure	-0.072***	-0.029***	-0.038***
	(0.000)	(0.000)	(0.000)
Sales	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Market-to-Book	0.000	0.000	0.000
	(0.169)	(0.179)	(0.216)
Average Industry Asset	0.000	0.000	0.000
	(0.000)	(0.391)	(0.330)
Industry Concentration	1.245***	1.268***	1.249***
	(0.009)	(0.008)	(0.009)
Industry-Adjusted Market Share	3.104***	3.125***	3.112***
	(0.000)	(0.000)	(0.000)
Age	-0.006	-0.008	-0.009
	(0.851)	(0.806)	(0.771)
Year Fixed Effect	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes
No. of Observation (firm-year)	14187	14187	14187
R-Squared	0.586	0.583	0.583

***,**,* indicates 1%, 5%, and 10% confidence level respectively.

FIGURE 1
Dual Signals of Debt in the Pecking Order

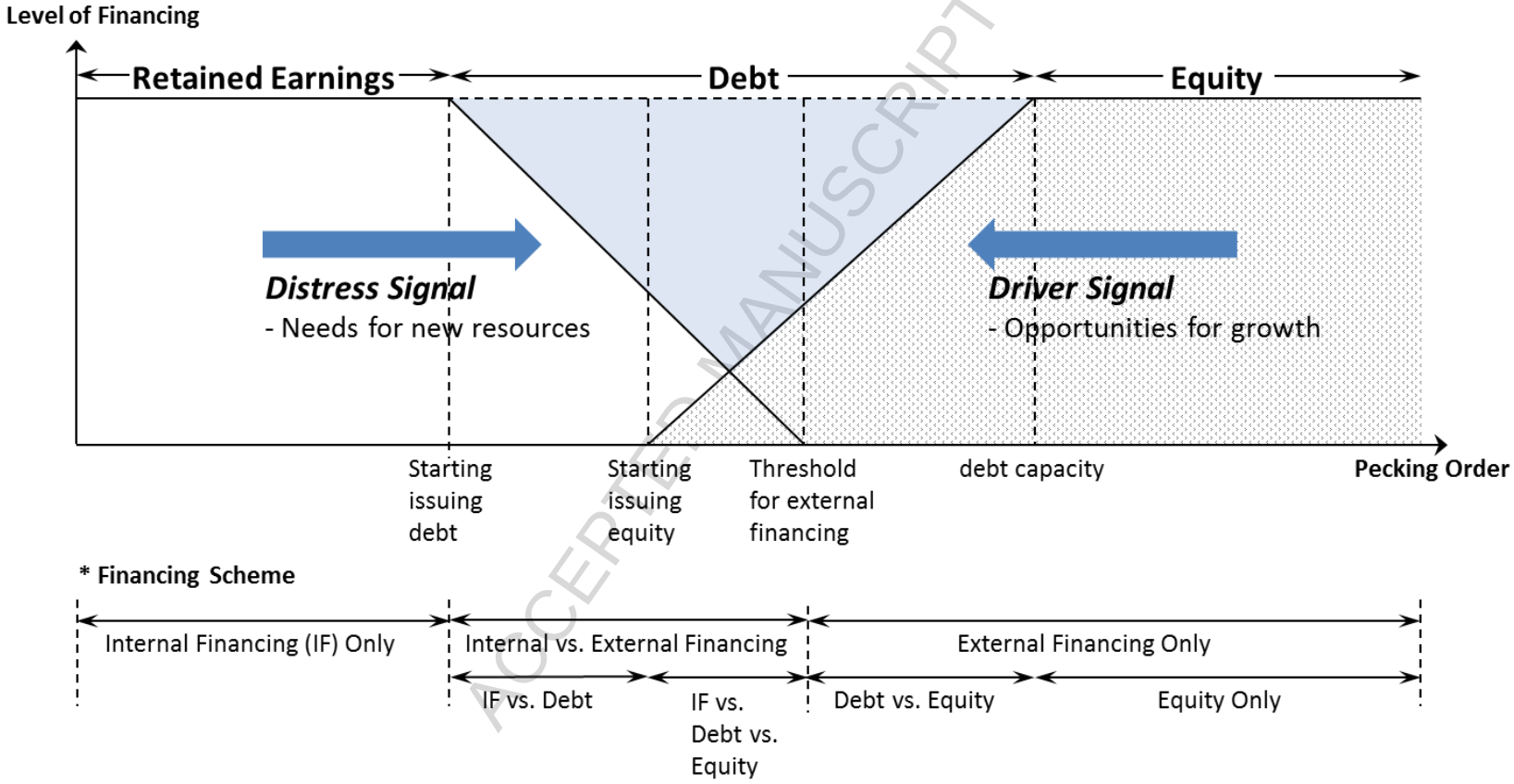

FIGURE 2
Quadratic Relationship between Financial Leverage and Firm Valuation

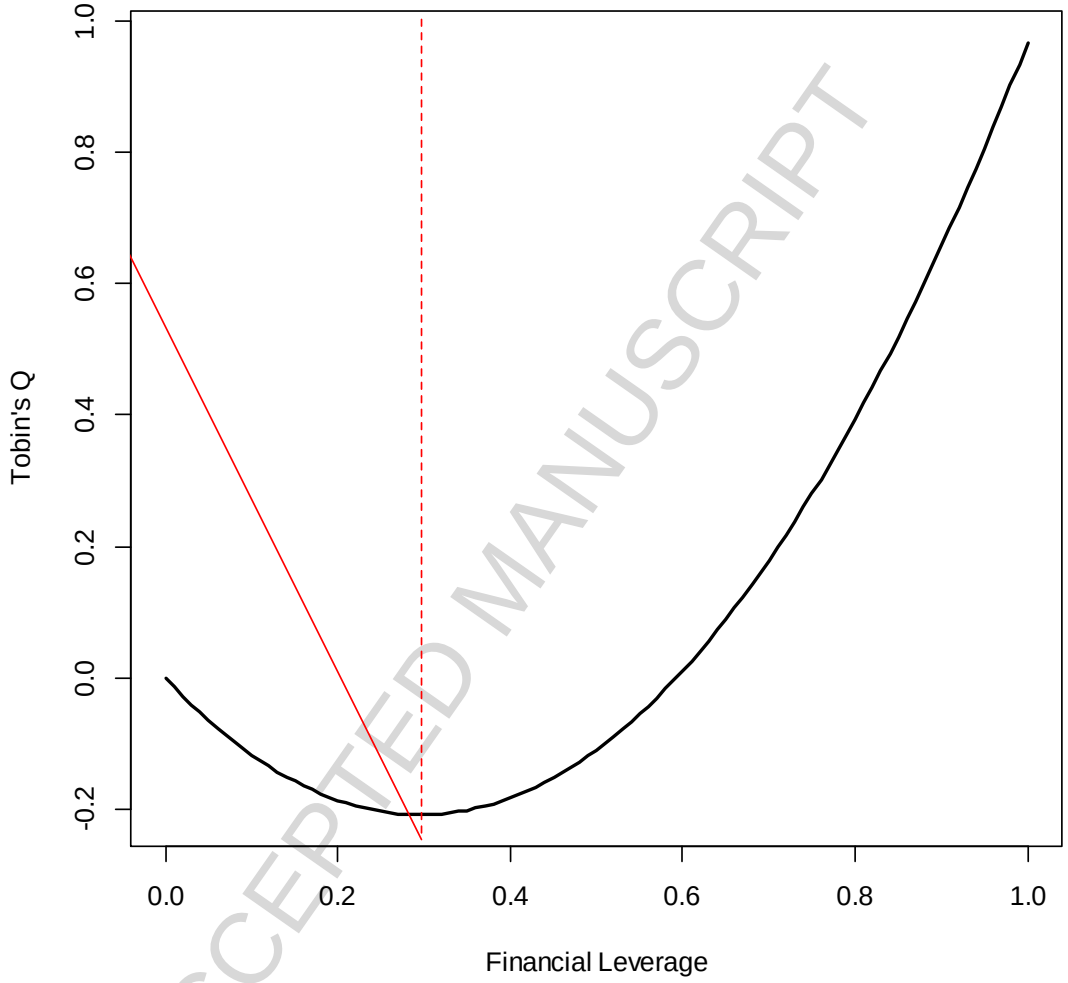

FIGURE 3
Marketing Moderation of the Quadratic Relationship between Financial Leverage and Firm Valuation

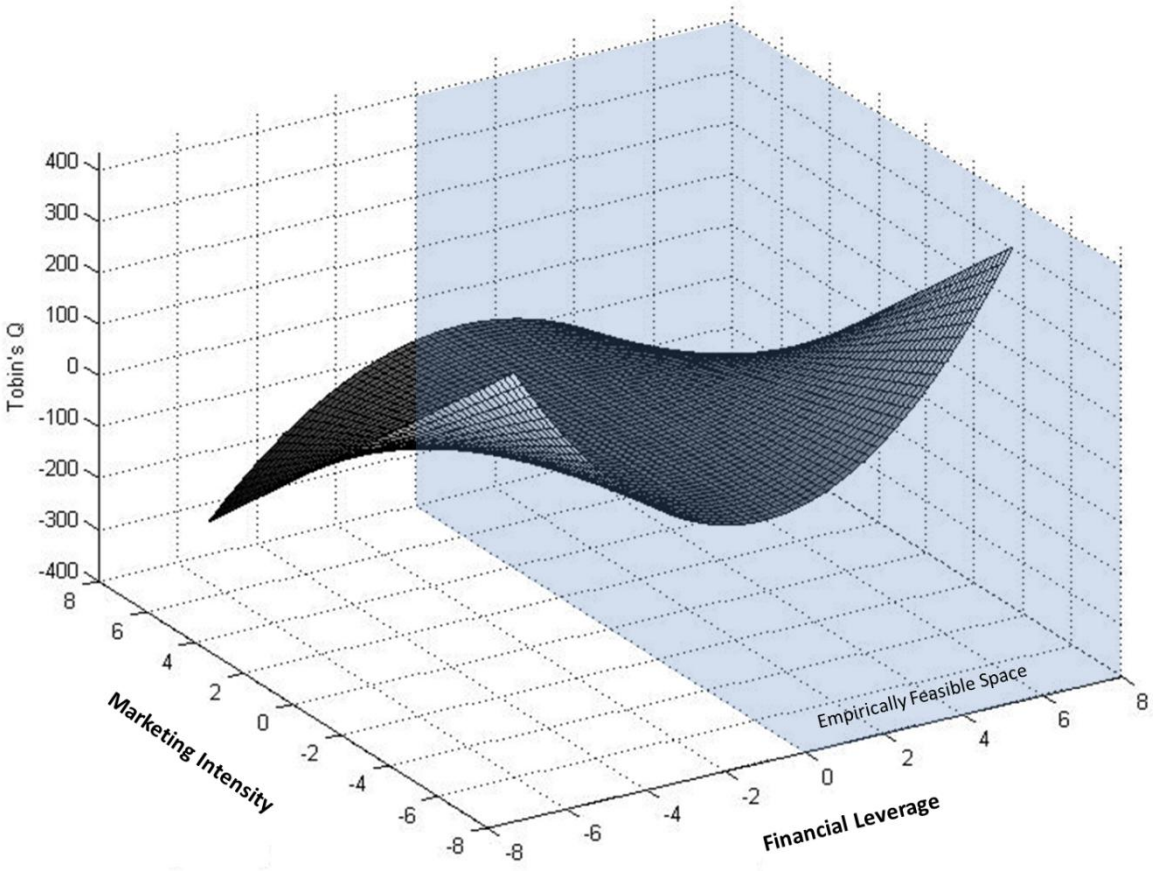

FIGURE 4
Quadratic Relationship between Financial Leverage and Firm Valuation by Marketing Intensity