ΣΠΟΥΔΑΙ / SPOUDAI

ΕΤΟΣ 1993 ΙΟΥΛΙΟΣ - ΔΕΚΕΜΒΡΙΟΣ ΤΟΜΟΣ 43 ΤΕΥΧ. 3-4

YEAR 1993 JULY - DECEMBER VOL. 43 No 3-4

RETENTION RATE, DEBT-EQUITY, AND RETURN ON ASSETS: A THEORETICAL RISK RECONCILIATION FOR SMALL FIRM GROWTH*

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Abstract

There has been relatively little research into the financing and growth rates of small firms even though they are the main vehicle for a nation's economic growth. This paper examines the relationship among retention rate, debt-equity ratio and return on assets for the small firm. The study demonstrates, through a simplified model, that the lack of an active equity market can be responsible for limitations in the size of the small firm. The model further demonstrates that if only internal financing is utilized a severe constraint is placed on the actual rate of growth of the firm. A combination of internal equity financing and external debt financing produces a higher (though still constrained) growth rate. (JEL G32)

1. Introduction

The financing of small firms is an area of investigation that has yet to receive extensive attention. This lack of attention is despite the fact that small businesses are a central part of the economic life of any nation. Despite the importance of finance in the development of entrepreneurial companies, there

* The authors wish to thank the anonymous referees and the Editor Professor S. A. Sarantides for helpful suggestions and comments.

have only been limited attempts to apply finance theory and methodology to the issues in the field (for example: Varaiya, Kerin and Weeks, 1987; Norton, 1990; and Norton, 1991). Other studies (such as Varadarajan and Dillon, 1982 Fombrum and Wally, 1989; and Miner, 1990) have focused on strategic management-oriented issues and growth. Finance theory sharpens tha ability of entrepreneurs, managers, and investors to estimate how their actions might affect future cash flows, risk levels, and the creation of corporate value and personal wealth in entrepreneurial ventures. It has been suggested and/or implied that the tools and techniques applicable to large business organizations can be extended to the small firms. However, small firms have many unique characteristics. For example, small forms have been recognized to face liabilities of smallness and newness not faced by larger organizations (Freeman, Carroll and Hannon, 1983; Stinchcombe, 1965). That is, small firms have fewer slack resources to cushion the firm from unexpected events and environmental changes. This lack of slack resources can result in the small firm's financial structure having a much greater impact on the success or survival of the small firm. Norton (1990) finds that small firms tend to rely less on target debt ratios, and, have a greater preference for zero debt. However, entrepreneurs still face *capital structure decisions* with their associated issues such as the timing and scheduling of cash flows and funds procurement. The cash flow management will be impacted by such things as the rate of growth, the level of profits, the timing of operating cash flows, and the initial infusion of equity capital. This paper, therefore, considers the relationship among retention rate (or dividend policy); equity financing (and consequently the firm's debt-equity ratio); and, return on assets (or the attainable growth rate) for the small firm.

Firms in the first stage of growth are initially dependent for capital sources on self-financing or relatives and friends. Such firms may be forced to follow a cash pattern that strains their liquidity (i.e., they have to pay before they receive payment), even if they carefully monitor the timing of the cash flows. Any attempt to sustain the firm's growth tends to put a considerable strain on the company's resources and assets. If the small firm is in the midst of a strong growth stage, the problem is more acute. The increased demand for assets, due to the growth of the firm, may be financed either by debt or equity. However, it is unlikely that the firm will be able to finance all the growth from the initial capital. Further infusion of capital from the promoters of the firm i.e. further "self-financing" is likelly to be inhibited by the personal asset diversification needs of the promoters. Also, friends and relatives may be poor financial intermediaries. Further, it is possible that friends and relatives may interfere with the control and independence of the entrepreneurial enterprise. While the entrepre-

neurs may be willing to relinquish absolute independence in order to maximize expected shareholder wealth through corporate growth (and, thereby, be deemed rational investors as per the finance literature), this may create another type of problem. Most entrepreneurial entities may be unable to distinguish between managers and shareholders, or, may co-mingle personal and corporate assets. This may create agency cost or shareholder conflict problems. However, to maintain orderly growth, the firms will be forced to consider other sources of funds. Thus, the firm has to seek formal, professional sources of financing, such as commercial banks or venture capital firms, or, consider raising funds from the financial markets.

The capacity of the business firm to raise funds by borrowing or through equity is affected by its organizational size. Small firms usually face a problem in obtaining medium and long run commercial bank financing since banks normally lend only short-term funds to firms in the early stages. Banks may consider the "investment" as "very risky" especially in the case of a "small firm;" may be more so, if the small firm is proposing to enter into the "riskier" area of manufacturing". Unanticipated sales declines or cost increases may create liquidity crises for the small firm due to their lack of slack resources especially if fixed charges continue to drain cash. The challenges related to financial growth in early stages may thus result in severe liquidity crises later on. As a consequence, there is a high default risk among entrepreneurial firms which could be a factor contributing to banks' conservativeness in extending credit. As a result, banks may impose rigid collateral requirements. Entrepreneurs interested in expanding their endeavors are likely to be discouraged by the conditions imposed by the bank. Fortunately, as the firm grows in size and financial strength, the relative risk to a banker, and consequently the explicit cost of funds to the corporate borrower, declines. Therefore, commercial banks generally prefer to begin unsecured lending after the firm establishes positive cash flow, profitability, and solvency.

A similar problem may arise if the small firm approaches investors in the financial markets to raise funds through the issue of bonds. Small firms are less able to participate in the bond market because of investor preference for the bonds of large and well-known firms. The small firms face the problem of "investors' lack of faith in their credit-standing".

In contrast to debt financing, which is always external, equity financing may be obtained externally (through the issuance of common stock) or internally (through retained earnings). However, the option of external financing

through sale of stocks may be too limited for small firms. The management is likely to be less able to sell new equity since the equity market, similar to the bond market, is also relatively inactive for the stocks of small firms due to investor preference for the stocks of large and well-known firms. Also, the promoters might be reluctant or unwilling to sell new equity due to perceived problems associated with the resultant reduced voting power and possible passing of control to "outsiders".

While, the lack of access to external debt and equity markets is commonly recognized to have a significant impact on small firms, to date, the extent of this impact is yet to be established. This study will demonstrate, through a simplified model, that the lack of an active equity market can be responsible for limiting the size of the small firm. The model will be used to demonstrate the interdependencies between growth, risk and the financial policy of the firm under conditions of an inactive equity market. Additionally, the model will illustrate the relationship between actual and target firm growth and the financial policies of the firm.

2. Literature Review

One of the longest-established areas of interest in finance is capital structure theory, essentially the study of the "bargain for funds". This body of knowledge involves the junction of corporate governance and rights to the flow of future values produced by the firm. This aspect of finance has been extended over time to include the recognition that the corporation consists of interrelated contracts entered into by shareholders, lenders, employees, managers, suppliers, distributors, and customers, all referred to as "stakeholders". These contracts involve the stakeholder providing resources in exchange for claims to the future values produced by the corporate entity. While these parties are joined by a common interest in the firm's success, there are potentially costly conflicts of interest among them, many due to the "contract terms" enjoyed by each of the parties. To the extent that financial policy can reduce these conflicts, it can enlarge the cash flow pie and thereby increase the value of the firm. Therefore, growing firms, particularly in the early stages of life, will experience a number of critically important financial decisions. Essentially, any proposal with a multi-period series of uncertain cash flows contains investment risk that needs to be assessed in a valuation theory framework.

However, as has been mentioned earlier, there is a paucity of studies which examine growth and financing for small firms specifically. Most studies have

examined large firms. For example, Babcock (1970) uses an expression developed by him to examine the growth rates of the Dow Jones Industrial Average (DJIA) stocks which are very large "blue chip" companies. He examines the concept of sustainable growth in earnings for a firm and suggests that the same is a function of margin, turnover, leverage, taxes, retention rate and "external" factors. Brandon, Jarrett and Khumuwala (1983) used data from 150 firms drawn from the "Industrial Compustat" (again medium to large companies!) to examine the use of various time series models to predict growth in earnings per share. Harris (1986) examines the use of financial analysts' forecasts of dividend growth rates to estimate the shareholder required rates of return. In this study too the empirics involve the data of larger firms. Barnes (1983) examines the consequences of growth maximization, where growth is measured by the annual percentage increase in total assets, of Building Societies in UK. Most of the other studies on "growth" do not relate very well to this study[1].

On a theoretical basis, Higgins (1981) and Johnson (1981) examine the aspects of growth and financial structure under conditions of inflation. They build upon the model developed by Higgins (1977) to examine the growth and financial structure of a firm under depressed financial market conditions. Finally Merikas, Bruton and Vozikis (1993) examine the impact of financial policy when there are differences between the strategic target growth and the actual growth rate. Underlying all these studies is the assumption that there is no problem with the firm raising funds based on its target capital structure, i.e. debt may be raised on a pro-rata basis to the retained earnings. This study extends the earlier work by examining a simplified model to relate the growth rate and financial policies in the light of the problems of the small firm, especially the problem of not being able to raise additional debt. The model is also used to examine the sources of risk related to the growth rate of the firm.

3. The Model

To develop the model certain assumptions had to be made. For example, it is assumed that the management is unable to sell new equity, or bonds, in the capital market as the result of inactive equity and bond markets for the small firm. Further, it is assumed that the management decides that it will pay out a portion of the firm's earnings to the shareholders in the form of dividends, and retain the rest to plow back into the firm. The retained funds are used to help further the firm's growth. It is also assumed that the management desires to maintain a certain target debt-equity ratio.

At any point in time, the firm's total assets should equal its total liabilities and shareholders' equity:

$$A = D + E \tag{1}$$

where: A = Total Assets; D = Total Debt; and E = Total Equity.

Any change in the assets during a period must be financed by a change in the level of debt or a change in the level of equity or a combination of both. Finance theory requires that the uses of capital should equal the sources of capital for the period:

$$d(A) = d(D) + d(E) \tag{2}$$

where: d(A)= change in Total Assets; d(D) = change in Total Debt; and d(E) = change in Total Equity.

If the firm is efficiently utilizing its assets, the amount of sales (S) is directly related to the assets already in place (A):

$$S = (1/\alpha) \cdot A \tag{3}$$

where: α = a constant factor of proportionality.

This results in the following relationship between the change in sales, d(S), and the change in assets, d(S):

$$d(S) = (1/\alpha) \cdot d(A) \tag{4}$$

or

$$d(A) = \alpha \cdot d(S) \tag{5}$$

In other words, equation (4) implies that in order to have increase in the level of sales, i.e. for the firm to grow, there must be an increase in the level of assets. From equation (2), we know that this increase in the level of assets has to be financed by increased funds in the form of debt or equity or some combination of both. As mentioned earlier, the small firm faces a problem in raising equity externally due to the inactive public equity market for the small firm. However, since the firm only pays a part of its earnings to the shareholders, the firm's equity is increased by internally generated funds in the form of retained earnings, RE. Let rr be the retention rate and EACS be the earnings available to the common stockholders, then the change in equity[2] is:

$$d(E) = RE = rr \cdot EACS \tag{6}$$

Further, if the profit margin is pm, equation (6) can be rewritten as follows:

$$pm = EACS/S \tag{7}$$

and

$$d(E) = rr \cdot EACS = rr \cdot pm \cdot s \tag{8}$$

Recalling that the firm has a target capital structure policy, an increase in equity implies that the level of debt should be raised accordingly. As mentioned earlier, the small firm faces a problem in raising debt externally due to the inactive bond market for the small firm. However, in the first instance, let us assume that there would not be a problem in raising the debt by way of loans from a bank since the equity base of the firm has increased through retained earnings. This kind of assumption could be applicable to the small firm which has established its credentials through steady or rapid growth, stable or increasing earnings, responsible cash flow management etc. The increased equity base should result in an increase in the asset base which could act as a "collateral" for the bank[3]. Then the incremental level of debt is given by the following expression:

$$d(D) = der^* \cdot d(E) = der^* \cdot rr \cdot pm \cdot S \tag{9}$$

where: der^* = a constant debt-equity ratio followed as per the target capital structure policy of the firm.

The increase in equity and the increase in debt would lead to an increase in assets as per equation (2). Substituting from equation (8) for d(E), from equation (9) for d(D), and from equation (5) for d(A) into equation (1) results in:

$$[\alpha \cdot d(S)] = [der^* \cdot rr \cdot pm \cdot S] + [rr \cdot pm \cdot S] \tag{10}$$

Let the growth rate be gr [= d(S)/S]. Then the theoretical relationship between the growth and the financial policy of the firm is given by the following expression[4]:

$$gr = d(S)/S = [rr \cdot (1+der^*)] \cdot [EACS/A] \tag{11}$$

Recognizing that the ratio [EACS/A] is the return on assets (ROA), it may be seen that:

growth rate = f (retention rate, target debt-equity ratio, return on assets) (12)

Equation (11) provides a theoretical relationship between the growth of a firm and the firm's financial policies under the circumstance where the firm cannot (or, the management is unwilling) to raise equity externally but is able to raise debt from commercial banks. It has to be recognized that each firm has a degree of uncertainty or risk associated with its operations magnified by the level of debt adopted by the firm. The model theoretically establishes the impact of the capital structure on growth, and firms applying the model need to factor in the fact that as their level of debt increases, the level of risk is also likely to increase. The increased level of risk, in addition to the increased growth prompted by an increased level of debt (i.e. higher debt-equity ratio), would impact the value of the firm's equity. This impact of risk produces a U or saucer shaped cost of capital curve for the firm (Norton, 1991). Thus, the greater interaction between risk, debt level and the value of the firm's equities (than is obvious from the model at first sight) the greater the constraint on the capital structure of the small firm, and consequently, on the growth rate of the small firm. The model suggests a 100% retention rate (i.e. a zero dividend payout policy) to maximize growth. However, this may not be practical. Non-payment of dividends is also a source of risk. Shareholders are likely to become unhappy if dividends are not received and may create conflict, and problems, for the promoters active in the management. The model also suggests that the firm keeps the highest possible profit margin. Again, such a policy may be fraught with risk. Usually, a higher profit margin is achieved through higher price for the company's product, or, through a reduction in costs. Higher prices may lead to a drop in sales due to substitution with a competitor's product or; drop in demand by some buyers being forced out of the market. Excessive lowering of costs on the other hand could also a edversely affect sales - in the long run if not in the short run.

Let us now examine the situation when there is a problem in raising the debt by way of loans from a bank, even though the equity base of the firm has increased. As was discussed earlier in the paper, especially for the new or unestablished small firm, obtaining matching funds from the bank may be a problem. The extreme situation would be when the bank does not provide any additional funds. Thus, the incremental level of debt would be zero:

$$d(D) = 0 \qquad (13)$$

The increase in equity, even though there is *no* increase in debt, would still lead to an increase in assets as per equation (2). Substituting from equation (8)

for d(E), from equation (13) for d(D), and from equation (5) for d(A) into equation (1):

$$\alpha \cdot d(S) = 0 + rr \cdot pm \cdot S \tag{14}$$

Let the growth rate now be gr' [= d(S)/S]. Then the theoretical relationship between the growth and the financial policy of the firm is given by the following expression[5]:

$$gr' = d(S)/S = rr \cdot [EACS/A] = rr \cdot [ROA] \tag{15}$$

Thus, it may be seen that:

$$\text{growth rate} = f(\text{retention rate, return on assets}) \tag{16}$$

Equation (15) provides a theoretical relationship between the growth of a firm and the firm's financial policies under the circumstance where the firm cannot (or, the management is unwilling) to raise equity externally but is able to raise debt from commercial banks).

4. Implications of the Model

For large firms continued growth at a rapid rate may not pose a problem because the firm can finance its growth by selling new shares and/or bonds in the financial markets. However, this alternative financing of growth is not an option for a business which does not have access to a well developed capital market. As discussed earlier, the equity and bond markets are generally inactive for small firms. The model (according to the above equation (11) shows that, under constrained financial market conditions, the growth rate is going to be governed by 3 factors (i.e. the retention rate, the debt-equity ratio and the return on assets) provided debt support is available from financial institutions. The growth rate can be increased by increasing the retention rate (ideally with a zero dividend payout), by increasing the debt equity ratio, and by increasing the return on assets. However, an increase in debt could decrease the return on assets by reducing the earnings available to the shareholders due to the higher interest payments. The inter-relationship between the three factors, along with the associated risks, suggests that some compromise would have to be reached to maximize the firm's growth.

Financial executives can apply the model developed above in various ways. First, in situations where the actual growth rate of the firm is lower than that

suggested by equation (11). If such a situation prevails, the model suggests that the firm may actually have a lower retention rate and/or lower debt-equity ratio than necessary. Alternatively, and more likely, either the firm's assets are not being utilized efficiently or the retained earnings are not being plowed back to the full extent. Thus, managers must seek to ensure that capital structure policies are consistent with the growth maximization the firm desires.

Second, consider the situation where the actual growth rate is higher than the one suggested by equation (11). The management should realize that if is not likely that it would be possible for them to sustain the growth rate without compromising other management policies, and the firm may become highly leveraged. Another potential scenario facing the small firm is that potential and existing investors may become disillusioned if dividend payments continue to be meager or non-existent. The model would indicate that such actions may have serious negative effects and could eliminate the firm from equity markets.

In addition, the model shows that, under constrained financial market conditions and financial support from the institutions, the growth rate is going to be more controllable by management by two factors the retention rate, and, the return on assets — according to equation (15), wich shows that the capital structure decision is dependent on external factors, and therefore, not necessarily a decision controllable by the management. While management may adopt a target capital structure, the actual capital structure depends on the level of debt that the firm *is actually* able to raise. The achievable growth rate under these circumstances will be lower than the growth rates suggested under the assumption that matching debt would be available (i.e. $gr' < gr$)[6].

5. Conclusions

The model developed in this paper shows a relationship between a firm's growth rate and its financial structure under conditions of an inactive capital market i.e. inactive equity and bond markets for the small firm. Thus, if the options available to the small firm for financing growth are internal financing, or a combination of the internal financing and debt from financial institutions either option puts a constraint on the achievable rate of growth. However, it is through a combination of both internal and external financing as compared to the situation where the small firm is dependent on internal financing alone. The model indicates that it may be necessary for management to examine its financing and management policies to determine what combination of dividend policy (through the retention rate), capital structure policy (through the debt-equity

ratio) and profit maximization policy (in terms of the profit margin) will allow the maximum sustainable growth rate. The combination chosen, say through an optimization process, would be constrained by the risks associated with the different levels of retention rate, debt-equity ratio and the profit margin. If the maximum achievable growth rate is defferent from the firm's present growth, management should consider changing its present policies.

The limiting effect on the size and rate of growth of the small firm, if external equity or bond financing is not available, could be further accentuated by the absence of matching debt financing from the banks or other financial institutions.

The constraints imposed on the small firm's growth by its inability to access the financial markets also have implications for the greater economy. It is well recognized in economic literature that the size of capital formation, growth and economic development depend on factors such as the existence of productive resources and their augmentation due to technological innovation, access to well developed product and factor markets, and, access to both financial institutions and well developed financial markets. Small firms represent the economic engine for most countries generating the greatest growth in jobs and often bringing technical innovations to the benefit of the consumers. Thus, any impediment to small firm growth also impedes the growth rate of the economy. This study, therefore, provides support to the notion that liberalized credit funds and/or "seed capital" equity funds are needed to assist in, and, nurture the growth of the small firms.

Footnotes

1. For example, Grauer (1981) — and some other researchers — examine "growth" in an entirely different context, i.e. dividend growth for portfolio selection models. Senbet and Thompson (1982) —and some other researchers including Yagil (1986)— examine the relationship between the dividend growth of a firm and its riskiness.

2. Since the retention rate is rr and the earnings available to the common stockholders is EACS, the dividends DIV paid to the stockholders is to the extent of DIV = EACS - RE = (1-rr) · EACS.

3. This may not pose a problem for the firm, provided the bank finds the debt-equity ratio to be acceptable and believes that the funds it provides will be applied towards further investment in assets which in turn would result in increased future earnings for the firm.

4. By substituting from equations (5), (8) and (9) into equation (2):

(2) $d(A) = d(D) + d(E)$

or

$[\alpha \cdot d(S)] = [der^* \cdot rr \cdot pm \cdot S] + [rr \cdot pm \cdot S]$

or

$d(S) = \{[(der^*+1) rr \cdot pm] \cdot S\} \cdot \{1/\alpha\}$

or

$d(S)/S = [(der^*+1) \cdot rr \cdot pm] \cdot \{1/\alpha)\}$

or

$gr = d(S)/S = [(der^*+1) \cdot rr] \cdot pm \cdot \{1/\alpha\}$

Substituting for pm and α from equations (7) and (3) respectively:

$gr = d(S)/S = [(der^*+1) \cdot rr] \cdot [EACS/S] \cdot \{S/A\}$

or

$gr = d(S)/S = [(der^*+1) \cdot rr] \cdot [EACS/A]$

or

$gr = d(S)/S = [rr \cdot (1+der^*)] \cdot [EACS/A]$

5. By substituting from equations (5), (8) and (9) into equation (2):

(2) $d(A) = d(D) + d(E)$

or

$[\alpha \cdot d(S)] = 0 + [rr \cdot pm \cdot S]$

or

$d(S) = \{[rr \cdot pm] \cdot S\} \cdot \{1/\alpha\}$

or

$d(S)/S = [rr \cdot pm] \cdot \{1/\alpha\}$

or

$gr' = d(S)/S = [rr] \cdot pm \cdot \{1/\alpha\}$

Substituting for pm and α from equations (7) and (3) respectively:

$gr' = d(S)/S = [rr] \cdot [EACS/S] \cdot \{S/A\}$

or

$gr' = d(S)/S = [rr] \cdot [EACS/A]$

or

(15) $gr' = d(S)/S = [rr] \cdot [EACS/A]$

6. Assuming that the firm has the same retention rate, rr, and return on assets, [EACS/A], whether the bank provides matching debt or not, from equations (11) adm (15),

$$\frac{gr'}{gr'} = \frac{[rr] \cdot [EACS/A]}{[rr \cdot (1+ der^*)] \cdot [EACS/A]} = \frac{1}{(1 + der^*)}$$

For any target capital structure (i.e. debt-equity ratio), der* will be a number greater than zero. Therefore, 1/(1+der*) will be a number between zero and less than one - since (1+der*) >1.

$$\frac{gr'}{gr} < 1$$

or, $gr' < gr.$

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