



Optimal dynamic contracts with moral hazard and costly monitoring [☆]

Tomasz Piskorski ^{a,*}, Mark M. Westerfield ^{b,2}

^a *Columbia University, United States*

^b *University of Washington, United States*

Received 12 November 2015; final version received 10 August 2016; accepted 17 August 2016

Available online 31 August 2016

Abstract

We introduce a tractable dynamic monitoring technology into a continuous-time moral-hazard problem and study the optimal long-term contract between principal and agent. Monitoring adds value by allowing the principal to reduce the intensity of performance-based incentives, reducing the likelihood of costly termination. We present a novel characterization of optimal dynamic incentive provision when performance-based incentives may decline continuously to zero. Termination happens in equilibrium only if its costs are relatively low. In general, the intensity of both monitoring and performance-based compensation can be non-monotonic functions of the quality of past performance. Our results can also help explain puzzling empirical findings on the relationship between performance history and future pay-performance sensitivity and on the linkage between termination, performance, and monitoring. We also discuss implications of our model for optimal security design and endogenous financing constraints.

© 2016 Elsevier Inc. All rights reserved.

[☆] We are grateful to the Editor, the Associate Editor and three anonymous referees for helpful comments and suggestions. We also thank seminar participants at the USC Marshall School, Columbia Business School, NYU Stern, NYU Economics Department, UC-Berkeley Haas School, ASU W.P. Carey School, Rochester Simon School, UT Austin McCombs School, and the North American Summer Meeting of the Econometric Society for their useful discussion and comments.

* Corresponding author.

E-mail addresses: tp2252@columbia.edu (T. Piskorski), mwesterf@uw.edu (M.M. Westerfield).

¹ Associate Professor of Finance and Economics, Columbia Business School, Uris Hall 810, Broadway 3022, NYC, NY 10027, United States. Fax: +1 212 662 8474.

² Assistant Professor of Finance and Business Economics, Foster School of Business, University of Washington, Box 353226, Seattle, WA 98195, United States.

JEL classification: D82; D86; M52

Keywords: Monitoring; Dynamic contracts; Managerial compensation; Moral hazard; Endogenous financing constraints

1. Introduction

Despite its fundamental role as an incentive device, the optimal use of costly monitoring has remained relatively unexamined in dynamic settings. In this paper we fill this gap by showing how compensation, monitoring, and contract termination should be jointly and optimally structured in a dynamic principal-agent framework with moral hazard. The important change relative to earlier work is the addition of a dynamic monitoring technology with variable intensity – a second signal in addition to observed performance – that allows the principal to detect, at a cost, undesirable activity on the part of the agent.

Our continuous time setting allows us to provide a tractable characterization of a fully history dependent optimal contract. As we discuss below, this characterization yields novel insights on the interplay of compensation, monitoring, and termination as a function of observed history of performance. In addition, our model helps explain two puzzling sets of empirical findings in managerial compensation literature – one having to do with the relationship between performance history and future pay-performance sensitivity and a second having to do with the empirical linkages between termination, performance, and monitoring. Finally, we also discuss how use of monitoring relaxes the endogenous financing constraint implied by the agency problem.

We begin with a dynamic agency problem similar to [DeMarzo and Sannikov \(2006\)](#) and [Biais et al. \(2007\)](#) in which the principal hires an agent to operate a project. A particular agent-asset match generates a project that increases the productive value of the asset, but the agent lacks the funds to purchase that asset directly. Instead, the agent is offered a compensation contract by the principal (a firm or outside investors) in exchange for undertaking the project. There is a moral hazard problem because the project's cash flows are subject to shocks that are privately observed by the agent, and the agent receives a private benefit from taking actions that decrease the payoff from the project (e.g. shirking, diversion, asset misuse, etc.). To induce the agent not to divert resources for his own benefit, the principal can use standard performance-based incentives, where bad performance leads to termination of the contract and good performance leads to bonus payments to the agent. Termination is costly because the principal retains assets that are less valuable without the match to the agent.

We extend this setting by giving the principal access to a monitoring technology that allows her to detect, at a cost, undesirable activity by the agent. The probability of detection depends on the resources the principal spends on monitoring and on the extent of the agent's bad acts. The monitoring technology can be interpreted as continuous or repeated audits of the project by the principal, or as direct involvement of the principal in the operations of the project. If the agent is caught shirking, the principal can impose penalties on the agent by reducing his future compensation, or at the extreme, by terminating the contract early. Thus, instead of having to observe a series of negative cash flows – either from bad behavior or bad luck – before terminating, the principal can probabilistically observe and punish bad behavior directly.

Active monitoring provides a second incentive device for the principal. Using the monitoring technology allows the principal to reduce the agent's share of the project's gains and losses (to lower performance-based incentives) and to reduce the likelihood of costly termination, while

Download English Version:

<https://daneshyari.com/en/article/7359374>

Download Persian Version:

<https://daneshyari.com/article/7359374>

[Daneshyari.com](https://daneshyari.com)