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Executive compensation: A general equilibrium perspective[☆,☆☆]

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ABSTRACT

We study the dynamic general equilibrium of an economy where risk averse shareholders delegate the management of the firm to risk averse managers. The optimal contract has two main components: an incentive component corresponding to a non-tradable equity position and a variable "salary" component indexed to the aggregate wage bill and to aggregate dividends. Tying a manager's compensation to the performance of her own firm ensures that her interests are aligned with the goals of firm owners and that maximizing the discounted sum of future dividends will be her objective. Linking managers' compensation to overall economic performance is also required to make sure that managers use the appropriate stochastic discount factor to value those future dividends. General equilibrium considerations thus provide a potential resolution of the "pay for luck" puzzle. We also demonstrate that one sided "relative performance evaluation" follows equally naturally when managers and shareholders are differentially risk averse.

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1. Introduction

We construct a dynamic general equilibrium model with agency conflicts between risk averse shareholders and managers and derive the first best compensation contract. General equilibrium considerations impose properties on this contract that, in turn, bring a natural resolution to two outstanding anomalies in the executive compensation literature. These "puzzles" are introduced below.

Standard incentive theory suggests that managerial incentive pay should depend on events exclusively under the manager's control, and not on events exogenous to her own efforts or decisions. To the extent that significant components of a CEO's pay are directly or indirectly (via, e.g., option grants) related to her own firm's stock returns, this theory advocates compensation mechanisms that reward the CEO only to the extent that her own firm's stock outperforms a chosen sectoral

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[☆☆] The views expressed in this paper are those of the authors and do not necessarily represent those of the Swiss National Bank.

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or broad based market index. Accordingly, such considerations mandate “relative performance evaluation” or RPE, that is, a negative relationship between a CEO’s compensation and the chosen comparative performance benchmark. Surprisingly, RPE contracts are not commonly observed: large components of the average CEO’s compensation appear to be positively related to factors totally beyond her control. This is the “pay-for-luck” puzzle.

Garvey and Milbourne (2006) further refine the puzzle by observing a stronger link of executive pay to market returns when returns are positive than when they are negative: executives enjoy good luck and appear to be insulated from bad luck, a practice referred to as “one sided RPE.” This asymmetry in deviations from RPE constitutes the second puzzle.

Our explanation for these diverse anomalies will proceed along the following lines. Internal incentive considerations imply that the manager’s compensation must be tied to the performance of her own firm. Performance-based compensation ensures that her interests are appropriately aligned with the goals of the firm’s owners and that maximizing the sum of future dividends will be her objective. Correct intertemporal decision-making, however, also requires that managers use the appropriate stochastic discount factor to value those future dividends. If shareholders are well diversified and exposed only to aggregate risks, aligning managers’ and shareholders’ stochastic discount factors (or SDFs) will typically require tying the managers’ remuneration to aggregate state variables as well.

We make this point in a fully explicit context where the typical firm owner is the representative agent of the standard macroeconomic model. If managers and shareholders are equally risk averse, managers’ decisions will be correct from the shareholders’ perspective if and only if managers’ and shareholders’ consumption streams are in direct proportion to one another. This implies that managers must at least in part be compensated in proportion to the aggregate wage bill and to the payouts from all other firms. In other words, general equilibrium considerations, per se, demand a partial renunciation of RPE; as such, they argue directly for “pay for luck” as it is commonly understood and observed. We further demonstrate that one sided “pay for luck” is, in large measure, a consequence of optimal contracting in general equilibrium when managers and shareholders are differentially risk averse.

Ours is a simple infinite horizon dynamic general equilibrium model where both shareholders and managers are risk averse. The advantage of our set-up is that we can identify the contract that implements the first best allocation and, as a consequence, be fully specific as to its requirements. Reality is likely to be more murky, in particular because firm ownership may deviate from our representative agent assumption, and because firm owners’ information on managers’ private wealth and actions may be incomplete. Yet, the essential lessons drawn from our simple set-up remain broadly applicable. To the best of our knowledge our model is a first application of dynamic agency theory in a world where both principal and agent are risk averse.

An outline of the paper is as follows. Section 2 spells out the model. Section 3 characterizes the first best allocation of resources. Section 4 argues that there exists a contract decentralizing the first best allocation of resources, and completely characterizes this contract under the assumption that the manager’s effort level is immaterial for production. The first best contract requires not only endowing the manager with a non-tradable equity share of the firm but also ensuring that the time series properties of the manager’s stochastic discount factor, and thus her consumption, are identical to those of the firm owners. This latter condition in turn requires that the manager’s remuneration includes a time-varying salary-like component whose properties are indexed to the aggregate wage bill. Section 5 generalizes this characterization to the situation where the manager’s (unobservable) effort is essential for production while Section 6 develops the case of an economy with multiple firms. The salary component of a manager’s remuneration must then include a share in the aggregate economy-wide dividend payment but, rather strikingly, a manager’s equity stake in the firm under management cannot exceed her share of the market portfolio. Section 7 details the related literature while Section 8 concludes.

2. The model economy

For ease of exposition we start with the assumption that the entire economy’s output is produced by a single perfectly competitive firm. Section 6 discusses the extension to many firms. There is a continuum of identical agents of measure $(1+\mu)$, a subset of which – of measure μ – is selected at the beginning of time to manage the firm permanently. The rest act as workers and shareholders. Managers are self-interested and are assumed to make all the relevant decisions in view of maximizing their own intertemporal utility. When they make the hiring and investment decisions on behalf of firm owners, managers are viewed as acting collegially and thus we may refer to them collectively as “the manager.”

At the center of our attention is the repeated principal–agent problem between the (risk averse) shareholders of the firm and the (risk averse) manager and its general equilibrium dimension. This agency problem has two distinct features. One is the familiar moral hazard dimension: the executive’s effort choice is non-verifiable. The other, more important aspect is one of asymmetric information: the manager possesses specific knowledge of the firm’s operations that is not available to shareholders. One of the main motives for delegation is, indeed, to relieve shareholders of the day-to-day operation of the firm and the information requirements it entails. This means that shareholders delegate to the manager the hiring and investment decisions and all that goes with them (human resource management, project evaluation, etc.) but that, as a by-product, they lose the informational base upon which to evaluate and monitor the manager’s performance.

The representative **shareholder-worker–consumer** is confronted with a work/leisure decision and a portfolio investment decision. The form of his optimization problem is standard. The representative shareholder-worker’s problem reads:

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