On the Informativeness of External Equity and Debt

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Abstract

According to the pecking order hypothesis, firms' sources of finance can be ranked in order of preference as (i) internal equity, (ii) debt, and (iii) external equity. In reality, however, it is not unusual that a firm seeking funds for new investment issues common stock (*i.e.*, external equity) even in a situation where the issuance of bonds or borrowing from the bank (*i.e.*, debt) is also available. This paper focuses on the informational aspects of external equity and debt, and gives an explanation why firms occasionally prefer external equity to debt as a source of funds. Using a simple cheap-talk model, we show that external equity can be more informative to investors than debt, thus making external equity a more preferred source of financing than debt for entrepreneurs.

Keywords: Corporate finance, Pecking order hypothesis, External equity, Debt, Information revelation

1. Introduction

According to the pecking order hypothesis, firms' sources of finance can be ranked in order of preference as (i) *internal equity* such as the entrepreneur's cash flow or the firm's retained earnings, (ii) *debt* such as bonds or borrowing from the bank, and (iii) *external equity* such as common stock. In efforts to explain this order of firms' preference, Myers (1984) and Myers and Majluf (1984) construct a model of corporate finance under asymmetric information on the profitability of a firm and show that the firm prefers debt to external equity because the effects of adverse selection in the financial market are smaller for debt than for external equity.

In reality, however, it is not unusual for firms earnestly seeking funds for expansion, such as fast-growing high-tech firms, to issue common stock (external equity) even when the issuance of bonds or borrowing from the bank (debt) is an available option. (Note 1) One reason for such financial strategy is presumably the costs of bankruptcy; *i.e.*, firms can reduce potential risks of bankruptcy by building up equity capital rather than by increasing debt capital.

Following the informational approach taken by Myers (1984) and Myers and Majluf (1984), and using a cheap-talk model, this paper offers an alternative explanation for the occasional preference of external equity over debt in corporate finance. For this purpose, we consider the following situation: (i) A stockholder has the right to dismiss the manager but a bondholder does not have such a right; (ii) a manager is dismissed because of the poor performance of the firm; and (iii) a manager's cost of being dismissed is greater than his/her benefit of controlling the firm. In these circumstances, we show that a mechanism can work through which the firm's private information is revealed to a stockholder outside the firm costlessly. At the same time, we show that such a mechanism does not work for a bondholder. These results imply that the informational costs associated with external equity can be smaller than those associated with debt, making firms prefer external equity to debt as the source of funds for new investment.

The financial implications of shareholders' control rights have been examined in a different, but related, context. Admati, Pfleiderer, and Zechner (1994) and Burkart, Gromb, and Panunzi (1997), among others, consider how the existence of a large shareholder can affect the market value of the firm. They argue the possibility that a large shareholder has access to costly monitoring, which becomes effective by virtue of his/her ability to replace board members or start proxy fights, and increases the profitability of the firm. This is interpreted as saying that the exercise of control rights by shareholders may increase the market value of equity. This conclusion is consistent with our result, which insists that the control rights of shareholders potentially increase the attractiveness of external equity compared with debt as the source of financing.

The rest of the paper is structured as follows. The next section presents a simple cheap-talk model between an

entrepreneur and an investor outside the firm. Section 3 examines whether private information of the entrepreneur is truthfully revealed to the investor when the firm issues common stock or bonds. Section 4 concludes the paper.

2. The model

This section develops a model of a firm that issues either stock or bonds to finance a project.

2.1 Individuals

We assume there are two individuals: an entrepreneur and an investor. The entrepreneur has a project to undertake but does not have financial capital to invest in it. The investor has sufficient financial capital to invest in the project.

There are potentially two types of entrepreneurs: skilled, labeled 'S', and unskilled, labeled 'U'. The entrepreneur knows his/her own type but the investor does not know it.

2.2 Project

The project requires initial investment $I > 0$. The (gross) return of the project is $R > 0$ if it is undertaken by a skilled entrepreneur and 0 if it is undertaken by an unskilled entrepreneur. For analytical convenience, we assume that

$$2I \le R < 3I. \tag{1}$$

If the project is undertaken by a skilled entrepreneur, the profit π of the firm is given by

$$\pi = R - I.$$

It is apparent from (1) that

$$I \le R - I < 2I. \tag{2}$$

If the project is undertaken by an unskilled entrepreneur, the profit is given by

$$\pi = -I < 0.$$

2.3 Financing

There are two channels by which the firm can raise funds for investment: the issuance of common stock (external equity) and the issuance of bonds (debt).

If the firm issues stock and the investor accepts it, then the investor becomes a shareholder of the firm (with an ownership share in the firm). In this case, the investor receives a dividend if the firm earns a positive profit and receives nothing if it earns a zero or negative profit.

If the firm issues bonds which the investor accepts, then the investor becomes a creditor of the firm (with no ownership share in the firm). In this case, the investor receives a fixed amount of return as long as the firm's cash flow exceeds that amount.

We assume that corporate decisions are made by simple majority rule and, for simplicity, the market interest rate is zero.

2.4 Dismissal of management

We assume that an equity holder has the right to dismiss the manager but a debt holder does not have such a right on the following grounds: (i) Corporate laws usually grant shareholders the rights to elect and remove the directors, and in turn grant the board of directors the rights to appoint, supervise, and remove the managers, thus giving shareholders the ultimate legal power to dismiss the managers. (ii) It is reported in empirical research that poor performance is more likely to lead to CEO removal when the board of directors, which is supposed to represent the interests of shareholders, is more independent from management (Weisbach, 1988; Goyal & Park, 2002). (iii) It is also reported in empirical research that a high debt-equity ratio does not increase the probability of management replacement (Ofek, 1993), which could be interpreted to imply that, in general, debt holders may not have significant power to replace managers. (Note 2)

We also assume that the manager is removed for the reason of poor performance on the grounds of robust empirical evidence (Osborn, Jauch, Martin, & Glueck, 1981; Coughlan & Schmidt, 1985; Warner, Watts, & Wruck, 1988; Bonnier & Bruner, 1989; Friedman & Singh, 1989).

2.5 Cost and benefit of control

We assume that the entrepreneur earns a private benefit from control $B > 0$ by obtaining funds for investment and undertaking a project. Such a benefit can be non-pecuniary. For example, the benefit may arise from the accumulation of experience and the improvement of reputation as a manager.

If the firm decides to issue stock, the entrepreneur sells a share $\theta > 0$ of the stock to the investor such that

$$\theta(R-I)=I. \tag{3}$$

(Recall that $R-I$ is the profit of the firm and is paid out to the stockholders as dividends.) The entrepreneur keeps the remaining share $1-\theta$. It holds from (2) and (3) that

$$\frac{1}{2}<\theta\le 1.$$

Therefore, under simple majority rule, the investor will have the right to remove the entrepreneur from management. We assume that the investor as a stockholder removes the entrepreneur from management if the firm posts a net loss and pays no dividends on the grounds as discussed in the previous subsection. If dismissed, the entrepreneur is assumed to incur a private cost $C>0$. Again, the private cost C can be non-pecuniary. For example, the loss may arise from the deterioration of reputation as a manager.

If the firm decides to issue bonds with value I, the entrepreneur remains the full owner of the firm. In this case, the investor does not have a voting share in the firm and therefore has no power to remove the entrepreneur from management.

2.6 Time structure of the model

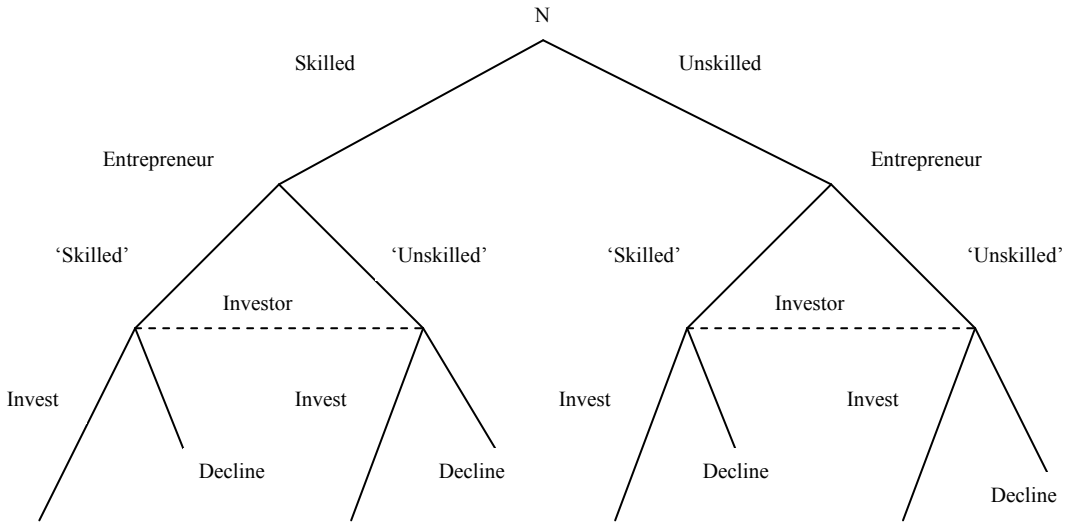

Figure 1. The time structure of the model

For each funding method (*i.e.*, external equity or debt), we consider the following time structure (see Figure 1; we therefore have two separate games, one for external equity and the other for debt).

First, the nature determines the type of the entrepreneur, skilled (S) or unskilled (U).

Second, knowing his/her own type, the entrepreneur sends a message $m\in\{S,U\}$ to the investor whether he/she is 'skilled' ('S') or 'unskilled' ('U'). Let m_S and m_U denote the messages sent by skilled and unskilled entrepreneurs, respectively.

Third, receiving the message of the entrepreneur, the investor forms a belief about the type of the entrepreneur. Let

$$\mu:\{S,U\}\to[0,1]$$

stand for the investor's subjective probability that the entrepreneur is skilled (S). That is, $\mu(m)$ and $1-\mu(m)$ show the investor's belief that the entrepreneur is type S and type U, respectively, when a message m is sent from the entrepreneur. Based on this belief, the investor decides whether to invest in the firm. Let

$$a:\{S,U\}\to\{I,D\}$$

be the strategy of the investor, where I and D stand for 'Invest' and 'Decline to invest', respectively. We assume

that the investor prefers investing to declining to invest on the boundary case.
Finally, the payoffs of the investor and the entrepreneur are determined according to the type of the entrepreneur and the action taken by the investor.

3. Truthful information revelation in equilibrium

In this section, we investigate the existence of an equilibrium with the truthful revelation of information by the entrepreneur; *i.e.*, an equilibrium where a skilled entrepreneur announces 'S' and an unskilled entrepreneur announces 'U'.

3.1 External equity

This subsection examines if the message of the entrepreneur can be informative to the investor when the firm issues stock.

Table 1. The payoffs regarding the issuance of stock

		Entrepreneur	
		Skilled	Unskilled
Investor	Invest	0, (*R*-*I*)+*B*	-*I*, *B*-*C*
	Not invest	0, 0	0, 0

We first construct the individuals' payoffs. In Table 1, the first number shows the investor's payoff and the second the entrepreneur's.

Consider the case when the entrepreneur is type S (see the second column of Table 1). If the investor makes the investment, because he/she pays I and receives $\theta(R-I)$, his/her payoff is 0; see eq. (3). If he/she declines to make the investment, his/her payoff is 0. Meanwhile, if the investor makes the investment, the entrepreneur earns R and pays out a dividend of $\theta(R-I)$ to the investor. In addition, the entrepreneur obtains the private benefit from control B. Hence, the payoff of the entrepreneur is given by

$$(R-\theta(R-I))+B=(R-I)+B>0 \tag{4}$$

where we used (3). (Note 3) If the investor declines to make the investment, the payoff of the entrepreneur is 0. We hence obtain the second column of Table 1.
Next, consider the case when the entrepreneur is type U (see the third column of Table 1). If the investor makes the investment, because he/she pays I and receives nothing, his/her payoff is $-I<0$. If he/she declines to make the investment, his/her payoff is 0. Meanwhile, if the investor makes the investment, the entrepreneur obtains the private benefit from control $B>0$. However, because the project fails and the firm posts a net loss $-I<0$, the entrepreneur is removed from management and incurs the private cost $C>0$. The entrepreneur's payoff is therefore $B-C$. If the investor declines to make the investment, the entrepreneur's payoff is 0. We thus obtain the third column of Table 1.
The following finding states the existence of an *informative equilibrium*; *i.e.*, a pure-strategy perfect Bayesian equilibrium in which the entrepreneur's type is truthfully revealed to the investor.

Finding 1:
Suppose that the firm issues common stock. If $B<C$, there exists an informative equilibrium with

$$m_S=S \tag{5}$$

and

$$m_U=U. \tag{6}$$

Proof:
We construct the investor's strategy a such that

$$a(S)=I \tag{7}$$

and

$$a(U)=D. \tag{8}$$

We also construct the investor's belief μ such that

$$\mu(S) = 1 \tag{9}$$

and

$$\mu(U) = 0. \tag{10}$$

In what follows, we show that the set $((m_S, m_U), a(\cdot), \mu(\cdot))$ with (5)–(10) constitutes a pure-strategy perfect Bayesian equilibrium.

First, according to the entrepreneur's messages (5)–(6), the investor's belief (9)–(10) satisfies Bayes' rule for obvious reasons.

Second, given the investor's belief (9)–(10), when the entrepreneur announces 'S', the investor's expected payoff ψ is

$$\psi(I) = \mu(S) \cdot 0 + (1 - \mu(S)) \cdot (-I) = 0$$

if he/she invests and

$$\psi(D) = 0$$

if he/she declines to invest. Therefore, it holds that $\psi(I) = \psi(D)$ and, by assumption, his/her action (7) is optimal. When the entrepreneur announces 'U', the investor's expected payoff is

$$\psi(I) = \mu(U) \cdot 0 + (1 - \mu(U)) \cdot (-I) = -I$$

if he/she invests and

$$\psi(D) = 0$$

if he/she declines to invest. Therefore, it holds that $\psi(I) < \psi(D)$ and hence his/her action (8) is optimal.

Third, given the investor's strategy (7)–(8), a type S entrepreneur's payoff φ_S is

$$\varphi_S(S) = (R - I) + B > 0$$

if he/she announces 'S' and

$$\varphi_S(U) = 0$$

if he/she announces 'U'. Therefore, $\varphi_S(S) > \varphi_S(U)$ and hence his/her message (5) is optimal. A type U entrepreneur's payoff φ_U is

$$\varphi_U(S) = B - C$$

if he/she announces 'S' and

$$\varphi_U(U) = 0$$

if he/she announces 'U'. Because $B < C$ by assumption, it holds that $\varphi_U(S) < \varphi_U(U)$ and hence his/her message (6) is optimal.

This proves that the set $((m_S, m_U), a(\cdot), \mu(\cdot))$ with (5)–(10) constitutes a pure-strategy perfect Bayesian equilibrium. Q.E.D.

Finding 1 suggests that, if $B < C$, the message of the entrepreneur is informative to the investor. In contrast, when $B \geq C$, skilled and unskilled entrepreneurs have the same preference about the investor's action; *i.e.*, both types of entrepreneurs want the investor to make the investment rather than to decline to do so. Therefore, the message of the entrepreneur cannot be informative for the investor.

3.2 Debt

This subsection examines if the message of the entrepreneur is informative to the investor when the firm issues bonds.

Table 2. The payoffs regarding the issuance of bonds

		Entrepreneur	
		Skilled	Unskilled
Investor	Invest	0, (*R*-*I*)+*B*	-*I*, *B*
	Not invest	0, 0	0, 0

We first construct the individuals' payoffs. In Table 2, as in Table 1, the first number shows the investor's payoff and the second the entrepreneur's.

Consider the case when the entrepreneur is type S (see the second column of Table 2). If the investor makes the investment, because he/she first expends I and then receives I, his/her payoff is 0; recall that the interest rate is assumed to be zero. If he/she declines to make the investment, his/her payoff is 0. Meanwhile, if the investor makes the investment, the entrepreneur receives the entire profit of the firm as well as the private benefit from control, $(R-I)+B>0$. If the investor declines to make the investment, the entrepreneur obtains 0. This constructs the second column of Table 2.

Next, consider the case when the entrepreneur is type U (see the third column of Table 2). If the investor makes the investment, his/her payoff is $-I<0$. If he/she declines to make it, his/her payoff is 0. Meanwhile, if the investor makes the investment, the entrepreneur obtains the private benefit from control $B>0$. Note that, because the investor has no power to dismiss management in the present case, the entrepreneur does not incur the private cost C even if the firm posts a net loss. If the investor declines to make the investment, the entrepreneur's payoff is 0. The third column of Table 2 is thus obtained.

We now have the following finding about debt financing.

Finding 2:

Suppose that the firm issues bonds. Then, there does not exist an informative equilibrium with (5) and (6).

Proof:

Suppose that there exists a pure-strategy perfect Bayesian equilibrium with (5) and (6).

First, because $m_S \neq m_U$, in order for the investor's belief μ to satisfy Bayes' rule, (9) and (10) must hold.

Given the belief (9)–(10) of the investor, when the entrepreneur announces 'S', the investor's expected payoff ψ is

$$\psi(I)=\mu(S)\cdot 0+(1-\mu(S))\cdot(-I)=0$$

if he/she invests and

$$\psi(D)=0$$

if he/she declines to invest. Therefore, it holds that $\psi(I)=\psi(D)$ and, by assumption, his/her optimal action must be (7). When the entrepreneur announces 'U', the investor's expected payoff is

$$\psi(I)=\mu(U)\cdot 0+(1-\mu(U))\cdot(-I)=-I$$

if he/she invests and

$$\psi(D)=0$$

if he/she declines to invest. Therefore, it holds that $\psi(I)<\psi(D)$ and hence his/her optimal action must be (8).

Given the strategy (7)–(8) of the investor, the payoff of a type U entrepreneur is

$$\varphi_U(S)=B>0$$

if he/she announces 'S' and

$$\varphi_U(U)=0$$

if he/she announces 'U'. Therefore, $\varphi_U(S)>\varphi_U(U)$. This contradicts the assumption that (6) is optimal for a type U entrepreneur. This proves that there does not exist a pure-strategy perfect Bayesian equilibrium with (5) and (6). Q.E.D.

The essence of Finding 2 is as follows. Skilled and unskilled entrepreneurs have the same preference about the investor's action; *i.e.*, both of them want the investor to make the investment rather than to decline to make it. For this reason, the message of the entrepreneur is not informative to the investor.

4. Conclusion

This section presents the summary, implications to the reality, and a remark to the analysis.

4.1 Summary

The results obtained in this paper imply that, if communication occurs between an informed entrepreneur/manager and uninformed investors outside the firm, then the private information can be revealed to stockholders who have the

right to dismiss management but cannot be revealed to bondholders who do not have such a right. When this mechanism works, external equity is expected to involve smaller informational costs compared to debt and firms will prefer external equity to debt as the source of funds for new investment.

The essential factors that differentiate the informativeness of common stock and bonds in our model are the power of firm owners to dismiss management and the cost of dismissal C incurred by the manager. That is, the investor as a stockholder has the right to remove the entrepreneur from management and, if removed, the entrepreneur incurs a cost C. This hampers the incentive of an unskilled entrepreneur to pretend to be a skilled entrepreneur, which makes an entrepreneur's message credible to the investor. On the other hand, bonds cannot be informative to the investor because the investor as a bondholder does not have a right to remove the entrepreneur from management and therefore the entrepreneur need not worry about being fired even if the result is not satisfactory for the investor. For this reason, an unskilled entrepreneur does not hesitate to pretend to be a skilled entrepreneur in order to induce investment in his/her project. Such a behavior makes an entrepreneur's message incredible to the investor.

4.2 Implications

This conclusion seems consistent with the fact that the pecking order hypothesis applies best to mature firms, whereas, as we mentioned in the Introduction, external equity is often preferred to debt by venture firms. Generally speaking, the ability of managers seems to be better known to investors in mature firms than in venture firms, implying that asymmetric information on the ability of managers is smaller in mature firms than in venture firms. If this is the case, the mechanism of information revelation discussed in this paper seems to work more effectively in venture firms than in mature firms. This may explain the above-mentioned difference in the financing method between the two types of firms.

Also, our result suggests that, besides the problem of corporate finance as discussed in the present paper, ownership of a firm can imply access to private information of the firm for a wide range of issues. For example, if the safety of workplace is private information of the firm, workers may have better access to that information in ESOP (employee stock ownership plan) firms or in worker cooperatives rather than in conventional capitalist firms. This is because workers in the former type of firm have the power to replace management. Similarly, if the quality of the product is private information of the firm, customers may have better access to that information in consumer cooperatives than in capitalist firms, because customers have a formal right to remove the manager in consumer cooperatives but not in capitalist firms.

4.3 Remark

Finally, it should be noted that our conclusion is derived from a simplified model and in reality there are some other factors that can affect the informativeness of external equity and debt. For example, the court may order the seizure of the entrepreneur's personal assets, such as his/her home, during the bankruptcy proceedings. In that case, an unskilled entrepreneur issuing bonds may prefer 'Decline to invest' to 'Invest', thus making bonds informative to investors. (In Table 2, letting D stand for the personal liability of the entrepreneur imposed by the court, the payoff of an unskilled entrepreneur when the investor chooses 'Invest' becomes $B-D$. If $B-D<0$, an unskilled entrepreneur will send message 'U' in equilibrium.) On the other hand, corporate tax does not seem to affect our conclusion. Corporate tax applies only when the firm earns a positive profit, which reduces the amount of profit that is available to the firm but does not push it into negative territory. Therefore, the preference of a skilled entrepreneur with respect to the action of the investor remains unchanged. (In Tables 1 and 2, if corporate tax t is levied, the payoff of a skilled entrepreneur when the investor chooses 'Invest' is $(1-t)(R-I)+B>0$, which does not affect the equilibrium of the model.)

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Notes

Note 1. See Brealey, Myers, and Marcus (2001), Chapter 15, Section 15.4.

Note 2. Nevertheless, we do not deny the fact that in some occasions, particularly when firms are under financial distress, large creditors such as banks and insurance companies often have substantial power to replace management.

Note 3. For another interpretation, besides the private benefit from control B, the entrepreneur receives a dividend of $(1-\theta)(R-I)$ as a shareholder as well as an entrepreneurial profit, which is defined as the total revenue R minus the total payment of dividends $R-I$; *i.e.*, $R-(R-I)$. By using (3), the sum of these values (B, $(1-\theta)(R-I)$, and $R-(R-I)$) coincides with (4).