Firms' capital structure decisions and product market competition: a theoretical approach

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ABSTRACT

This paper presents a theoretical model, in which a firm's market position and industry structure provide a new rationale for limits on the firm's borrowing. When there are rival firms, the outstanding long-term debt of a firm leads to a competitive disadvantage in the product market due to inflexibility in meeting competitive pressure from its rivals. This inflexibility emanates from the requirement of long-term debt service. If competition is intense, and the levered firm possesses no market power advantage in the product market, it would be difficult to raise outside funds to continue its operation in the future.

The competitive disadvantage induced by long-term debt is referred to as the "market power cost of debt". This is a real cost firms have to consider when they decide on their debt policies. Thus, firms would not seek a higher level of long-term debt than rivals, unless they enjoy a relatively superior position in the product market. Since the extent of competitive pressure depends upon firms' market positions and industry structure, firms' capital structure decisions become a function of their market positions and industry structure.

The idea of the market power cost of debt is different from the agency cost of debt discussed in the existing literature on capital structure. It is also different from the strategic role of debt discussed in the current literature on game theory. This new insight could improve our understanding of firms' capital structure decisions.

Keywords: Capital structure, product market competition

INTRODUCTION

Modigliani and Miller (1958, 1963) laid an important foundation for a theory of capital structure by developing their famous "irrelevance propositions", using the assumption of a perfect capital market. Their work, however, presents no explanation for actual corporate financing behavior. Thus, financial economists have challenged their model in that a firm's return stream is unaffected by its capital structure in a tax-free world. Since that seminal work, there have been several competing theories of capital structure which develop the idea that perceived or real return streams are influenced by a firm's financing decisions.[1] However, the present financial literature suggests that the determinants of a firm's capital structure are still subject to debate, and require further investigation. Myers (1984) calls this lack of consensus the "capital structure puzzle".

One of the difficulties with current capital structure theories is that they do not consider the linkage between the output market (or input market) and a firm's financial policy. It is not difficult to conceive the fact that a firm's financial policy interacts with the product market, where the firm eventually generates cash flow. Moreover, it can be argued that a firm's ultimate survival depends upon how well it competes in the product market. The linkage between a firm's financial policy and the product market is well documented in survey papers. Donaldson (1961) reported in his survey, that an important determinant of a firm's debt policy is its relative market position in the industry.
He noted:

"This study of corporate practice with respect to debt revealed considerable evidence of conformity in industry thinking and practice and a sensitivity to the reactions of those competitors who were considered to be near rivals" (p. 81)

Corroboration for these findings is found in a survey report authored by Scott and Johnson (1982). They reported that industry-wide leverage ratios were an important influence on a firm's leverage decisions. It is also well known that rating agencies look closely at economic variables such as pricing practices and market shares. However, it is rather surprising that we do not have much understanding of how competitive conditions in the product market are linked to firms' capital structure decisions. If firms' capital structure decisions are associated with the product market, represented by market power and market structure, then this effect would be an important determinant of their capital structure decisions.

The theoretical model in this paper suggests that when there are rival firms, the outstanding long-term debt of a firm leads to a competitive disadvantage in the product market due to an inability or inflexibility in meeting competitive pressure from rival firms. The inflexibility in market competition is induced by the requirement of long-term debt service. If competition is expected to be intense in the future, and firms possess no market power advantage in the product market over one another, the more levered firm would be unable, or would find it more difficult, to raise outside funds to keep operating in the future. The more levered firm would also have a greater moral hazard problem caused by existing stockholders. Ex ante, capital markets would recognize this, and the future competitive disadvantage induced by outstanding long term debt would be reflected in the current market valuation of the firm.

[1] For an excellent review, see Harris and Raviv (1991).

This competitive disadvantage of long-term debt would be much greater when rival firms possess a significant degree of market power. Because of the competitive disadvantage induced by long-term debt, firms would not seek to have a higher long-term debt than rival firms, unless they have a competitive advantage in the product market. The competitive disadvantage induced by long-term debt is termed as the "market power cost of debt". Competitive pressure from other firms differs across firms and industries, depending upon firms' relative market positions and the market structure of industries. Using the concept of the market power cost of debt, this paper provides cross-sectional implications about financial policies across firms and industries.

LITERATURE REVIEW

The analysis in this paper can be compared to those found in the literature examining the strategic role of debt in imperfectly competitive industries. This literature comprises the works of Brander and Lewis (1984, 1988), Maksimovic (1988), and McAndrews and Nakamura (1992). On the other hand, Maksimovic and Zechner (1991) show that firms are indifferent between alternative debt levels in perfectly competitive industries.

Their models, in general, show that firms can use a leverage ratio as a strategic variable in influencing the behavior of other firms operating in the same product market. There are, however, some problems with these models. First, by resorting to game theoretic models, their conclusions are very sensitive to assumptions and choices of strategic variables. Game theory recognizes a large number of competing equilibrium concepts for different game situations. For example, the result of Brander and Lewis (1984) is derived under the assumption of Cournot competition. Their result is reversed for Bertrand competition. This is a classic example of strategic substitutes vs. strategic complements discussed in the literature on game theory. Thus, it is difficult to generalize their conclusions.

These game theoretic models also do not explain why firms use leverage as a strategic variable in influencing other firms' behavior, instead of using other variables. Another problem is that their models are developed under the assumption that in the product market, firms have the same competitive positions. Thus, how their implications apply to a real market situation, where firms have different competitive positions, is unresolved. Perhaps most importantly, though their models deal with the product market, they do not actually consider the interaction between the product market and the financial market because of the exclusion of financial markets in their settings.

This paper presents an alternative theoretical model which examines how a firm's financial policy interacts with product market competition by taking the above problems into consideration. Further, this model generates new insights and reverses the implications of the current literature on the effects of financial structure on product market decisions.

This paper is closely related to Myers (1977), who provides a valuable insight into understanding capital structure decisions by recognizing the shareholders' moral hazard problem, a problem of underinvestment which exists when firms have future investment opportunities (positive NPV projects) in the form of intangible assets. Myers argues that if the level of cash flow from investment is not high enough to cover investment costs and debt payment, shareholders would forgo some positive NPV projects because the expected return to existing shareholders from those future investments would be negative. Ex ante, the bondholders would recognize the motivation of the shareholders' underinvestment, which would be reflected in the bond price. Firm value would be reduced by the existence of outstanding debt, and as a result, a

firm with a relatively high percent of intangible assets would have less debt. Myers correctly recognizes that there must be imperfections in input or output markets in order for a firm to have future investment opportunities. However, he assumes that the future investment opportunity set is exogenously given and the firm chooses its investments freely from this investment opportunity set.

When the product market is perceived to possess valuable investment opportunities, competition will be intense among firms to capture those opportunities. On the other hand, in the product market where there is no valuable investment opportunity (no positive NPV project), firms are not motivated to engage in competition. Because the cash flow from the new positive NPV investment results in additional sales in the product market, selling activities designed to broaden a firm's cash flow inevitably breed competition among rival firms in the same market. When these other firms react to retain market shares, the firms' cash flows in the same product market are affected by the competition. The extent of competitive pressure from rival firms depends upon the market power of a firm relative to those of its rivals and industry structure. Thus, the firm's investment opportunity set becomes a function of its market power and industry structure.

By extending Myers' model to the multi-firm setting, and introducing product market competition as a factor that makes the investment opportunity set endogenous, this paper examines how product market competition influences a firm's debt policy, and further, seeks to provide insights qualitatively different from Myers' model. Unlike Myers, who shows that the asset structure of the firm limits borrowing, it is maintained here that the firm's market position and industry provide an additional rationale for limits on the firm's borrowing. Myers deals with the agency cost of debt related to firms with rent-yielding intangible assets, when the firms' investment opportunity sets are exogenously given.

This paper deals with the disadvantage of debt related to competition among firms with rent-yielding intangible assets, and hence, firms' market positions and market structure. Later, it will be shown that this disadvantage of debt is not necessarily related to the agency cost. An explanation is offered for why firms are sensitive to the decisions of rival firms with respect to their debt policies. It is shown that such competitive conditions also provide the basis for implications about a firm's other financial policies, such as maturity structure of debt.

THE THEORETICAL MODEL

Firms engage in continuous competition in the product market. This competition occurs in various modes, such as price competition, R&D competition, advertising competition, etc. A few dramatic examples of price competition include the gas war fought by oil companies in the 70's, the fast food giants' 'burger-wars' of the 80's, and the price competition of the cigarette companies.

By competing, firms deviate from the optimal pricing decisions which would maximize their cash flows, thus making their cash flows lower than they would otherwise be. Firms adopt these sub-optimal pricing decisions in order to increase their sales (gain market share) at the expense of short-term stockholders' cash flow. In the literature, discussions about a firm's sub-optimal decisions, namely those which induce suboptimal stockholders' cash flow, are mainly concerned with sub-optimal investment decisions in relation to the agency cost argument.

When a firm initiates price competition, it adopts a sub-optimal pricing decision. Also, if the other firm initiates price competition, the first firm has to follow suit. Thus, sub-optimal

stockholders' cash flow can occur without a sub-optimal investment decision related to the agency cost argument.

It has been a subject of continuing debate whether firms maximize sales, or stockholders' cash flow. Firm' sales maximization can be explained in two ways. First, as Jensen (1986) argues, managers may sacrifice profits to increase their power by increasing the resources under their control (the agency cost of managers). Second, maximization of sales is not necessarily contradictory to long-term maximization of stockholders' cash flow. By increasing sales (market share), firms can broaden their basis for future profit-yielding opportunities. This would correspond to long-term stockholders' interest. Irrespective of the view we maintain, the efforts to increase sales inevitably induce other firms to do likewise, resulting in competition among firms in the same industry. This paper adopts the second view, investigating the effect of competition on a firm's capital structure decisions without consideration of the agency cost of management.

The assumptions in the model are:

(1) Capital markets are efficient and perfect (with no taxes and no bankruptcy cost).

(2) Product markets are not perfect. Assume that there are two firms in the same product market. The two firms are identical in every respect except outstanding debt level, and they produce a homogeneous product. When they charge the same price for their products, they divide market demand in half. When one firm charges a lower price than the other firm, the firm with the lower price captures the entire market demand. Their production costs are the same.

(3) In Period 0, both firms raise the same amount of funds. But Firm 1 raises all funds with equity, while Firm 2 raises a fraction of funds with debt. These funds are used for initial investment and other activities to create future investment opportunities (rent-yielding intangible assets). Initially, there are no assets in place, and firm value in Period 0 is entirely derived from future investment opportunities (rent-yielding intangible assets), and debt is supported only by this future investment opportunity.[2] The debt matures at the end of Period 1, and there is no interim interest payment.

(4) At the beginning of Period 1, each firm announces its price and during Period 1, they initiate production to sell their products. If one firm finds that the other firm announces a lower price, it simply follows the other firm's price. Cash flow from sales accrues at the end of Period 1. For production during Period 1, each firm needs new funds. Such funds are raised by new external financing (debt and/or equity).[3] New investors provide funds after observing the product price, thus they know the level of

[2] Firm value is defined as the value of assets in place plus the value of rent-yielding intangible assets (future investment opportunities). In a perfectly competitive product market, firms do not enjoy these rents. For these firms, value is accounted for only by the value of assets in place. Therefore, there is no motivation for firms to engage in competition. In an oligopolistic market, firms enjoy these rents. The existence of these rents motivates the firms in the same market to engage in competition to capture a larger portion of industry rent.

[3] If a firm raises debt for new financing in Period 1, this debt is short-term debt relative to debt incurred in Period 0. Our concern is how this long-term debt incurred in Period 0 affects the firm's capability of raising funds in Period 1, and its competitive position in the output market. In practice, the purposes of short-term debt and long-term debt would be different. Short-term debt would be used primarily for short-term purposes such as working capital maintenance. Long-term debt would be used mainly for long-term purposes such as plants, equipment, machinery, or an initial large outlay for R & D and advertising. These investments require a long time period to recover initial outlay. Long-term debt obligates the firm to pay the fixed amount of money for a long period, and the absolute amount of long-term debt would usually be larger than that of short-term debt. Once raised, long-term debt would have a more serious effect on the firm's future viability in areas such as financing capability and competitive position. The current theories usually ignore the difference between short-term and long-term debt. Scott and Johnson (1982) report that, in practice, firms usually use a long-term leverage measure as their relevant target leverage measure.

cash flow firms would provide in Period 1.

(5)There is no information asymmetry between the manager and current stockholders/new investors. The only assumption about information structure is that the rival firm's future (i.e., the beginning of Period 1) pricing decisions are not known to the investors and the manager in Period 0. However, price becomes known at the beginning of Period 1.

(6) Managers act in the interest of existing stockholders.[4]

(7) Both firms incur lump-sum production costs in Period 1.[5]

To summarize the sequence of decisions,

(Financing Decisions)

* Capital structure decided * Debt matures
* Initial financing * New financing

------(Period 0)----------(Period 1)----------

* Initial investment & activities to create future rent-yielding intangible asset * Price determined * Production and Sales

(Operating Decisions)

In the model, investors in Period 0 do not know what price would prevail in Period 1 (i.e., they do not know the extent of future competition in the product market). Accordingly, they also do not know how much both firms will produce in Period 1, because the firms would make their production decisions according to whatever price level is prevailing in Period 1. Investors in Period 0 know that both firms would have to duplicate that price because they produce the same products. Investors in Period 0 also know that if one firm chooses a certain price, the other firm has to follow that price, even though it is not the optimal one for maximizing the firm's cash flow. If it does not follow the other firm's price, it would not be able to compete successfully. Based on this information, investors in Period 0 would consider every possible price level which might prevail in Period 1, and figure out which firm would have a stronger competitive position in Period 1 before they provide funds. If they expect that one firm would have a competitive advantage over the other firm in period 1, then they will reflect the competitive advantage in the estimation of firm value in Period 0.

It is assumed that both firms engage in price competition. At the beginning of Period 1, the price of the product becomes known (i.e., the extent of competition becomes known), and therefore, investors know what level of cash flow each firm will provide during Period 1. Each firm's expected demand curve and resulting expected total cash flow during Period 1 are shown in Figure 1. It is assumed that each firm has a linear downward sloping demand curve. This demand curve yields a concave cash flow (revenue) curve with respect to the price level.

[4] The assumptions here are plausible. The cash flow from investment opportunities comes from future sales in the product market. Because future sales depend on future competition, the size of the expected cash flow would be affected by the interaction with the other firm's future action. The other firm's future action is not known even to managers, ex ante, when they make the initial investment. Thus, the assumption that the managers do not know more than the investors about future events is quite plausible.

[5] The assumption of lump-sum production costs is purely for illustration purposes. Depending on the quantity firms produce, production costs would vary. Even if the assumption of lump-sum costs is relaxed, the results of this study would not change, since it is assumed that both firms have the same cost structure.

Because of the assumption of a lump-sum cost (i.e., marginal cost = 0), the price level that provides the highest cash flow is one at which marginal revenue is 0 (i.e., Po in the Figure 1).

In Figure 1, the manager of the all-equity firm would be able to set a price within the range of P_0 and P_e (P_0 is the price level that provides maximum cash flow, P_e is the minimum price level that can be charged). Since the price of the product has already become known at the beginning of Period 1, existing stockholders know what level of cash flow the firm would provide. At a price level below P_e, the expected cash flow is not sufficient to cover new production costs. The current stockholders have nothing to gain from the new production, because expected return from new production is negative to them.

Even though the manager is willing to charge a price below P_e, no new investor would be willing to provide the necessary funds. Because these new investors already know the price, they know the level of expected cash flow the firm would provide. At a price below P_e, the expected cash flow is not sufficient to cover their investment [New investors' investment = cost of production (in terms of dollars)]. This investment provides a negative return to new investors too.

On the other hand, the manager of the levered firm would be able to charge a price within the range of P_0 and P_d. Below P_d, the cash flow from new production would have to go first to the existing bondholders, and therefore, the remaining cash flow would not be sufficient to cover new production costs. The existing stockholders have nothing to gain from new production, since the expected return from new production is negative to them.

Even though the manager is willing to set the price below P_d , no new investor would provide the necessary funds. To new investors, this investment would provide a negative return, because cash flow would have to go first to existing bondholders [(Expected cash flow - debt payment) < new investment]. Thus, the levered firm cannot generate new production and sales, because it cannot raise external funds when the all-equity firm sets the price below P_d. Accordingly, the levered firm would not be able to operate in the product market in Period 1. The minimum price each firm can charge is lower for the all-equity firm ($P_e < P_d$).

Because investors in Period 0 do not know what price prevails in Period 1, they will consider the situations facing each firm at every possible price level that may prevail in Period 1. Accordingly, they will expect that at a price level below Pd, the levered firm would not be able to generate new production and sales. It would have no cash flow. Thus, they will put less value on the levered firm than the all-equity firm. The levered firm cannot keep up with the all-equity firm with respect to price competition in Period 1.

Investors in Period 0 would recognize, in an expected value sense, that the levered firm would have a competitive disadvantage in the product market because of the following two factors:

(1) It would have greater difficulty in raising external funds if competition becomes intense in Period 1. This difficulty in raising external funds occurs because of new investors' aversion to providing funds when the expected cash flow is low and therefore, the expected return is negative. It has nothing to do with the moral hazard problem caused by existing stockholders, which may arise in a time of financial distress.

(2) The levered firm would have a greater chance of a moral hazard problem on the part of existing stockholders. The existing stockholders might be motivated to give up competition when competition is severe because cash flow from new production would go first to existing bondholders and the remaining cash flow is not enough to

cover new production cost. These two factors can be mutually exclusive. Thus, the competitive disadvantage of the levered firm can occur without the conflicts of interest between classes of security holders.

A state preference framework can be used to arrive at the ex ante expected firm value in Period 0. Let us regard as a state variable each price that would prevail in Period 1.
The ex ante expected value of the all-equity firm in Period 0 would be:

$$V_E = \int_{Pd}^{Po} M(P)[V(P) - C]dp + 2\int_{Pe}^{Pd} M(P)[V(P) - C]dp \quad (1)$$

[Where M(P) is the period 0 equilibrium price of a dollar delivered in Period 1]
The ex ante expected value of the levered firm in Period 0 would be:

$$V_D = \int_{Pd}^{Po} M(P)[V(P) - C]dp \quad (2)$$

The ex ante expected value of the levered firm in Period 0 is less than that of the all equity firm. As the levered firm has more outstanding debt, P_d would be higher. Therefore, this firm has a greater disadvantage in terms of competition in the product market. The more the debt the firm has, the more the difficulty it will face in raising outside funds, and the greater is the moral hazard problem affecting existing stockholders. Thus, the ex ante expected value of the levered firm would become smaller as the firm increases its debt level. In other words, investors in Period 0 would consider every possible state of competition in Period 1, and would recognize the competitive disadvantage of the levered firm. Investors in period 0 would reflect that disadvantage in the pricing of securities before they provide funds. Thus, when firms decide on their capital structure in Period 0, they would not incur debt in their capital structure.

Because of the competitive disadvantage induced by debt, the existence of higher debt itself can induce the other firm to engage in price competition, even though there is no disadvantage to the firm's operating side. The levered firm would not initiate price competition, because it has a competitive disadvantage. Because the all-equity firm has a relative competitive advantage, the condition of each firm in period 1 would depend on the actions of the all-equity firm. Rational investors and firms in Period 0 would recognize the motivation of the rival firm to take advantage of the burden of debt payment in Period 1. Therefore, the value of the levered firm in Period 0 would be smaller. No firm would raise debt in Period 0 when it sets its capital structure.

The all-equity firm and the levered firm have been taken here as examples in order to illustrate the effect of leverage on the firm's market power. What is significant is not whether one firm is levered, but rather the difference in the level of outstanding debt which puts one firm at a competitive disadvantage. If both firms are levered, then the less levered firm is at a competitive advantage. In Period 0, no firm would want to raise more debt than the rival firm. Thus, firms in the same industry would maintain similar long-term debt ratios if they have no advantage on the operating side, over one another.

DIFFERENCE IN MARKET POWER

In the real world, no firm has the same market power in the product market. An interesting question is how the existing market power of the firm can affect its leverage decisions. Market power is defined as the firm's ability to influence other firms' behavior in the product market. The source of market power can come from an advantage on the input side

and/or the output side. An input side advantage comes from better technology, efficiency of scale, better management, a better form of organization, etc. This input side advantage would result in lower costs of producing output. An output side advantage comes from better customer relationships, product differentiation, etc. This outside advantage would result in a less elastic demand curve. In this model, firms make initial investments in Period 0 to create future rent-yielding intangible assets. Let us assume one firm has done a better job than the other firm in creating intangible assets in Period 0. Thus, the two firms are different in terms of market power in Period 1, when they generate new production and sales.

Market Power on the Output Side

If we assume that Firm A has less market power than Firm B because of a disadvantage on the output side. The cash flow of Firm A is lower than that of Firm B at the same price level, while costs of production are the same. Firm A already has a competitive disadvantage due to less market power in the product market. Thus, debt would increase Firm A's disadvantage. It is assumed that both firms have incurred the same amount of debt in Period 0. Figure 2 shows that the minimum price each firm can charge in Period 1 is higher for Firm A ($P_a > P_b$). By following the same logic in the previous section, Firm A cannot compete with the same amount of outstanding debt as Firm B. As Firm A has more debt outstanding, the minimum price Firm A can charge increases. Thus, the competitive disadvantage increases.

Market Power on the input Side

If we assume that Firm A has less market power than Firm B due to inefficiency in its production and operation activities, the cash flows of both firms are the same at the same price level, while the cost of production of Firm A is higher than that of Firm B. It is also assumed that both firms have incurred the same amount of debt in Period 0. Figure 3 shows that the minimum price each firm can charge in Period 1 is higher for Firm A. Therefore, debt would be more of a disadvantage to Firm A than otherwise.

It is shown that if the firm with less market power has the same amount of outstanding debt, it would face more of a competitive disadvantage than otherwise. The value of the firm with less market power would decrease with higher levels of debt. Thus, when firms decide on their financial policies in Period 0, the firm with less market power would not incur more debt than the firm with greater market power. Two implications follow:

(1) Even if there is an advantage of debt, such as a tax shield, the firm with less market power has a limit in utilizing debt. The firm with larger market power in the product market also enjoys a relative financial advantage when it uses debt, because of its superior position in the product market. This financial advantage again reinforces its market position in the product Market.

(2) The firm with the greater market power, which leads other firms' behavior in the product market, also plays a leading role in setting the financial policies of other firms in the same product market.

DISCUSSION

Unavoidable real cost

It has been shown that there is a disadvantage to outstanding debt, in that it reduces the market power of firms when they compete in the same market. This is a real cost which a firm would have to consider in setting its financial policy. This ex ante cost has not been recognized in the literature, and will be referred to in this paper as the "market power cost of debt". The market power cost of debt is different from the agency cost of debt. It is the competitor cost of debt, which would not occur if there were no competitor. The competitive disadvantage in the product market occurs because of two factors: (1) a greater moral hazard problem caused by existing stockholders and (2) a greater difficulty in raising external funds. Thus, the market power cost of debt cannot be avoided through monitoring mechanisms designed to remove the moral hazard problem. Unless the firm can solve the second problem, it cannot avoid the market power cost of debt. The primary reasons why the market power cost of debt occurs are: (1) competitive pressure from other firms, and (2) the inflexibility of debt payment. As long as a firm cannot remove these two factors, it would be impossible to avoid the market power cost of debt. An interesting question is whether firms can avoid the market power cost of debt.

The firm's objective is to maximize the cash flow of stockholders through competition among firms in the same market. As long as there are rival firms in the same market, firms cannot avoid competitive pressure from rivals. Accordingly, the market power cost of debt cannot be eliminated, unless competition is regulated by law. Can firms eliminate the market power cost of debt through a contract between themselves, so that they would not engage in competition? If this kind of collusion were possible, firms would not worry about competitive pressure from rivals, and thus, they would be free of the market power cost of debt. However, this type of explicit contract is not allowed by law (The Sherman Antitrust Act 1890).

Is it possible for a firm to avoid the market power cost of debt by implicit collusion among themselves? An oligopoly market is characterized by the existence of rents. In this market, each firm knows that if all firms in the market cooperate, they can maximize their total profits. The incentive is to cooperate, not to compete. The rewards from cooperation and collusion are high. Firms might arrive at an implicit collusion not to compete, but this type of implicit collusion is fragile if one firm has a weakness relative to its competitors. Once a firm finds the other firms' weakness, a burden of higher debt payment and/or less market-power in our model, it could take advantage of that weakness. Thus, as long as there is a rival firm in the same market, the market power cost of debt cannot be avoided.

Even though competition is currently mild, that does not mean that firms are less subject to the market power cost of debt, because there is always a possibility of intense competition in the future. Firms and the financial market will recognize this, and accordingly, firms would limit their borrowing. The mere existence of a rival would subject firms to the market power cost of debt.

The market power cost of debt occurs because of the inflexibility of debt, and therefore it would be impossible to avoid the market power cost of debt ex ante under the provision of debt. Then, can this problem be solved ex post? It would be in both the stockholders' and bondholders' interests to cooperate ex post. Mere postponement of debt payment would not be of benefit in removing the market power cost of debt as long as there is a possibility of competition. If stockholders and bondholders could easily negotiate to exchange bonds for stocks, then this

would mitigate the market power cost of debt. However, this type of negotiation is costly, and would be more so when the firm is less powerful. With long term debt outstanding, firms cannot avoid the market power cost of debt because of the inflexibility of payment.

Modigliani and miller model, and product market competition

Modigliani and Miller (M/M) model (1958, 1963) is basically a one-period static model which assumes that the same cash flow is generated in each period. On the other hand, the model presented here is a two-period dynamic model. Unlike M/M, this paper introduces competition in the product market and demonstrates that the M/M irrelevance proposition would not hold in a competitive situation, because outstanding long-term debt induces a competitive disadvantage in the future output market where the firm's ultimate cash flow is realized.

If there is no competition (i.e., in a monopoly situation), then the firm, levered or unlevered, would not deviate from optimal pricing decisions which maximize its cash flow (Po in Figure 1). In this case, the difficulty of raising external funds and the moral hazard problem, the sources of the competitive disadvantage of debt, would not occur. Thus, the M/M irrelevance proposition would hold true in a monopoly market. Even though there is more than one firm, if firm values are derived entirely from assets in place (i.e., in a perfectly competitive market), there is no motivation for firms to engage in competition.

The M/M irrelevance proposition (and the M/M corporate tax-relevance proposition) would hold good in either a pure monopoly or a perfectly competitive market. However, no firm in the real world fits exactly into either of these two frameworks. Modigliani and Miller (1963), recognizing that their theory does not apply to real-world situations, suggested (1963, p. 111) that firms need to maintain a substantial reserve of untapped borrowing power, because of many other dimensions (and kinds of costs) in real world problems of financial strategy which are not fully comprehended within the framework of static equilibrium models, either their own or those of the traditional variety. The market power cost of debt is one of those costs, which forces firms to reserve borrowing capacity.

CROSS-SECTIONAL IMPLICATIONS

Thus far, price-cutting has been used as a means of competition. However, firms engage in other forms of competition as well, such as advertisement competition and R & D competition. These modes of competition are basically another form of price competition. When firms engage in these other forms of competition, they are sacrificing the short-run stockholders' cash flow (profit) for long-run benefit through an increase in market share. Once a firm begins to invest heavily in R & D or advertising, rival firms must do the same to survive in the market, thus leading to competition. Even though the modes of competition might be different depending upon the characteristics of the industries (for example, firms in the high-tech industry engage primarily in R & D competition, and firms in the consumer product industry engage primarily in advertisement competition), the theoretical concept discussed thus far would apply to any industry. Based upon the model in this paper, some cross-sectional implications can be derived.

Inter-industry Implications

One of the puzzles of optimal capital structure is that there appear to be cross sectional regularities in the observed industry leverage ratios of U.S. firms. These regularities appeared even before the existence of corporate income taxes. Bowen, Daley and Huber (1982), and Bradley, Jarrell and Kim (1984) found that there is more variation in mean leverage ratios across industries than in firm leverage ratios within industries. Copeland and Weston (1988) demonstrated that the firm's leverage ratio actually tends to move toward the mean leverage ratio of the industry in the long run. Current capital structure theories do not fully explain these cross-sectional regularities. This paper provides one possible explanation without resorting to the current capital structure theories.

In this paper, it was assumed that there are only two firms in the industry. When an industry has more than two firms, each firm knows that if all the firms in the industry cooperate, they can maximize their total profits. The incentive is to cooperate, not to compete. The rewards from cooperation and collusion depend largely upon the concentration of the market. The greater the concentration, the stronger the incentives and opportunities to cooperate and to maximize joint profits. But even when concentration is low, the incentive to collude is still present.

On the other hand, the incentive to compete successfully with rival firms is also higher in the more concentrated industry. By deviating from implicit collusion from time to time, and seeking to increase their market shares, firms in the more concentrated industry have a higher potential prize. These individualistic deviant behaviors could, from time to time, lead to price competition, increased competition in advertising outlays, etc., imposing fluctuations on cash flow. The extent or frequency of such breakdowns in implicit collusion should depend upon, among other things, the degree of industry concentration. Firms in the more concentrated industry are more subject to competitive pressure, and would be more sensitive to competitive disadvantage induced by debt. A lower industry mean leverage ratio would be observed in the more concentrated industry because of the market power cost of debt.

Intra-industry Implications

Another puzzle faced by current capital structure theories is that firms within the same industry having similar tax benefits, asset structures, and financial distress probabilities, exhibit different leverage ratios. Furthermore, this dispersion varies across industries.

In this paper, it was argued that the determinant of the size of the market power cost of debt is the firm's existing market power and market structure. In other words, the competitive pressure facing each firm varies depending upon the firm's existing market power and market structure. Thus, in industries where firms are more dispersed in terms of market power, a larger dispersion in leverage ratios would be observed across firms. In industries where firms are similar in terms of market power, similar leverage ratios would be found.

Regulation and the Maturity Structure of Debt

If competition is limited within an industry by regulation (for example, the utility industry), firms will be less subject to the market power cost of debt due to less competitive pressure. Thus, a higher leverage ratio would be observed in the regulated industry. Because

outstanding long term debt reduces the market power of firms, firms facing greater competitive pressure would tend to have relatively short-term debt.

CONCLUSION

This paper introduces product market competition as a determinant of a firm's capital structure decision and shows that long-term outstanding debt introduces a competitive disadvantage in the product market. This happens because of the difficulty in raising outside funds when competition is intense. This is a real cost which firms have to consider when deciding upon their capital structure policies. Thus, firms subject to rival firms' competitive pressure would limit borrowing. This cost is referred to as the "market power cost of debt".

The market power cost of debt is different from the agency cost of debt, because it does not necessarily assume that there is a conflict of interest between stockholders and bondholders. The market power cost of debt is also different from the bankruptcy cost per se, which is widely discussed as an important determinant of capital structure. The market power cost of debt occurs because a firm has an inability or difficulty in raising outside funds. Although this might eventually lead to bankruptcy, the bankruptcy cost is irrelevant to the market-power cost of debt.

Because the extent of competitive pressure depends upon firms' market positions and industry structures, firms' capital structure decisions become a function of firms' market positions and market structure. The idea of the market power cost of debt is also different from the strategic role of debt which is discussed in the current literature on game theory. This new insight could improve our understanding of firms' capital structure decisions.

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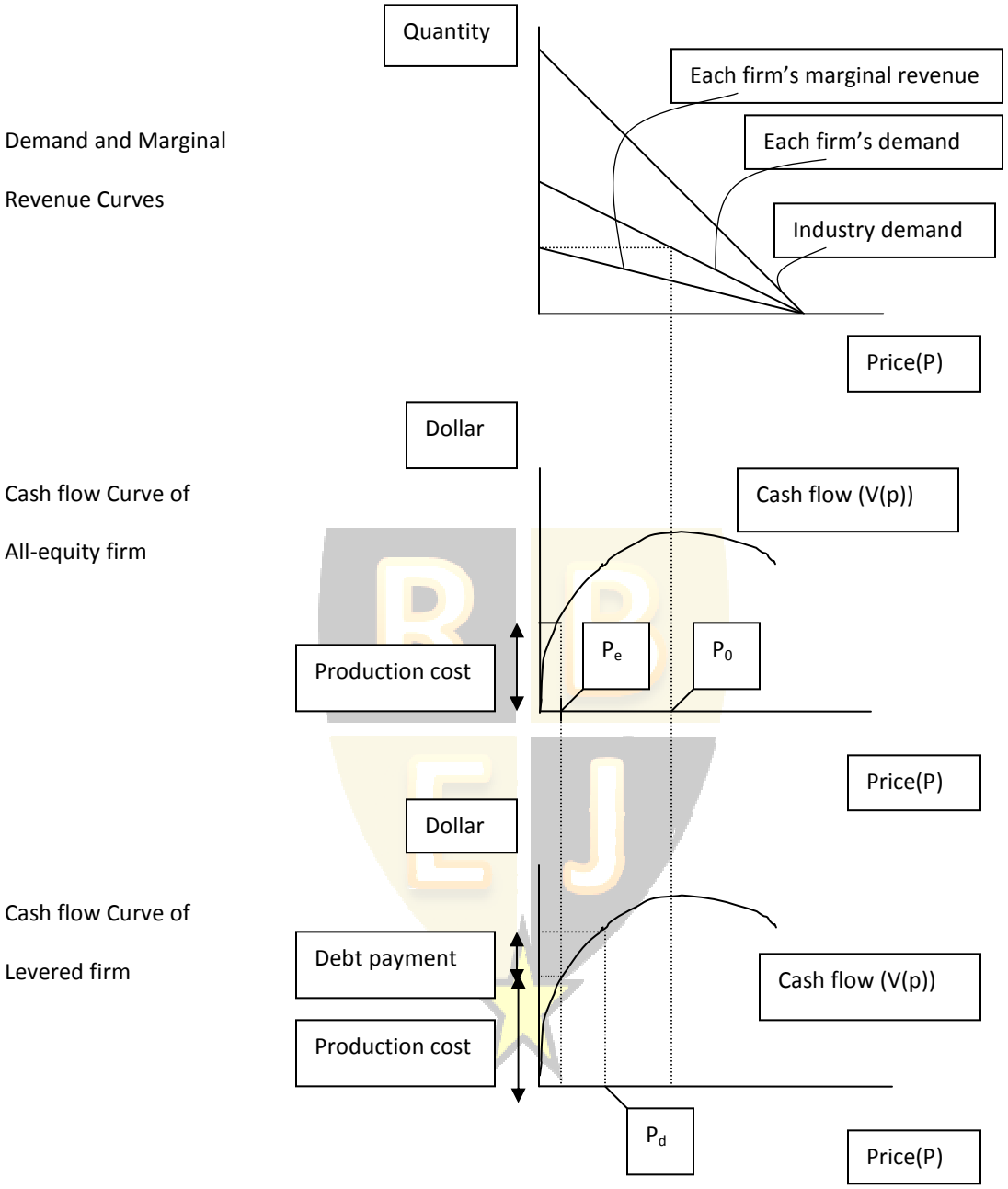

Figure 1. The relationship among demand, marginal revenue, and cash flow for the all-equity firm and the levered firm. This diagram illustrates that at the sample level of cash inflow and production costs, the addition of debt payment compels the levered firm to charge a price only within the range($P_{d,}$ P_0), while the all-equity firm can choose from a wider price range($P_{e,}$ P_0). Thus, the all-equity firm enjoys a competitive advantage over the levered firm.

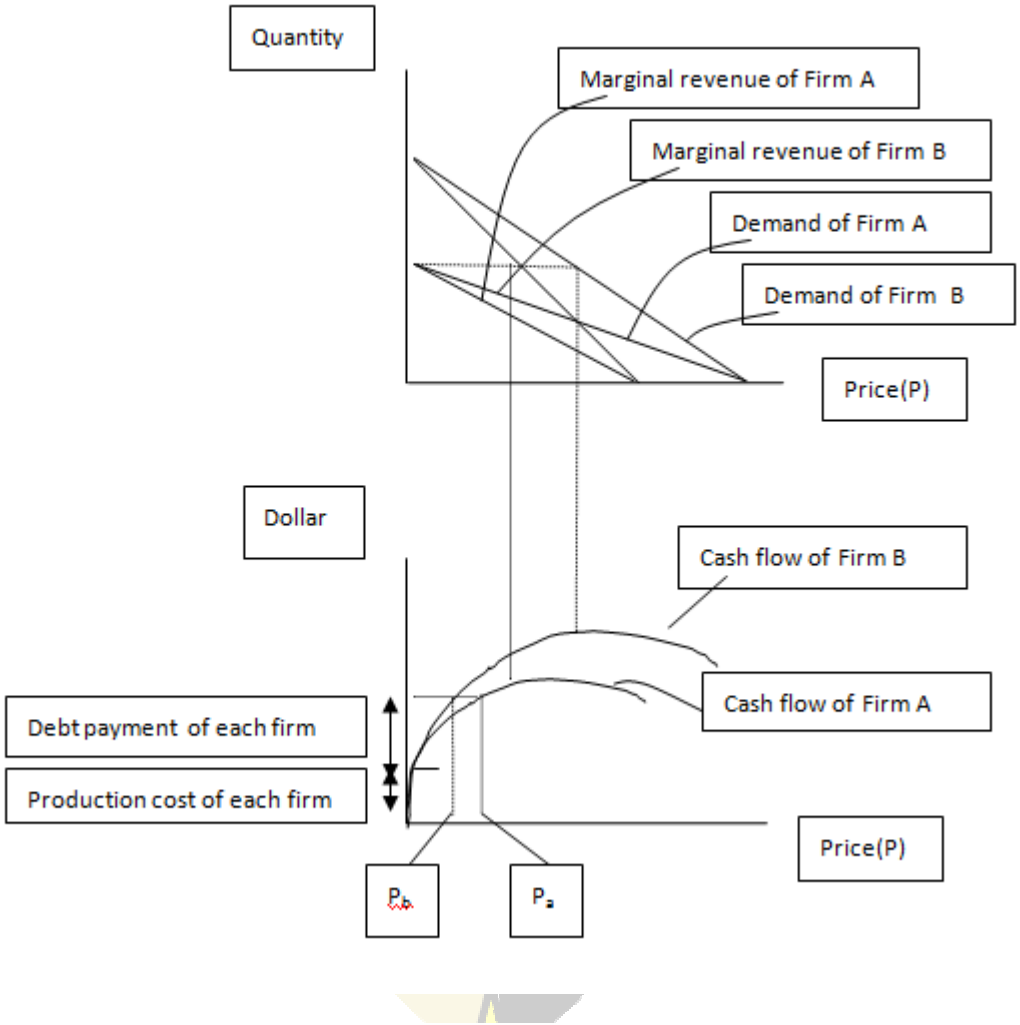

Figure 2. The relationship among demand, marginal revenue, and cash flow, When Firm B has stronger competitive position in the product market, due to advantages on the output side. This diagram illustrates that at the same level of production costs and debt payment, the minimum price Firm A is compelled to charge is P_a. On the other hand, Firm B can charge a lower minimum price P_b. Thus, Firm A cannot match Firm B in terms of price competition, at the same level of debt.

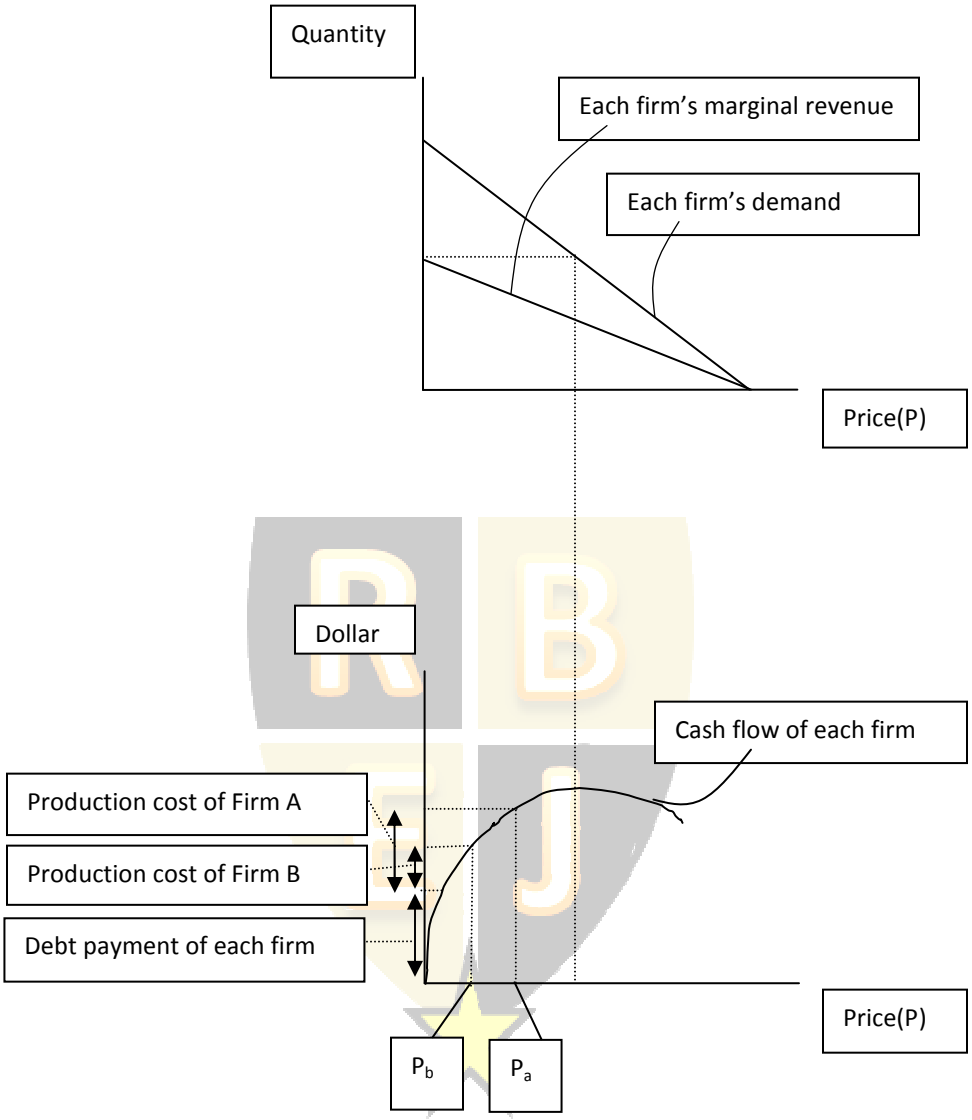

Figure 3. The relationship among demand, marginal revenue, and cash flow, when Firm B has stronger competitive position in the product market, due to advantages on the input side. This diagram illustrates that at the same level of cash inflow and debt payment, the minimum price Firm A is compelled to charge is P_a. On the other hand, Firm B can charge a lower minimum price P_b. Thus, Firm A can not match Firm B in terms of price competition, at the same level of debt.