

# The Journal of Entrepreneurial Finance

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Volume 2  
Issue 1 Fall 1992

Article 2

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December 1992

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### Recommended Citation

Schnabel, Jacques A. (1992) "Small Business Capital Structure Choice," *Journal of Small Business Finance*: Vol. 2: Iss. 1, pp. 13-21.

Available at: <https://digitalcommons.pepperdine.edu/jef/vol2/iss1/2>

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# Small Business Capital Structure Choice

Dr. Jacques A. Schnabel

A simple single-period model of entrepreneurial capital structure choice under conditions of informational asymmetry is developed. The uncertain terminal cash flow generated by a business venture is assumed to depend on both the amount of effort provided by the entrepreneur and the quality of the business venture. External financing induces the effort-averse entrepreneur to reduce the amount of effort he exerts. However, by astute choice of capital structure, the entrepreneur can mitigate this effect. It is shown that this entails financing high quality ventures with debt and low quality ventures with equity. This explains the predominance of debt in the capital structures of small firms.

## I. INTRODUCTION

One of the stylized facts of small business financing is the heavy usage of debt. This phenomenon has been well documented in numerous empirical studies. In their early landmark study Walker and Petty [11] point to small firms' high debt ratios as a distinguishing feature of small versus large firms. Andrews and Eisemann [1, p. 76] conclude the following in their comprehensive study of small business financing: "... the debt-equity ratio for small business is higher than for all business ... the differences in debt-equity ratios ... have existed for at least the last twenty years." Heavy reliance on debt financing characterizes not just the actual choices of entrepreneurs but also their *desired* choices. Stoll [8, p. 191] cites a 1980 survey for the Heller Institute by the Roper Organization in which it was found that only 2% of the small businesses surveyed would choose equity financing as their first choice whereas 90% would choose debt financing from a financial institution as their first choice.

The foregoing naturally leads to the question of what motivates this empirical regularity in the financing of small business. The predominant

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The Journal of Small Business Finance, 2(1): 13-21  
ISSN: 1057-2287

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view is that this phenomenon is primarily cost-induced. Specifically, there are large fixed costs associated with issuing equity securities and maintaining a secondary market in the shares. These large fixed costs render the equity financing option infeasible for small firms. Only after the firm has achieved a certain size threshold are these large fixed costs outweighed by the benefits of diffuse equity ownership. Among others, Stoll [8] and Day, Stoll and Whaley [3] provide empirical support for this explanation. This view regarding heavy debt usage among small firms has elicited various public policy responses in attempts to reduce the equity financing cost burden on small firms. Cases in point are the Japanese Small Business Investment Law of 1963, discussed in Clark [2], which led to the establishment of government-funded Small Business Investment Corporations charged with the specific mandate to take equity, rather than debt, positions in small firms. In Canada, Vencap Equities Alberta Ltd. was established by the Alberta provincial government with a similar mandate; see Williamson [13]. Another public policy initiative with the same objective of promoting equity investment in small businesses is the Québec Stock Savings Plan. This plan grants common stock investors in small businesses tax deductions amounting to 100% of the cost of the shares; see Turner et al.[10].

Complementary to the foregoing explanation are various agency-theoretic interpretations of the phenomenon of small firm heavy debt usage. Stoll [8, p. 191] argues for this point of view by initially observing that for many small firms most of the financing provided by external capital suppliers is in the form of debt held by one financial institution. Since the costs of monitoring the entrepreneur can be large when external capital suppliers comprise a diffuse group, these costs can be reduced by having a single knowledgeable lender. However, as Shleifer and Vishny [7] have emphasized, although not in the context of small business financing, the same argument can be applied to stockholders, to wit, the presence of a single large stockholder can similarly reduce the costs of monitoring the entrepreneur as well as address the free-rider problem present in a diffuse group of external capital suppliers. Thus, Stoll's argument is not germane to the issue of debt versus equity in the capital structures of small firms. Stoll's argument is really one for having a single large external capital supplier rather than numerous small capital suppliers.

A second agency-theoretic perspective on the phenomenon of small firm heavy debt usage is provided by Pettit and Singer [6] and van der Wijst [12] who apply the Myers and Majluf [5] and Myers [4] pecking order theory of capital structure. Basing their theory on considerations of informational asymmetry, i.e., managers have superior information regarding the value of a firm's shares, Myers and Majluf argue that equity financing is a negative signal of a firm's value. Although the Myers-Majluf theory provides a

compelling explanation for the general capital structure problem, its application hinges on the preexistence of a market in the firm's shares and the financial manager's adoption of a policy calling for maximization of the wealth of existing shareholders. Because small firm capital structures reflect the initial financing of the business venture, the preexistence of a market in the small firm's shares is a difficult assumption to make. It is this problem with the Myers-Majluf theory as applied to small business firms which motivates this paper. Similarly invoking informational asymmetry considerations, this paper develops a simple model of entrepreneurial capital structure choice which arrives at a conclusion identical to the Myers-Majluf pecking order theory. However, as emphasized later in this paper, the identical conclusions are induced differently. This paper's focus is on the entrepreneur's choice of capital structure as it affects his incentive to provide effort subsequent to obtaining the financing. This paper examines how the payoff from entrepreneurial effort is allocated between the entrepreneur and external capital suppliers and how this allocation is affected by different capital structures and business ventures of differing quality. As modeled here, it is the dominant role of the entrepreneur in determining the firm's capital structure so as to appropriate to himself the returns from entrepreneurial effort which distinguishes the small firm from the large firm. In contrast, the large firm's capital structure choice, as it is modeled in the traditional finance literature, involves maximizing the market value of the firm's outstanding common stock by trading off agency costs and tax effects.

The plan for this paper is as follows. The next section develops a simple model in which an entrepreneur wishes to finance a single-period business venture with an uncertain terminal cash flow that depends on the amount of effort provided by the entrepreneur. The section also examines how the marginal payoff from entrepreneurial effort is allocated between the entrepreneur and external capital suppliers. Section III considers how this allocation affects the entrepreneurial incentive to provide effort, demonstrating the adverse effect of external financing. Section IV then discusses how ventures of differing quality affect the allocation of the marginal payoff from entrepreneurial effort. There the critical result of this paper is demonstrated, namely high (low) quality business ventures tend to be heavily debt (equity) financed. The last section contains concluding comments.

## **II. MODEL DEVELOPMENT**

Consider a single period setting where an entrepreneur wishes to finance a business venture with a uniformly distributed uncertain terminal cash flow

of  $T$ . The venture requires an exogenously specified investment of  $I$  at the start of the period. To simplify the presentation, universal risk neutrality and a zero time value of money are assumed. Whereas the lower bound of  $T$  is zero, the upper bound is determined by both the entrepreneur's effort, denoted  $e$ , and the quality or potential profitability of the venture, denoted  $\tau$ . Both entrepreneurial effort and the venture's quality interact to determine the venture's maximum possible cash flow. Thus,  $T$  is uniformly distributed in the interval  $[0, e\tau]$ . Informational asymmetry prevails at the start of the period when the venture has to be financed. Thus, while the entrepreneur knows the values of  $e$  and  $\tau$ , the values of these two parameters are unknown to external capital suppliers, i.e., potential debtholders and stockholders. However, at the end of the period when all uncertainties are resolved, no informational asymmetry remains.

Let  $f(T|e)$  and  $F(T|e)$  denote, respectively, the probability density function and the cumulative probability distribution of the venture's terminal cash flow conditional on the entrepreneur's effort. Given the uniform distribution assumption, for  $T$  in the interval  $[0, e\tau]$ ,  $f(T|e) = 1/e\tau$  and  $F(T|e) = T/e\tau$ . Observe that for  $e_2 > e_1$ ,  $F(T|e_1) > F(T|e_2)$ . Thus, greater entrepreneurial effort results in a first degree stochastically dominant business venture. By the same token, holding the amount of effort exerted constant, a higher quality venture first degree stochastically dominates a lower quality venture. Note that the outcome of a first degree stochastically dominant venture need not exceed that of the first degree stochastically dominated venture. Thus, for a venture of fixed quality, greater entrepreneurial effort does not imply that the (uncertain) terminal cash flow will increase. Similarly, holding entrepreneurial effort constant, a higher quality venture's (uncertain) terminal cash flow does not necessarily exceed that of a lower quality venture. In addition, defining "risk" as the dispersion of possible outcomes, it is clear, from inspection of the probability density function  $f(T|e)$  defined earlier, that greater exertion of entrepreneurial effort or the choice of a higher quality venture will increase the "risk" of the venture. Since the venture is the only activity of the firm which the entrepreneur proposes to establish, the value of the firm at the start of the period, expressed as a function of entrepreneurial effort, denoted  $V(e)$ , is given as follows.

$$V(e) = \int_0^{e\tau} T f(T|e) dt = \frac{e\tau}{2} \quad (1)$$

Assuming that the entrepreneur does not have sufficient personal wealth to fully fund the venture, he has to attract external investors, i.e., debtholders and stockholders. Since the entrepreneur is a residual claimant of the venture,

he is also a stockholder. However, to reduce verbiage, the term “stockholders” is reserved here for external investors who hold common stock as distinguished from the entrepreneur who likewise holds common stock. Only one type of common stock is assumed in the simple model developed here.

The debtholders are promised a terminal payment of  $D$ . The beginning of period value of the debt, denoted  $B(e)$ , is given by the following.

$$\begin{aligned} B(e) &= \int_0^D T f(T|e) dT + [1 - F(D|e)]D \\ &= D \left(1 - \frac{D}{2e\tau}\right) \end{aligned} \quad (2)$$

Observe that  $B(e)$  is the sum of two components. The first component assumes that the firm is bankrupt, in which case all of the venture’s terminal cash flow accrues to the debtholders, whereas the second component assumes that the promised payment of  $D$  is made in full. Each component is suitably probability-weighted.

The stockholders are promised a portion, denoted  $p$ , of the venture’s terminal cash flow which remains after payments to the debtholders have been made. Let  $S(e)$  denote the beginning of period value of the common stock. Thus,  $pS(e)$  accrues to the stockholders whereas  $(1-p)S(e)$  accrues to the entrepreneur. The value of the common stock is given by the following.

$$\begin{aligned} S(e) &= V(e) - B(e) \\ &= \frac{e\tau}{2} - D \left(1 - \frac{D}{2e\tau}\right) \end{aligned} \quad (3)$$

Consider the effect of a marginal increase in the effort the entrepreneur exerts. Using primes to denote derivatives,  $V'(e) = \tau/2$  is the marginal payoff from entrepreneurial effort. This marginal payoff is allocated among the firm’s debtholders, stockholders and entrepreneur in the following manner.

$$\text{Debtholders: } B'(e) = \frac{1}{2\tau} \left(\frac{D}{e}\right)^2 \quad (4)$$

$$\text{Stockholders: } pS'(e) = p \left[ \frac{\tau}{2} - \frac{1}{2\tau} \left(\frac{D}{e}\right)^2 \right] \quad (5)$$

$$\text{Entrepreneur: } (1-p)S'(e) = (1-p) \left[ \frac{\tau}{2} - \frac{1}{2\tau} \left(\frac{D}{e}\right)^2 \right] \quad (6)$$

As expressions (4), (5) and (6) are all positive, both the entrepreneur and the external capital suppliers partake in the gains induced by greater

entrepreneurial effort. Herein lies the potential for an agency problem, a topic addressed in the next section.

### III. ADVERSE EFFECT OF EXTERNAL FINANCING ON ENTREPRENEURIAL EFFORT

This section's focus is on the effect of external financing on the entrepreneur's incentive to provide effort. Let  $\gamma(e)$  denote the disutility the entrepreneur derives from exerting effort  $e$ . Consistent with the existing agency theory literature, e.g., Tirole [9, pp. 51-55],  $\gamma(e)$  is assumed to be expressed in financial terms, additively separable from the financial payoff the entrepreneur derives from organizing the venture, and convex, i.e.,  $\gamma'(e)$  and  $\gamma''(e)$  are both greater than zero.

If the entrepreneur is sufficiently wealthy to preclude the need to raise external financing, the entrepreneur's problem may be depicted as follows.

$$\text{MAX}_e [V(e) - \gamma(e) - I] \quad (7)$$

The solution to this problem, denoted  $e^{**}$ , is given by the following equation.

$$\gamma'(e) = \tau/2 \quad (8)$$

What happens if the entrepreneur requires external financing of  $(I - I_E)$  where  $I_E$  is the entrepreneur's financial investment in the venture? In this situation the entrepreneur's problem may be depicted as follows.

$$\text{MAX}_e [(1 - p)S(e) - \gamma(e) - I_E] \quad (9)$$

The solution to this problem, denoted  $e^*$ , is given by the following equation.

$$\gamma'(e) = (1 - p) \left[ \frac{\tau}{2} - \frac{1}{2\tau} \left( \frac{D}{e} \right)^2 \right] \quad (10)$$

Clearly,  $\gamma'(e^*) < \gamma'(e^{**})$  which implies that  $e^* < e^{**}$ . Thus, the presence of external financing causes the entrepreneur to reduce the amount of effort he exerts which, in turn, diminishes the value of the venture.

The intuition for this result is clear. In the absence of external financing, the entrepreneur captures all of the benefits which are derived from entrepreneurial exertion of effort. However, in the presence of external financing, the entrepreneur captures only a fraction of the benefits while incurring all of the disutility from the provision of effort. Thus, in the latter

case, the entrepreneur is motivated to reduce his effort. Reviewing expression (6) and equations (8) and (10), the entrepreneur sets the value of his marginal disutility from effort equal to the marginal payoff which the entrepreneur appropriates. Since  $\gamma'(e)$  is increasing in  $e$ , whatever increases the marginal payoff from effort which the entrepreneur appropriates would likewise increase the effort provided by the entrepreneur. It is argued in the next section that the entrepreneur's choice of capital structure can have precisely this effect. The discussion has so far ignored the potential effect of the quality of the venture, measured by the parameter  $\tau$ , on the entrepreneur's choices regarding effort level and capital structure for the firm. These are also examined in the next section.

#### IV. VENTURE QUALITY

Recall that the quality of the venture interacts with entrepreneurial effort to determine the venture's maximum possible terminal cash flow. Consider the effect of a higher quality venture on the allocation of the marginal payoff from entrepreneurial effort among the debtholders, stockholders, and entrepreneur. This may be gauged by examining the derivatives of expressions (4), (5) and (6) with respect to  $\tau$ .

$$\text{Debtholders: } \frac{d}{d\tau} [B'(e)] = \frac{-1}{2} \left( \frac{D}{e\tau} \right)^2 < 0 \quad (11)$$

$$\text{Stockholders: } \frac{d}{d\tau} [pS'(e)] = p \left[ \frac{1}{2} + \frac{1}{2} \left( \frac{D}{e\tau} \right)^2 \right] > 0 \quad (12)$$

$$\text{Entrepreneur: } \frac{d}{d\tau} [(1-p)S'(e)] = (1-p) \left[ \frac{1}{2} + \frac{1}{2} \left( \frac{D}{e\tau} \right)^2 \right] > 0 \quad (13)$$

Observe that the higher (lower) the quality of the venture, the lower the portion of the marginal payoff from entrepreneurial effort appropriated by the debtholders (stockholders). The logic for this result derives from the fact that since *ceteris paribus* higher quality ventures exhibit lower bankruptcy risk, the enhancement of debtholder wealth caused by greater entrepreneurial effort is smaller for a higher quality venture. Whatever the external capital suppliers fail to appropriate accrues to the entrepreneur. Thus, the entrepreneur is motivated to adjust the capital structure for the business to reduce the portion of the marginal payoff from entrepreneurial effort captured by the external capital suppliers. This entails financing high quality ventures with debt and low quality ventures with equity.

The intuition for the preceding conclusion may be gleaned by considering the following. On the one hand, debt financing reduces the



entrepreneur's appropriation of the venture's terminal payoff by a fixed amount  $D$  in all nonbankrupt states of nature. On the other hand, equity financing reduces the entrepreneur's appropriation by an amount which is strictly proportional, equaling  $p$ , to the venture's terminal payoff. Entrepreneurial effort yields high returns in high quality ventures. Since payments to stockholders exceed payments to debtholders in precisely those high quality ventures, the entrepreneur maximizes his incentive to exert effort by heavy usage of debt for high quality ventures.

Due to informational asymmetry between the entrepreneur and the firm's potential external capital suppliers, the latter know neither  $e$  nor  $\tau$ . However, conscious of the entrepreneur's motivation, external capital suppliers would view the venture's capital structure as a signal of the venture's quality. Debt financing is a positive signal of the venture's quality whereas common stock financing is a negative signal.

Although the preceding conclusion is similar to that derived by Myers and Majluf [5] in their pioneering paper as well as Myers [4] in his articulation of a pecking order theory of capital structure, the motivations are different. The Myers and Majluf conclusion is induced by mispricing of the firm's outstanding common stock. Thus, the use of equity financing means that the firm's managers view the firm's common stock as overvalued by the stock market likewise resulting in common stock financing being interpreted as a negative signal. But the story line here is different. The entrepreneur chooses a capital structure which will not impair his incentive to provide effort. For high (low) quality ventures, this entails heavy usage of debt (common stock) financing.

## V. CONCLUSIONS

A single-period model of entrepreneurial capital structure choice under conditions of informational asymmetry was developed. The uncertain terminal cash flow generated by a business venture was assumed to depend on the interaction of both the effort expended by the entrepreneur and the quality of the business venture. Although these two attributes are known to the entrepreneur, the external capital suppliers are ignorant of their values. It was shown that external financing induces the effort-averse entrepreneur to reduce the amount of effort he provides, resulting in a diminution in the value of the business venture. The entrepreneur chooses a capital structure for the venture with an eye to ameliorating the effect of external financing on his impaired incentive to provide effort. It was shown that this entails financing high quality ventures with debt and low quality ventures with equity. Cognizant of the entrepreneur's incentive, external capital suppliers

would interpret equity financing as a negative signal of the business venture's quality. This provided an agency-theoretic explanation for the predominance of debt in the capital structures of small firms.

**Acknowledgement:** The assistance provided by a Society of Management Accountants of Canada research grant is gratefully acknowledged.

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