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The masquerade ball of the CEOs and the mask of excessive risk☆

Sadettin Haluk Citci [a], Eren Inci [b,*]

[a] Gebze Technical University, Department of Economics, P.K.:141, 41400 Gebze, Kocaeli, Turkey
[b] Sabanci University, Faculty of Arts and Social Sciences, Orhanli/Tuzla, 34956 Istanbul, Turkey

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ABSTRACT

Two well-known explanations for excessive risk taking by CEOs are limited liability, which protects them from the downward risks of their project choices, and convex compensation schemes that encourage risk taking. This paper provides a career-concerns-based motive for why a CEO might choose an excessively risky project even in the absence of them. A CEO of unknown managerial ability could be fired if she is found to be below average. To limit this layoff risk, she tries to conceal her true type by choosing excessively risky projects. Excessive risk taking makes the firm unable to determine if a poor outcome resulted from incompetency or negative risk realization.

1. Introduction

Why might CEOs take excessive risks in overseeing their firms? Two well-known explanations are limited liability, which provides insurance to CEOs against the downward risks of their project choice, and compensation schemes that encourage risk taking (*e.g.*, convex compensation schemes). In this paper, we provide an additional reason for why there might be excessive risk taking in the market even in the absence of limited liability and compensation schemes that encourage risk taking. We argue that a CEO's career concerns regarding potential termination give her incentive to try to improve the market's expectation about her managerial ability. We show that a CEO can achieve this goal by choosing excessively risky projects and that, under certain conditions, explicit incentives provided by optimal linear compensation contracts cannot prevent her from choosing such projects. Hence, our theory is based on managerial risk appetite erected by career concerns and shows that regulations restricting convex compensation schemes may not be the most effective to wipe out excessive risk from the market. In fact, in contrast to the movements toward linear contracts, especially in the US due to the injection of public funds, we find that while linear contracts cannot always guarantee optimal risk taking, bonus contracts or linear contracts with severance payment options result in optimally risky projects to be chosen by the CEOs.

We undertake our analysis in a simple principal–agent framework in which a (risk-neutral) firm operates for two periods. We initially assume that there are two types of (risk-neutral) CEOs, high and low ability, who are found equally in the population. Neither the firm nor the CEO knows the ability of the CEO in the beginning. The CEO chooses the project to be undertaken by the firm from a pool of investment projects. Projects differ in their probabilities of failure and potential returns, and there is a high risk-high return/low risk-low return technology in the sense that a project with a higher probability of failure has a higher return in the good state and higher loss in the bad state. Among the potential projects, there are excessively risky ones with lower expected returns and higher probabilities of failure, some even with negative net present values which are in fact chosen in equilibrium. In the end, the project can succeed or fail. Because of regulations, the firm may have to employ an (optimal) linear compensation contract that allows for any combination of fixed wages and stocks. Therefore, there is no convex compensation scheme that increases risk appetite, and there is no limited liability since the CEO incurs a loss if the output realization is negative.

The firm hires a CEO of unknown ability from the managerial pool and *ex ante* expects her ability to be average in the population. If it finds out that her ability is below average at the end of the first period, it fires her and hires a new CEO, whose ability is expected to be average. This layoff risk is the source of the CEO's career concerns and it gives her

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* Corresponding author.
E-mail addresses: hcitci@gtu.edu.tr (S.H. Citci), ereninci@sabanciuniv.edu (E. Inci).

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incentive to influence (or in fact improve) the market's expectation about her ability.[1] Suppose, for the moment, that the CEO knows her ability and it is low. In such as case, she can simply "gamble" by choosing an excessively risky project. When the good state realizes, the firm cannot be sure if the observed output is produced by a low- or high-ability CEO. However, it has to statistically conclude that the CEO is more likely to be a high-ability one in the bad state as the probability of success is lower with excessively risky projects. When the bad state realizes, the firm infers the CEO's ability and fires her. But, if she did not choose an excessively risky project, she would be fired in any output realization. This means that she can lower her probability of being fired by choosing an excessively risky project.

More importantly, a CEO who does not know her ability also has the same motivation. Because she takes into account the possibility that her ability might be low, she tries to prevent the firm from perfectly inferring her ability. In our model, she can do so by choosing the excessively risky project with which the good-state output of a low-ability CEO coincides with the bad-state output of a high-ability one. When the firm observes this "overlapped" output, it cannot know exactly which ability type in fact produced this output. However, because the probability of failure is higher with an excessively risky project, the firm believes that the observed output is more likely to be the bad-state realization of a high-ability CEO than the good-state realization of a low-ability one. Consequently, the firm's expectation about the CEO's ability will be higher than average even though each type is *ex ante* equally likely, which means that the CEO is not fired in such an output realization. In fact, by following this strategy, she is fired only if she turns out to be a low-ability CEO in the bad state.

We show that the strategy of overlapping the outputs (by choosing an excessively risky project) minimizes the probability of being fired when the difference between the two possible abilities is neither too high nor too low. One can interpret this situation as a business sector where both innate ability and project choice have substantial impact on the final outcome. Yet, minimizing the probability of being fired is not automatically an equilibrium even in that parameter range. It is so when the CEO's compensation benefit she derives by choosing the optimally risky project in the first period is dominated in expected payoff by the career benefit she derives by choosing an excessively risky project to minimize her probability of being fired. In such a case, excessively risky projects are undertaken in equilibrium under the optimal linear compensation contract that pays any combination of fixed wage and stocks. This contributes to the ongoing debate about the movement toward linear contracts in the regulation of compensation structures to prevent excessive risk taking. As opposed to these movements, in our setting, the optimally risky project is implemented with bonus contracts or linear contracts with severance payment options.

Policy debates emphasize the CEOs' *responsibility* in the inefficiently high levels of risk taken by firms. Yet, when a linear contract is used, we show that, in addition to cases in which the firm *involuntarily* allows the CEO to choose excessively risky projects, there are also cases in which it *voluntarily* allows her to do so. In the former case, the firm allows the CEO to choose an excessively risky project because no permitted compensation contract can have her choose the optimally risky project. However, in the latter case, although having the CEO choose the optimally risky project could be profitable for the firm, letting her choose an excessively risky project is even more profitable. This is inefficient from the point of view of society, as the return from an excessively risky project has negative net present value. Thus, shareholders sometimes share the responsibility of inefficient levels of risk in the firm.

Our results hold even when CEOs are risk averse. We further show that excessively risky projects are undertaken even when there is a continuum of ability types. This case also illustrates an inverse U-shaped relationship between the unobserved ability of the CEO and her layoff risk. Among below-average CEOs, a higher-ability one is more likely to be fired than a lower-ability one, while above-average CEOs face no layoff risk. Our explanation for excessive risk taking is not limited-liability based, as there is no limited liability for the CEO in the model. As a matter of fact, incorporating limited liability into our setting would increase CEOs' risk appetite.

The mechanism we describe in this paper is relevant to any sector where both innate ability of the CEO and her project choice are sufficiently important in project outcomes (which is the case analyzed in Lemma 2).[2] In such a setting, there could be a trade-off between innate ability and project choice and, because the ability is fixed, depending on the economic and institutional environment, the CEO might find it optimal to distort her project choice to hide her true ability as much as possible. Obviously, the occurrence of this situation is sector specific. Although the banking industry, or the financial sector in general, is an obvious example in which such incentives may be present, the mechanism we present is not limited to these sectors.

We now explain how our paper relates to prior work. There is a large body of literature that analyzes how career concerns affect the behavior of agents. Holmstrom (1982) finds that since investing in a project carries the risk of one's ability being discovered, a risk-averse manager behaves overly conservatively by not investing in risky projects at all. Holmstrom and Ricart i Costa (1986) elaborate on this idea further and show that conservatism can be fixed if the shareholders can offer a downward rigid wage. Building on Holmstrom's findings, the literature that followed has focused on *managerial conservatism* in a broad sense (see, *e.g.*, Hirshleifer and Thakor, 1992; Zwiebel, 1995, and Gormley and Matsa, forthcoming). Contrary to this literature, we show that career concerns may lead managers to choose excessively risky projects, even when they are risk averse.

Our paper is linked to the recent literature on the relationship between CEO turnover and their risk taking. For example, Bushman et al. (2010) analyze whether firm-specific or systematic risk increases turnover in a setting where risk is exogenous. Instead, we look at the implications of CEO turnover for risk taking when both the risk choice of the CEO and the turnover decision of the firm are endogenous. Hu et al. (2011) study risk-shifting effects of a manager's employment risk and find a U-shaped relationship between the manager's risk choice and her prior relative performance among her peers. We find a similar inverse U-shaped relationship between the CEO's ability and her layoff risk. In our setting, while above-average CEOs face no layoff risk, among below-average ones, lower-ability CEOs have lower layoff risk than do higher-ability ones. Using a continuous-time model of the dynamics of private equity funds, Buchner and Wagner (2015) show the relevance of career concerns for risk taking by fund managers. In particular, having call options leads fund managers to take excessive risk unless they are concerned about being hired again. In contrast to prior studies in this literature, we provide a unified framework where managerial turnover, risk taking, and compensation contracts are determined endogenously.

Our paper is also related to the literature analyzing types of statistical bias that managers try to add to the market's inference about their unknown abilities. In Scharfstein and Stein (1990), the motivation of the manager is to minimize reputational risk by following the crowd. In Hermalin (1993), in order to avoid actions that are informative about her abilities, the risk-averse manager decreases the informativeness of output by choosing projects with higher variance. In Milbourn et al. (2001), in order to alter the market's assessment of her ability, the manager distorts the probabilities of reputational states that are

[1] The firing rule and its career-concerns implications are practically relevant. As Wagner (2002) and Sheng et al. (2014) point out, many portfolio managers follow some benchmark indices in their investment strategies.

[2] Obviously, in some other sectors, either the impact of innate ability or that of project choice could be negligible and thus excessive risk taking due to career concerns does not arise. The cases analyzed in Lemmas 1 and 3 could be interpreted to represent these situations.

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