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Participation Financing as a Solution to the Agency Problem of Perk Consumption in Small Firms

Hua Yu

Although it has been suggested that participation financing may allow publicly-traded firms to reduce the agency cost of perk consumption, the effect of this type of financing in small firms needs more discussion. The objective of the article is to analyze the small firm effects on the effectiveness of the participation financing in dealing with the agency problem of perk consumption. The participation option gives outside investors less protection against the excessive entrepreneur perk consumption when the firm's default risk is high. By contrast, the option is more effective in firms with rapid growth or high levels of information asymmetry and therefore high monitoring costs.

I. INTRODUCTION

Debt financing with the option of equity participation allows debtholders to participate in the value appreciation of the firms they finance on a non-obligatory basis. The participation may be full, as in the case of convertible debt where a debtholder may convert all debt into equity, or partial as in the case of straight debt financing with detachable warrants where a debtholder may buy additional equity from the firm by exercising the warrants. More recently, the development of mezzanine financing allows institutional holders of relatively high risk loans to buy stock from the firm or to share the profit when the venture is successful (Stacy, 1988).

The rationale of participation financing has already been discussed in a number of studies. Among other things, the participation clause acts as a sweetener to attract investors (Long & Sefcik, 1990). Participation financing may also serve as a means to reduce the agency costs of perk consumption (Barnea, Haugen, & Senbet, 1985). This paper focuses on the second aspect.

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In the absence of the participation option, the owner-manager of a leveraged firm may have an incentive to consume more perquisites which will result in increased agency costs (Jensen & Meckling, 1976). The utilization of a participation financing contract, such as convertible bonds, allows outside investors to hold a put option which acts to offset the negative impact of owner-manager perk consumption (Barnea, Haugan, & Senbet, 1985; Green, 1984).

The objective of this paper is to assess the effectiveness of participation financing in reducing small firm agency costs of perk consumption. In terms of their ownership structure, the sources of financing and the level of information asymmetry, the financial circumstances of small firms are very different from those of large firms; this often results in high levels of agency costs (Ang, 1991a,b; Bink, Ennew, & Reed, 1992; Dunstant, Dwyer, & Helmes, 1992; Schnabel, 1992). It might serve the best interests of both small firm owners and outside investors to reduce these costs. A number of studies have already shown that some forms of financial contracting, among other things, can effectively reduce the agency costs of small firms. For instance, a well-designed stock option compensation scheme may reduce perk consumption and induce more efficient management efforts (Chua & Woodward, 1993; Mehran, 1992). On the other hand, the use of revolving asset-based lending contracts is another way of reducing information asymmetry and resolving agency problems (Constand, Osteryoung, & Nast, 1991). Moreover, efficient monitoring activities with costs shared partially by the owner-manager may induce him to lower perk consumption (Yazdipour & Song, 1991).

Although participation financing may be considered as an alternative method for dealing with agency problems, its effectiveness in financing small firms cannot be taken for granted. Some special features of small firms may have a decisive impact on the results of this particular form of financing. Due to the absence of a secondary market, the stock of small firms is much less liquid than that of large firms. Once investors decide to participate in the ownership of a small firm, it will be difficult to reverse this decision later on. Not only should investors value the participation decision in terms of value appreciation, but also in terms of the disadvantages such as the lack of liquidity which implies that they have to maintain their relation with the firm for the entire holding period which could end only at the time of initial public offer.

Secondly, due to rapid sales growth or a lack of external financing, small firms have less liquid funds and thus are riskier than large firms. The eventual participation in the ownership of small firms should be viewed as a contingent issue. Barnea, Haugan, & Senbet (1985) argue that the convertibility of debt is a put option, which can be exercised when the value of the firm falls below the price of participation. However, the debt in the analysis is in fact default-

free. The same option on financial assets of a small firm should be more vulnerable and less likely to be exercised due to the high level of default risk.

Finally, most small firms are closely owned and controlled by entrepreneurs. The stock of these firms is not publicly traded and the firm is not required to reveal information to the public in exchange for financing. Consequently, outside investors are often less informed about the firm. This makes participation less predictable since the participation decision depends on the information available to investors at the time when the decision is made. Although outside investors may monitor the activities of the inside owners, the costs of these activities may reduce the efficiency of the monitor activities unless at least one part of the cost can be passed to the owners (Yazdipour & Song, 1991).

The structure of this paper is designed to incorporate these particularities of small firms into the analysis. Section II discusses a valuation model of equity participation financing for a firm with risky debt. The impacts of the liquidity and possibility of bankruptcy on perk consumption is discussed. In Section III, the opportunity for growth is added to the analysis. Growth may increase future cash flows, but it may also reduce the firm's liquidity. For small firms which do not have access to public financing, high growth may mean high risk and high opportunity cost for perk consumption. Section IV extends the analysis to include asymmetrical information. The impacts of monitoring costs on the participation decision and entrepreneur perk consumption will also be examined. Finally, a discussion of the results obtained from the previous sections is presented in Section V.

II. THE MODEL: FINANCING WITH OPTION OF PARTICIPATION

Under participation financing, an outside investor provides a firm with debt financing which may be converted into equity. This could be regarded as a type of delayed equity financing with a put option which allows the investor to exercise the debt claim and remain outside of the firm. Although this option increases the value of the investment, the eventual benefit depends on the firm's ability to repay the debt claim. In other words, the ability of the outside investor to exercise his right depends on the solvency of the firm. Typically, such an investment may result in three different outcomes: the investor participates in the ownership and becomes an owner of the firm; the investor receives the full debt repayment and ends the relationship with the firm; the firm defaults and the investor receives the cash flows generated by the operations of the firm.

The valuation model of participation financing presented in this section integrates the three possible results in the analysis whose objective is to examine the effects of the risk of default on the value of the option and more importantly, on the entrepreneur perk consumption. The following assumptions are used to develop the model:

1. The paper does not explicitly discuss the investment decision. It assumes that the project cannot be divided, thus the amount of financing required, B , is already given.
2. It is assumed that the contract allows the investor, if he wishes, to participate in the ownership of the firm, at the end of the contract period, by converting the debt into a proportion, α , of the firm's equity at a stated price, $C = rB + \tau$ where r is one plus the interest rate and τ a premium¹.
3. The eventual debt repayment depends on the firm's cash flow at maturity, Y , which is assumed to follow a stochastic distribution function $f(Y)$ with a lower limit of k . Since the financing is unsecured the firm has the option of defaulting.

A rational investor would choose to participate in the firm if and only if $Y > C$. By buying into the shares of the firm, the investor may hold a fraction, α , of the firm's ownership and receive the same fraction of the firm's future cash flows. Note that the perks consumed by the entrepreneur, K , are usually included in the operating costs. Thus the liquidity available to repay the debt is the net cash flow $Y - K$.² Naturally, as the entrepreneur increases his perk consumption, there will be less cash left to repay the debt; hence the likelihood of default increases. Equation (1) below describes the conditions of default:

$$D = \begin{cases} Y - K & \text{if } Y \leq rB + K \\ rB & \text{if } Y > rB + K \end{cases} \quad (1)$$

Since the firm will default when the net cash flow is insufficient to cover the debt service obligations the condition of full debt servicing is $Y - K > rB$. Based on equation (1), the end-of-the-period value of wealth of the investor and that of the entrepreneur can be written as V and E below:³

$$\begin{aligned} V &= \int_k^b (Y - K) f(Y) dY + \int_b^\infty rB f(Y) dY + \alpha \int_c^\infty (Y - b) f(Y) dY \\ &= - \int_k^b F[Y] dY + rB + \alpha \int_c^\infty F[Y] dY \end{aligned} \quad (2)$$

$$\begin{aligned}
 E &= K + \int_b^{\infty} (Y - b)f(Y)dY - \alpha \int_c^{\infty} (Y - b)f(Y)dY \\
 &= K + \int_b^{\infty} F[Y]dY - \alpha \int_c^{\infty} F(Y)dY
 \end{aligned}
 \tag{3}$$

where $c = C + K$ and $b = K + rB$. The first and second terms on the right hand side of equation (2) indicate the value of the ordinary debt to the investor while the last term in the same equation represents the value of the option. On the other hand, the value of the entrepreneur wealth consists of his perk consumption and the value of the future cash flows, as shown in equation (3). Intuitively, the incentive of perk consumption is associated directly with the method of financing. In the case of straight equity financing, the cost of the entrepreneur perk consumption K is shared between the entrepreneur and the outside investor. The net benefit to the entrepreneur from perk consumption is the proportion of shares held by the investor. Thus for each dollar of K , the wealth transferred to the entrepreneur is α . This can also be seen from the optimal perk consumption of the entrepreneur:

$$\frac{\partial E}{\partial K} = F[b] + \alpha(1 - F[c])
 \tag{4}$$

In the case of straight equity financing, both $F[b]$ and $F[c]$ should be set equal to zero. Thus the marginal value of the entrepreneur's perk consumption is α . Under participation financing, the investor retains his option of withdrawing from the firm and this provides him with a protection. For a riskless firm or a relatively safe firm, the marginal benefit of perk consumption to the entrepreneur is $\alpha(1 - F[c])$; this is obviously less valuable to the entrepreneur than in the case of equity financing. It would appear that the existence of the option allows the investor to capture some of the welfare losses resulting from the entrepreneur's excessive perk consumption. However this is not always the case for a firm with risky debt. As the risk of default increases, the investor will be less able to exercise his option while the entrepreneur's benefit for each dollar of perk consumption is the probability of default, $F[b]$. The entrepreneur's incentive for perk consumption increases with the risk of default as long as the debt is not secured by other assets of the entrepreneur. With a sufficiently high level of risk, the entrepreneur's perk consumption will not fall even if a participation clause is included in the financing contract.

Although high risk of default encourages the owner-manager to increase perk consumption, it is still possible to find an incentive-compatible contract

for a risky firm by choosing the cost of financing, r , given the proportion of shares held by the outside investors. From equations (3) and (4), it is possible to find the condition which will insure that K does not increase. Mathematically, the participation financing is effective only when $F[b] < \alpha F[c]$. To ensure that this model of financing is efficient in solving agency problem, the marginal value of the perk consumption to the entrepreneur under the contract mechanism should be non-positive such as:

$$\frac{\partial E}{\partial K} \Big|_{r^*} = F[b^*] + \alpha(1 - F[c^*]) = 0 \quad (5)$$

In exchange for lower perk consumption, the investor reduces the interest rate charged on the debt in order to reduce $F[b]$; this consequently would tend to reduce incentives to transfer the cost of perks in the case of default at a given level of the shares held by outside investors after the conversion.⁴

III. EQUITY PARTICIPATION IN THE GROWTH FIRM

As indicated in the previous section, the possibility of default dilutes the value of the participation option and encourages entrepreneurs to consume more perks. However, this result was obtained on the basis of an implicit assumption that the entrepreneur does not have to consider any costs or penalties associated with his perk consumption. The reality of perk consumption may be more complex; the decision of perk consumption requires a careful calculation of the cost-benefit trade off. The particular trade off analyzed in this section is between the current perk consumption and the future consumption based on the opportunity for growth. Intuitively, the future perk consumption is closely linked to the growth of the firm. When the firm is bankrupt, the entrepreneur loses not only his capital but also future perk consumption. The high opportunity cost associated with the firm's growth potential should induce the entrepreneur to reduce the current perk consumption.

High growth rate may also increase the risk of the firm. While publicly-traded firms may use external sources to finance growth, small and privately-held firms have to rely on their own funds. Frequently, small firms invest a large part, if not all, of the internally generated funds into projects which are not expected to generate significant new cash flows until some time in the future. Although investment in such projects allows small firms to grow, it reduces the liquidity. The firm becomes more vulnerable and consequently the risk of default on its current debt may rise.

Suppose that a firm continues to reinvest a fixed amount, δ , from its cash flow, in new investment projects. The net cash flow at the debt maturity is, Y^*

$= Y - \delta$. Consequently, the total value of the firm at that time is equal to its net cash flow plus the residual value resulting from the growth opportunities, $Q = q\delta$ where q is a parameter to measure the value of the future cash flows generated from the investment. Under these assumptions, the value of the entrepreneur's wealth can be written as:

$$E = \int_b^{\infty} (Y^* - b + Q)f(Y^*)dY^* - \alpha \int_c^{\infty} (Y^* - b + Q)f(Y^*)dY^* + K \quad (6)$$

and the entrepreneur's optimal perk consumption can be written as

$$\frac{\partial E}{\partial K} = F[b^*] + \alpha(1 - F[c^*]) - Q(1 - \alpha)f \quad (7)$$

where $b^* = b + \delta$ and $c^* = c + \delta$. Note that $F[b^*] = F[b + \delta]$, is the probability of default based on the cash flow net of perk consumption and investment⁵. It is interesting to note that the usefulness of the participation option in reducing the perk consumption depends on the balance of the two opposing effects which result from high growth. Each time the investment in a growth project increases, it absorbs cash flow which could otherwise be used to repay debt. The higher default risk which results from cash flow shortfall allows the entrepreneur to benefit from a more valuable wealth transfer. However, this also makes current perk consumption more costly since the total expected loss is equal to $Q \times F[b^*]$. For each dollar of perks consumed currently, the entrepreneur loses $Qf[b^*]$ where $f[b^*]$ is the marginal probability of default derived from additional perk consumption. Thus the high growth potential may serve as a self-imposed penalty on current consumption. The last term of equation (7) shows this effect. Since Q depends on both the size of investment and the expected return on the investment projects, the entrepreneur whose firm has a more profitable project will be more cautious in choosing his perk consumption in order to avoid losing Q . This is the result which cannot be obtained with straight equity financing since in that case the value of f should be equal to zero thus the marginal benefit of perk consumption will not be affected by the opportunity for growth.

IV. EQUITY PARTICIPATION UNDER ASYMMETRICAL INFORMATION

One issue which often arises in dealing with the agency problems such as perk consumption is that the subject is not always directly observable. This is particularly true in case of small firms where information is somewhat difficult

to obtain. Small firms are usually private and few sources of information on them are available to the public. Even when information is produced in order to obtain financing from outside investors, it is often incomplete. Thus the owner-manager may possess inside information permitting him to benefit when dealing with outside investors.

An investor may attempt to design a particular participation financing contract to eliminate incentives to excessive perk consumption by the entrepreneur. But as indicated previously in equation (5), this can be done only in the context of perfect information where the investor knows the entrepreneur's exact objective function. When the objective function is unknown, the investor cannot predict the perk consumption, thus the contracting process should follow a different framework as below:

$$\underset{r, s, t.}{\text{Max } V} \frac{\partial E}{\partial K} = 0. \quad (8)$$

The entrepreneur maximizes the value of his wealth while the investor is looking for the optimal solution based on the partial information available to him. The decision variable is the interest rate, r . Given asymmetrical information on the part of the entrepreneur, the investor is unable to design an incentive compatible contract; thus the entrepreneur can increase his perk consumption without worrying about the reaction from outside investors.

Although some information is not available to the outside investor, it could be obtained at a cost. This implies that the investor spend time and money to monitor the activities of the entrepreneur in a timely fashion. The monitoring activities may allow the investor to identify the entrepreneur incentives and prevent the expropriation of the value of the firm by the latter. The monitoring, however, is costly, especially for the investors who hold the portfolios which include large number of small firms⁶. The monitoring activities and their cost may exert an important impact on both inside owner and outside investors, especially because the monitoring cost may act as a barrier to the participation: the investor may not exercise his participation option if the potential gain is not sufficient to cover the monitoring costs. Past experience concerning the convertible debt of large firms suggests that in a significant number of cases, the debt was not converted even though the value of the underlying assets was significantly higher than the exercise price. This implies the existence of an implicit exercise premium set by investors (Asquith & Mullins, 1991).

Suppose that monitoring activities can reduce current perk consumption by a particular percentage, s , which is a positive function of the monitoring cost, g . Knowing the value of g , the outside investors increases the threshold

of participation such that $c' = c + g$. With these modifications, the entrepreneur's objective function becomes

$$E = (1-s)K + \int_b^{\infty} (Y^* - b + Q)f(Y^*)dY^* - \alpha \int_{c'}^{\infty} (Y^* - b - g + Q)f(Y^*)dY^*. \quad (9)$$

The solvency of the firm at maturity is determined by the liquidity of the firm Y^* while the investor's participation is based not only on the exercise price but also on the cost of surveillance. If the entrepreneur is assumed to select his current perk consumption, then the optimal value of K will be based on the following condition:

$$\frac{\partial E}{\partial K} = (1-s) + F[b^*] + (1-\alpha)(1-F[c']) - Q(1-\alpha)f = 0. \quad (10)$$

Compared to equation (7), the optimal K from equation (10) is expected to be lower because of the lower marginal value of perk consumption. The existence of monitoring costs tends to make the investor more cautious when deciding to participate and more inclined to claim debt repayment. To see the impact of the monitoring cost, we take the partial derivative of the equation (10) with respect to g :

$$\frac{\partial^2 E}{\partial K \partial g} = -s_g - (1-\alpha)f < 0. \quad (11)$$

Interestingly, the cost of monitoring reduces the possibility of the participation and therefore the incentive of entrepreneur perk consumption. The explanation of this result is fairly straightforward: the high costs of monitoring reduces the likelihood of equity participation of outside investors hence the effect of wealth transfer is weaker. In firms with high levels of monitoring cost which results from a high degree of information asymmetry, the existence of the option allows outside investors, as potential shareholders, to exercise pressure on the entrepreneur to reduce perk consumption. If the entrepreneur wishes to maintain the outside financing, he has no choice but to release more information to the public. This may help to reduce monitoring costs and to increase the likelihood of investors participation. Either way, the investors will benefit.

V. CONCLUDING REMARKS

The entrepreneur-owner of a small firm will benefit from the excessive perk consumption as long as outside investors hold shares in the firm. To finance

projects, small firms often use financial instruments which include an equity participation option. When the investors have the option to choose between claiming debt repayment and buying shares in the firm, the participation is contingent. Although the usefulness of this particular form of financing in reducing the owner-manager's perquisite consumption in large firms is understandable, its effectiveness in small firms is less obvious.

Outside investors can choose to hold debt claim and not to participate in the firm as shareholders and not to share the cost of perks, but they still have to bear at least part of the cost if the firm defaults on the debt at maturity. As long as somebody else will pay part of the bill the entrepreneur is encouraged to consume more perks. Thus participation financing is effective in dealing with the issue of perk consumption only when the default risk of the firm is low.

In general, the value of the firm increases with its growth rate. However, this is true only for firms which finance growth with external funds. Small firms usually have to rely on internal sources of financing to realize growth. The entrepreneur's future revenue and perk consumption are linked directly to the firm's growth potential. Rapid growth reduces the firm's liquidity and increases the risk of default. Thus the opportunity cost of perk consumption to the entrepreneur becomes more expensive. Growth may act as a self-imposed penalty which forces the entrepreneur to reduce perk consumption. With straight equity financing the entrepreneur may be less concerned with the risk of default. The use of the participation financing introduces the possibility of default and increases the opportunity cost of entrepreneur perk consumption thus giving the outside investor some measure of protection.

Unless they can find the means to protect themselves against unpredicted events, investors will be less likely to participate in the firm when there is no sufficient information. Constant monitoring over the inside-owner's activities by outside investors may offer some protections from being manipulated and expropriated. But the cost of such activity reduces the likelihood of investor participation in the firm. In this context, the entrepreneur has no choice but to reduce the consumption of perquisites or to release more information on his ex-post behavior in order to calm the investors' fears. Other things being equal, financing with an option of participation should have stronger effects on entrepreneur perk consumption in firms with high degrees of information asymmetry. Moreover, the choice of this particular method of financing may also play a role in information signalling. For the entrepreneur who is not well known to investors, the use of participation financing may allow him to convince the investors and reduce the cost of financing.

The results of this paper may provide useful suggestions on the future direction of empirical studies. The potential future researches could concen-

trate on the three hypotheses raised in this paper. It would be interesting to test the impacts of three exogenous variables on the use of participation financing as a solution to the agency problem: probability of default, growth rate of sales revenue and the proportion of the stocks controlled by inside-owner. Such research may include firms of different sizes in an attempt to identify the existence, if any, of small firm effects. The timing of participation is also an important factor determining the effectiveness of participation. This article has analyzed the case of a European option where the investors can only choose at debt maturity. A further theoretical study may examine the more robust case of the American option and see dynamic relation between the perk consumption and the decision of participation.

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NOTES

1. This implies that the proportion of equity held by the debtholder after participation is exogenously given, based on the value of debt and that of the equity at the time of contract negotiation.
2. Obviously, the perk consumed by the entrepreneur should be always less than the minimum cash flow k , at the lower limit of the distribution.
3. Equation (2) presented in the text is obtained from the results developed below:

$$\begin{aligned}
 V &= \int_k^b (Y - K)f(Y)dY + \int_b^\infty rBf(Y)dY + \alpha \int_b^\infty (Y - b)f(Y)dY \\
 &= \int_k^b (Y - K - rB)f(Y)dY + \int_k^b rBf(Y)dY + \int_b^\infty rBf(Y)dY + \alpha \int_c^\infty (Y - b)f(Y) \\
 &= - \int_k^b (b - Y)f(Y)dY + rB + \alpha \int_c^\infty (Y - b)f(Y)dY \\
 &= - \int_k^b F[Y]dY + rB + \alpha \int_c^\infty F[Y]dY.
 \end{aligned}$$

Equation (3) is obtained in a similar way.

4. The percentage of shares held by an outside investor has a direct impact on the effectiveness of participation financing. Usually, the entrepreneur will benefit more when a larger proportion of the shares is held by outside investors who cannot participate in perk consumption but will share the costs. However, the existence of the option reduces the benefit by a proportion of $\alpha F[c^*]$. It is easy to see that the impact of the option increases with the proportion of outside equity participation.
5. The ability of repaying debt is based on the cash available. The firm cannot refinance its debt at maturity. This, however, is a very restrictive condition. In reality, the firm might be able to obtain financing given that its future growth is promising.
6. In their study, MacMillan, Kulow, and Khoyleian (1988) found that many institutional investors, mainly venture capitalists, are usually involved in the financial aspects of the firms which they invested. Their involvement in the other aspects of the firms are, however, limited.

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