

Lecture VI: Agency and Investment in the Firm

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I. Agency and Investment in the Firm

A. Starting from our agency graph

1. The loss in firm value associated with the principal/agent problem is $\bar{V} - V_0$.
2. This decline in value is entirely borne by the owner/operator.
3. The owner/operator is forced to choose point E (at a utility of U_2). He gets perks of F_1 which is greater than his original perks of F^* and he is able to sell an ownership share of αV_1 . However, we notice that the value of the firm is still less than its original value ($V^* - V_1 > 0$).
4. It is clear that the owner/operator would never choose to sell a share of the equity of an existing firm because the principal/agent problem implies that the loss in the value of the firm exceeds the gain in perks (i.e., the resulting level of utility U_2 is lower than the original level of utility).

B. Firm Expansion

1. One possible reason for selling a share of the firm to an outsider is to expand the scale of the enterprise.
 - a. Jensen and Meckling develop the scenario of choosing the optimal size of a monopolist.
 - b. As presented in Figure 2, Jensen and Meckling consider the scenario where the original owner/operator desires to expand the size of the firm beyond his original equity.

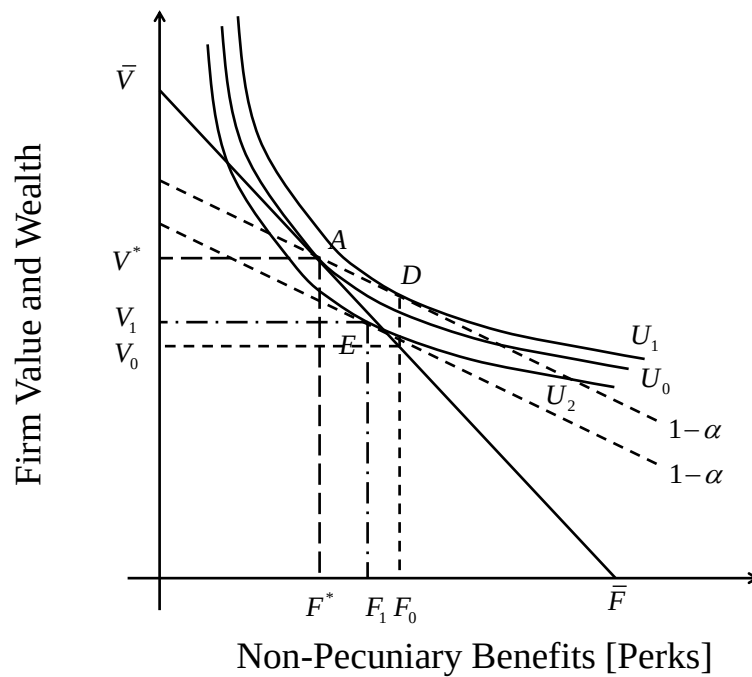


Figure 1: Choice of Firm Value and Non-pecuniary Benefits by Sole Proprietorship

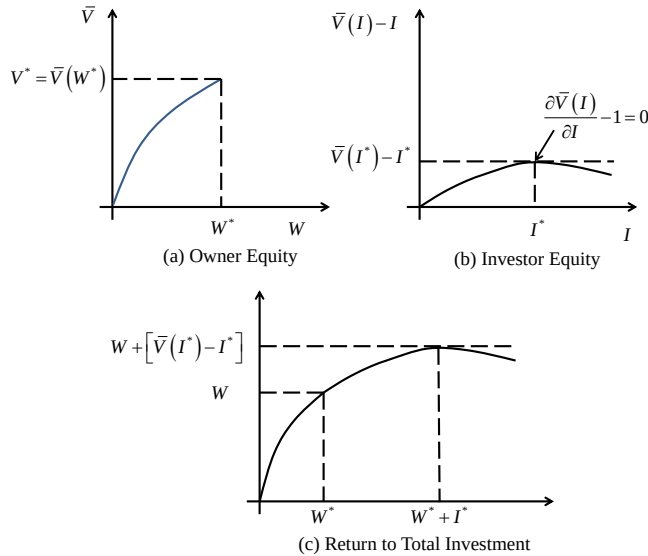


Figure 2: Optimal Investment Size

- c. The original equity of the firm is taken to be $V^* = \bar{V}(W^*)$ (which is equal to V^* in Figure 1). The return to this original investment is presented in Panel (a) of Figure 2.
- d. The return from additional (outside) investment is then presented in Panel (b) of Figure 2.
- e. The return from the sum of equity from the original owner/operator and the outside investor is presented in Panel (c) of Figure 2.
- f. Notice that each of the frontiers are initially increasing and concave over their entire range of possible investment amounts; hence, some level of investment I^* defined as

$$\frac{\partial (\bar{V}(I) - I)}{\partial I} = \frac{\partial \bar{V}(I)}{\partial I} - 1 = 0 \quad (1)$$

can be found that maximizes the value of the firm.

2. Figure 3 then presents the trade-off between the value of the firm and perks to the original owner/operator with outside investment that expands the size of the firm (i.e., the expansion of Figure 1).

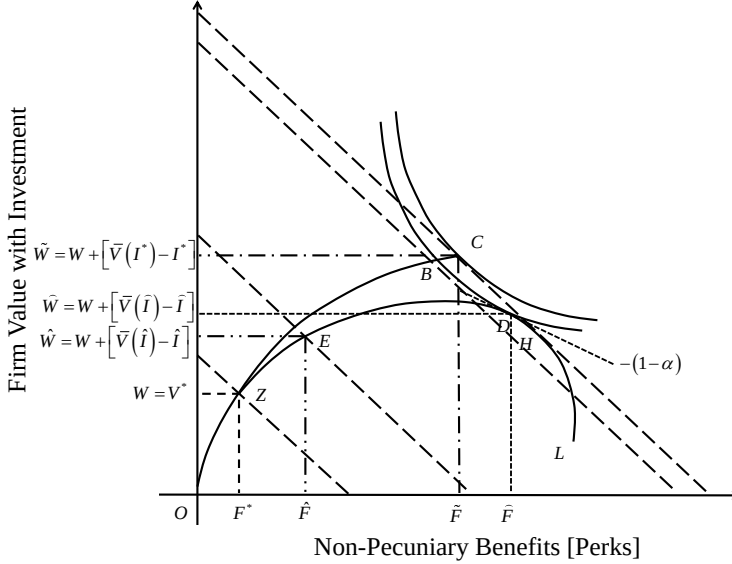


Figure 3: Choice of Firm Value and Non-pecuniary Benefits with Firm Expansion

- a. Without agency cost the optimal level of capital invested in the firm is $\hat{W} = W + [\bar{V}(\hat{I}) - \hat{I}]$ and the optimal level of non-pecuniary benefits is $\hat{F}$ (represented by point C).
- b. The expansion path (the optimal levels of firm value and non-pecuniary benefits) without agency cost is the locus of points $OZBC$.
 - The agency cost is represented by the divergence from the $OZBC$.
- c. Consider the equilibrium at point E which captures the agency cost developed in Figure 1.
 - At point E the owner/operator chooses a level of non-pecuniary benefits ($\hat{F}$) above the optimum level (i.e., the level of non-pecuniary benefits determined by Equation A.1 (Moss)).
 - This action yields a value of the firm $\hat{W} = W + [\bar{V}(\hat{I}) - \hat{I}]$ below the possible value of the firm with the same amount of investment.

- d. The point D in Figure 1 represents the optimum value of the firm under agency cost assuming that α is the ownership share to outside investors.
 - e. The cost of the agency problem is represented by the lost value of the firm between the locus of points $OZBC$ and the locus of choices under the agent problem depicted as $OZEDHL$.
- C. The development of the agency problem in Figures 1 and 3 assumes that the outside investor can take no actions to offset the actions of the original owner/operator. The question is whether certain actions can be taken by the investors to reduce the agency cost

In the above analysis we have ignored the potential for controlling the behavior of the owner-manager through monitoring and other controlling activities. In practice, it is usually possible by expending resources to alter the opportunity the owner-manager has for capturing non-pecuniary benefits. These methods include auditing, formal control systems, budget restrictions, and the establishment of incentive compensation systems which serve to more closely identify the manager's interest with those of the outside equity holders (Jensen and Meckling p.323).

1. Figure 4 is similar to Figures 1 and 3 except for the curve BCE (the curve from the intersection of U_3 to the budget line becoming tangent to U_2 at point C and passing through E).
 - a. The BCE curve depicts a budget constraint for the monitoring process.
 - b. Without monitoring, the equilibrium is at point B like the preceding solutions (i.e., the value of the firm is V_1 with the owner/operator withdrawing F_1 in non-pecuniary benefits).
 - c. As expenditures on monitoring increase, the amount of perks the owner/operator is able to take from the firm is decreased and the value of the firm increases.

By incurring a monitoring cost of, M , the equity holders can restrict the manager's consumption of perquisites to

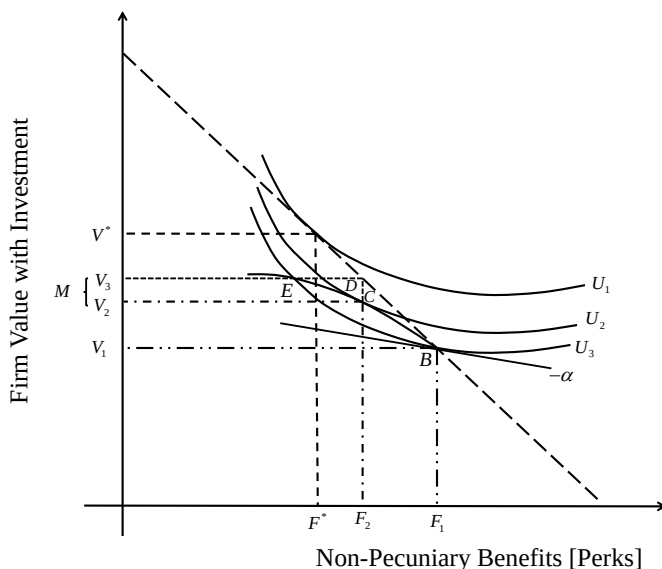


Figure 4: Agency and Monitoring Cost

amounts less than $[F_1]$. Let $F(M, \alpha)$ denote the maximum perquisites the manager can consume for alternative levels of monitoring expenditures, M , given his ownership share α . We assume that increases in the monitoring reduce F , and reduce it at a decreasing rate, i.e., $\partial F / \partial M < 0$ and $\partial^2 F / \partial M^2 > 0$ (Jensen and Meckling p.323).

2. The curve $F(M, \alpha)$ tells us the value (i.e., the vertical movement along the BCE curve) resulting from a given level of M for a specific value of α .
 - a. The value of monitoring to the firm is then $V = V_1 - F(M, \alpha) - M$. The vertical difference between the original budget line and the BCE curve is the current market value of future monitoring expenditures (i.e., $D - C$ in Figure 4).

If it is possible for the outside equity holders to make these monitoring expenditures and thereby to impose the reductions in the owner-manager's consumption of F , he will voluntarily enter into a contract with the outside equity holders which gives them the rights to restrict his

- consumption of non-pecuniary items to $[F_1]$. He finds this desirable because it will cause the value of the firm to rise to (Jensen and Meckling p.324).
- b. The optimal level of monitoring is then M which is bid into the value of the firm (i.e., V_2). However, the increase in the value of the owner/operator's wealth increases by less than the value of his reduction in non-pecuniary benefits.
- D. Jensen and Meckling then demonstrate how bonding expenditures for debt can be viewed as monitoring cost. Bonding costs are relevant because they are essentially equivalent to collateralization of personal and business assets by the sole proprietorship. To firm the linkage up, we quote Jensen and Meckling's conclusions on **the agency costs of debt**