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## Reducing managers' incentives to cannibalize: Managerial stock options when shareholders are diversified <sup>☆</sup>

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### ABSTRACT

We analyze the relative advantage of option grants compared to stock compensation when shareholders are diversified. Our analysis recognizes a conflict that is largely neglected in the corporate finance literature. Shareholders want to maximize their portfolio value while capital budgeting rules direct managers to choose projects that maximize firm (equity) value. Options can reduce this conflict by motivating managers to avoid projects that enhance the value of one firm at the expense of another firm. Also, in our framework, relative performance evaluation destroys value for shareholders as it encourages firms to engage in cannibalistic activity. Consistent with the predictions of our model we find that firms with lower insider ownership, higher institutional ownership, and lower leverage tend to provide more option grants as compensation to their executives.

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### 1. Introduction

Much of the empirical and theoretical work in corporate finance employs the assumption that shareholders want to maximize the value of the firm's equity and give managers incentives to do so. When investors are well-diversified but managers are relatively undiversified, however, the standard view of managerial compensation raises an important issue. Since investors hold diversified portfolios, they are concerned with firm value only through the value of the portfolio. Managers pursuing

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firm value maximization may not be acting optimally for investors if increases to some firm values are accompanied by decreases to the value of other firms in investors' portfolios.<sup>1</sup>

In this paper, we examine how shareholders' diversification<sup>2</sup> affects the choice of managerial compensation when managers select the mix of projects that a company pursues, and when a company's cashflow is affected by other companies' actions. Our framework captures the idea that managers have discretion over project selection, and affect both the risk characteristics of the firm, and the ability of the firm to create (or destroy) value for shareholders. We show that the relation between riskiness of project and value creation/destruction for shareholders is central for the understanding of the complex relation between shareholders and managers.

The kind of situation we have in mind can be described by the following example: Consider a pharmaceutical firm whose managers are faced with a choice between two projects that are mutually exclusive due to capital rationing or some other exogenous condition. One project involves developing a generic drug for a disease that is already treatable by a drug of a competitor company, whose patent life has expired. The other project involves research for a cure to an untreated disease. The first project will generate cashflow to the firm by reducing the cashflow of the competitor firm. The second project will increase the opportunity set of the economy, by generating cashflow that is incremental to the economy after considering the cashflows of other firms. In general, one might expect the second project to be riskier (i.e., a higher probability of failure, yet a high return in case of success).<sup>3</sup> This means that diversified shareholders who hold many pharmaceutical firms in their portfolio should compensate managers in a way that promotes the second type of project because these are the projects that increase the value of their portfolio.

In our model there are two firms and two non-diversified risk-neutral managers<sup>4</sup> who decide on the projects to be selected in their respective firms. Each of the managers has a two-dimensional problem in choosing a mix of projects: the manager exerts *cannibalistic* effort and *economy-increasing* effort. The cannibalistic effort involves imposing a negative externality on the other firm. This would typically involve taking market share from the competitor firm in a mature market. In contrast, economy-increasing effort involves investing in new markets that enhance the opportunity set of shareholders after accounting for the effects on the competitor firm.<sup>5</sup> We also make the critical assumption that economy-increasing projects have greater total risk than cannibalistic projects. We do not want to be dogmatic about this assumption as there could be circumstances in which the reverse is true. However, we do perceive that in general there is more theoretical reasoning and empirical evidence that economy-increasing projects are the riskier type of projects. There is more uncertainty about the success/failure of the development of new products and markets. Typically these projects involve high research and development expenses and there is evidence that these are the riskiest sort of expenditures.<sup>6</sup>

Our theoretical analysis concerns how commonly used compensation tools, namely stock and option grants; affect the value of a shareholder's portfolio in a moral hazard setting. We do so by solving for the competitive Nash-equilibrium where shareholders set the compensation package in each firm

<sup>1</sup> Since 1989 institutional investors (pension funds, mutual funds, insurance companies, bank trust, and foundation/endowments funds) hold the majority of corporate US equity (Brancato, 1991). It is hard to know what is the exact percentage holding today, but there is evidence that the percentage has only increased since then (e.g., Poterba, 1998; Gompers and Metrick, 2001). For our purposes, it is also important to understand that most institutional investors hold shares in firms that affect each other (i.e., in the same industry).

<sup>2</sup> Throughout the paper, if shareholders are diversified, we assume that they are perfectly diversified, and hold an equity stake in the market portfolio. This is done for simplicity and tractability and suits our objective, which is to highlight a contrast with the typical corporate capital budgeting rule that assumes that shareholders are concerned with the incremental cashflow of a single firm. Our assumption is also consistent with asset pricing models such as the CAPM. However, having heterogeneous investors with different portfolio holdings does not alter the qualitative nature of our results. Maximization of firm value is not a common objective of heterogeneous, but at least partially diversified, investors. There is no reason to believe that the diversified shareholders of a specific firm care more (or less) about its value than the value of the firm's competitors.

<sup>3</sup> See "Pharmaceutical Innovation Under Attack", Pharmaceutical Executive, September 2002, p. 22.

<sup>4</sup> Having risk-averse managers would not change the qualitative nature of the results. This is discussed later.

<sup>5</sup> In general, most real investment opportunities combine cannibalistic and economy-increasing aspects in different proportions. For convenience, we assume that managers can engage in any desired mix of these aspects.

<sup>6</sup> For example, Bange and DeBondt (1998), Ryan and Wiggins (2002), and Coles et al. (2006).

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