Chapter 7

INCENTIVE PROBLEMS AND INVESTMENT TIMING OPTIONS

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Abstract: We characterize optimal investment and compensation strategies in a model of an investment opportunity with managerial incentive problems, caused by asymmetric information over investment costs and the manager's desire to consume slack, and flexibility over the timing of its acceptance. The flexibility over timing consists of the opportunity to invest immediately, delay investment for one period, or not invest at all. The timing option provides an opportunity to invest when circumstances are most favorable. However, the timing option also gives the manager an incentive to influence the timing of the investment to circumstances in which he gets more slack.

Under the assumption that investment costs are distributed independently over time, the optimal investment policy consists of a sequence of target costs, below which investment takes place and above which it does not.

The timing option reduces optimal cost targets, relative to the case when no timing option is present. The first cost target is lowered because the compensation function calls for the payment of an amount equal to the manager's option to generate future slack, should investment take place. This increases the cost of investing at the first opportunity, thus reducing its attractiveness. In order to ease the incentive problem at the initial investment opportunity, the second target cost is also lowered, even though no further timing options remain.

Making the additional assumption that costs are uniformly distributed, we generate additional insights. First, circumstances are identified in which not only does the cost target for immediate investment exceed that for delayed investment but also the probability of immediate investment exceeds the conditional probability of delayed investment, results impossible in the first-best context. Here, relatively speaking, incentive problems shift the probability of investment away from delayed investment towards immediate investment. Second, incentive problems are generally thought to reduce target costs, relative to opportunities with no incentive problems, in order to limit the manager's slack on lower cost projects. Incentive problems, however, have more complex effects in the opportunity analyzed here. As a result, we are able to identify circumstances under which the target cost for immediate investment may be increased by incentive effects, relative to the target cost that exists in the absence of incentive problems.

Keywords: Capital budgeting, Incentives, Investment Options

1. Introduction

There is an extensive theoretical literature in accounting on resource allocation decisions in organizations, the ultimate goal of which is to understand the role of accounting information and its alternatives.[1] Motivated by work on capital rationing and organizational slack, Antle and Eppen [1985] - AE - offer a simple model of investment under uncertainty and dispersed information. They show how an owner's optimal response to a manager's superior information and desire for slack consumption leads to a hurdle rate contract that balances, *ex ante*, the *ex post* costs of underinvestment (capital rationing) against organizational slack.

AE study a simple, one-shot investment opportunity with one manager and a given information structure. Many variations of this model have been explored, and usually show that inefficiencies in resource allocation can be reduced in a number of ways. Most obviously, the production of information about costs can improve decisions (Antle and Fellingham [1990] and Antle, Bogetoft and Stark [2001]). Less obvious are the improvements brought about by restructuring the resource allocation decisions themselves. For example, Antle and Fellingham [1990], Arya, Fellingham and Young [1994], and Fellingham and Young [1990] show that there are beneficial incentive effects of tying together the analysis of a sequence of otherwise unrelated resource allocation decisions. Arya, Glover and Young [1996] show that it can be beneficial to tie together the resource allocation decisions affecting multiple managers, regardless of whether the dispersed information arrives before or after the investment decisions. Antle, Bogetoft and Stark [1999] and Arya and Glover [2001] show how bundling projects and considering them at the same time can ease incentive problems.

The purpose of this paper is to explore the effects on resource allocation decisions of another possibility - opening an option to delay the decision. The economics and finance literatures have emphasized the importance of options to delay. For example, Ross [1995] states that '... when evaluating investments, optionality is ubiquitous and unavoidable.' Dixit and Pindyck [1994] argue that '... irreversibility and the possibility of delay are very important characteristics of most investments in reality.' We explore the effects of opening an option to delay the decision by expanding the model of AE such that the investment opportunity can be accepted, if desirable at one of two points in time, but not both. As in AE, the source of information asymmetry between owner and manager relates to the cost of investment at each point in time.