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Agency-based asset pricing ☆

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Abstract

We study an infinite-horizon Lucas tree model where a manager is hired to tend to the trees and is compensated with a fraction of the trees' output. The manager trades shares with investors and makes an effort that determines the distribution of the output. When the manager is less (more) risk-averse than the investors, managerial trading results in a less (more) volatile stock price and a lower (higher) risk premium. Trading between the manager and investors acts as an indirect renegotiation mechanism that dynamically modulates the manager's incentives and allocates risk and return, but its effectiveness is limited with dispersed small investors.

JEL classification: D81; G12; G32

Keywords: Moral hazard; Managerial trading; Risk-sharing; Asset pricing

1. Introduction

The canonical asset pricing model views corporate cash flows as exogenous and focuses on identifying a stochastic discount factor or pricing kernel to price the assumed cash flows. On the contrary, the standard corporate finance model views the pricing kernel as exogenous and emphasizes the impact of managerial incentives on corporate cash flows to be priced by the

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given pricing kernel. Overall then, in the paradigm of financial economics there is a separation between asset pricing and corporate finance.

In this paper we incorporate a standard agency problem into a classical asset pricing model to simultaneously endogenize the pricing kernel and the cash flows. Specifically, we analyze an infinite-horizon Lucas tree model where a manager needs to be hired to tend to the trees and is compensated with a fraction of the trees' output. The manager trades shares with investors and makes an effort that determines the output. The stock price in this model plays two critical roles: in addition to the usual risk-sharing mechanism, it also acts as a monitoring mechanism that induces the manager to make an effort. The interaction between these two roles results in the reciprocal impact of the pricing kernel and cash flows.

The necessity of explicitly modeling the manager's trading decisions and effort choices poses challenges to the analysis. Since the manager's effort determines cash flows, he has to be modeled as a "big" corporate player. But, the manager's effort depends on his shareholding, so the manager's trading decisions have an impact on the share price and he also has to be modeled as a "big" trader—a non-price taker—in the stock market. We construct a dynamic model in which the manager controls cash flows and trades as a monopolist with a continuum of small competitive investors. For the equilibrium concept, the literature adopts state-dependent Perfect Public Equilibria (PPE) (see Phelan and Stacchetti [33] for the example of a big government and a continuum of individuals and Atkeson [7] for the example of two big agents as extensions of Abreu et al. [2,3]). In a PPE, the recursive state-dependent value correspondences characterize the equilibrium value sets. However, working with value correspondences is difficult, even numerically, and in addition, equilibrium selection is a problem. We propose a Strong Markov Perfect Public Equilibrium (SMPPE) that allows us to work with value functions instead of value correspondences. This generalizes the application of dynamic programming to broader economic settings beyond the traditional competitive market environment. Though more restrictive, SMPPE facilitates our understanding of the model and eases numerical analysis.

Our analysis shows that managerial trading has a large impact on the stock price. This impact depends on the relative risk tolerance between the manager and the investors. When the manager is more risk-averse than the investors, output and the stock price become more volatile and the risk premium is higher; when the manager is less risk-averse than the investors, managerial trading smoothes output and results in a less volatile stock price and a lower risk premium. In addition to its risk-sharing function, trading between the manager and investors also acts as an indirect renegotiation mechanism that dynamically modulates the manager's incentives. However, when the market consists of small competitive investors, the effectiveness of the incentive function is limited. The conventional wisdom posits that managerial trading leads to an unraveling of incentives, but we find that the opposite can also be true, especially when the manager is less risk-averse than the investors.

Although the literature on managerial compensation is voluminous (see surveys by Abowd and Kaplan [1], Murphy [30,31], Bebchuk and Fried [8], Holmström [21], Core et al. [11], among many others), the general understanding of the relation between managerial compensation and firm performance is still very limited, and there are different opinions about managerial pay performance sensitivity. The nub of the issue is the tension between risk-sharing and incentive provision. Having the manager own all of the equity would solve the agency problem, but would also expose the manager to too much risk. While stock compensation can be used to alleviate moral hazard by aligning the interests of firm managers and investors, its effectiveness is limited by the need of risk-sharing between these agents in the economy. For example, in response to Jensen and Murphy's [24] finding of low pay performance sensitivity estimate, Garen [17] and