Finance Research Letters 14 (2015) 150–159

Contents lists available at ScienceDirect

Finance Research Letters

journal homepage: www.elsevier.com/locate/frl

A compensation scheme for optimal investment decisions ☆

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ARTICLE INFO

Article history:
Received 30 January 2015
Accepted 2 May 2015
Available online 9 May 2015

JEL classification:
D81
D82
G31
J33

Keywords:
Real options
Investment timing
Agency
Optimal contracting

ABSTRACT

We derive an optimal compensation scheme that aims to eliminate inadequate misaligned managerial actions ensuring optimal investment decisions. With this model, the owners of the option to invest do not need to follow the future evolution of project value drivers in order to guarantee optimal behavior. The optimal contract scheme is a correct balance between effort costs, fixed wages, and a value-sharing bonus. As shown, even small deviations from the optimal compensation scheme may lead to highly sub-optimal decisions. The model is extended to accommodate impatience behavior by the managers or the shareholders.

1. Introduction

In financial theory, investors aim optimal investment decisions to reach the goal of value maximization (Jensen, 2001). When the owners of an investment opportunity fully control the endogenous variables and the decision process, we should not expect any deliberated value misappropriation caused by inside determinants. In such case, the investment risk bearer is the investment decision maker and so any deviation from the main financial goal is avoided.

☆ We thank Artur Rodrigues, Dean Paxson, Pawel Mielcarz, and participants at the 2011 Real Options Conference. All remaining errors are of our own. This research has been supported by National Funds through the FCT Fundação para a Ciência e a Tecnologia (Portuguese Foundation for Science and Technology) within the project UID/ECO/04105/2013.

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http://dx.doi.org/10.1016/j.frl.2015.05.004
1544-6123/

However, in some circumstances, for instance when the investment presents a high ownership dispersion (Berle and Means, 1932) or when the owners lack the necessary expertise (Shleifer and Vishny, 1997), the shift of control decision to an exogenous entity (agent) is inevitable. As a consequence, if there is a misalignment of interests between the owners and the controllers of the investment opportunity, the value maximization process may be affected. This is the prominent agency dilemma, formally established in the seminal paper of Jensen and Meckling (1976).

As observed in the works of Dixit and Pindyck (1994) and Trigeorgis (1996) the study of investment opportunities and its optimal implementation time usually tend to assume perfect aligning of interests between managers and owners, ignoring the impact of agency conflicts.

Recently, this issue has kept the attention of some authors, generating bridging papers in the study of investment timing decisions. For instance, Grenadier and Wang (2005) examines investment timing decision for a single project, where the owner delegates the investment decision to the manager. Manager behavior accounts for asymmetric information and moral hazard, generating sub-optimal decisions that can be corrected through an optimal contract, aligning the incentives of owners and managers. Nishihara and Shibata (2008) extends this model incorporating a relationship between an audit mechanism and bonus-incentives sensitive to manager's deviated actions. Furthermore, Shibata and Nishihara (2010) embodies debt financing on investment expenditure.

Hori and Osano (2013) presents an agency model under a real options framework where managerial compensation is described by three parameters: an initial base salary, a given quantity of stock options, and the corresponding exercise price. The authors show that the optimal compensation contract, which is endogenously determined, implies a zero initial salary, an optimal quantity of stock options and an exercise price equal to zero, so they show that restricted stock dominates stock options and the base salary. In addition to the standard factors, the optimal aligned trigger will depend on the impatience of the manager, and on the manager instantaneous disutility effort for implementing the project, that acts like an investment cost.

Our work differs from the related literature in several ways. Firstly, we consider a compensation scheme that depends on the state of the project, either idle or active. This means that even before implementing the project the manager earns a salary that pays his effort for running the investment opportunity. While realistic, this is ignored by the related models, either because they assume the manager works for free prior exercising the option, as in Grenadier and Wang (2005), or because the optimal contract compensation implies a zero base salary, as in Hori and Osano (2013).

Secondly, instead of considering only a single instantaneous disutility effort for the manager that occurs when the investment takes place (Hori and Osano, 2013), we consider that the managing actions require a continuous effort which, however, is different in each state of the project. We assume that a higher effort is needed for running an active project relative to the effort for managing the option, and so when the project is undertaken an increment in the disutility occurs. As we will see, this plays an important role in the definition of the optimal contract.

Finally, our compensation scheme is based not in stock options or restricted stocks, but instead in a fixed wage (prior investing) or in a mix between a fixed wage and a value-sharing bonus (after the implementation). As will see, a correct balance between the effort costs, the fixed wages and the value-sharing bonus allows us to establish a simple but meaningful contract scheme that aligns the interests of owners and manages.

The rest of the paper is organized as follows. Section 2 presents the basic model where the optimal compensation scheme is derived. Section 3 extends the model to accommodate impatience behavior of managers or shareholders. Section 4 presents a numerical example, and Section 5 concludes.

2. The model

2.1. The setup

A firm has an option to invest in a single project. The shareholders decide to hire a manager for running the investment opportunity, and on the behalf of the owner the agent will follow the market conditions and take the investment decision. This choice for professional management arises from restrictions that constrict owners' capacity to run the project.