Do the incentive effects of relative performance measurement vary with the *ex ante* probability of promotion?

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ABSTRACT

This study examines performance effects arising from the use of relative performance measurement (RPM) for promotion decisions in the organizational labor market. We use proprietary archival and survey data from the internal audit department of a large organization to document that the use of RPM positively interacts with the *ex ante* probability of promotion to influence performance. Thus, our study shows that while RPM may benefit employees by reducing uncertainty in incentive compensation as predicted by theory, the incremental performance benefits derived from the use of RPM as a promotion mechanism depend on the employee's promotion prospects. Specifically, we find greater (lower) performance benefits associated with the use of RPM when an employee's probability of promotion is greater (lower). Our findings suggest that RPM may be more effective in firms where there are opportunities for promotion at each organizational level.

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1. Introduction

Prior research documents positive performance effects associated with the use of relative performance measurement (RPM) in incentive contracting. These incentive benefits arise because RPM filters out the effects of common uncertainty from performance evaluation (Lazear and Rosen, 1981). This reduces the incentive risk that employees must bear and, in turn, the risk premium that must be paid (Lazear and Rosen, 1981). Economic theory thus predicts that relative performance measurement in incentive contracting improves contracting efficiency and increases employee effort (Holmstrom, 1982), and the incentive benefits of this "incentive contracting role" of RPM have been empirically documented in the accounting literature (*e.g.*, Matsumura and Shin, 2006).

RPM has value, not only as the basis for incentive contracting, but also as a sorting mechanism for promotion decisions (Berkowitz and Kotowitz, 1993). Promotions can provide an even stronger motivation for effort than short-term incentive pay (*e.g.*, annual bonus) because promotions result in larger and more persistent pay increases relative to short-term incentives (Lazear and Rosen, 1981; Baker et al., 1988; Campbell, 2008). In this study, we focus

on the "promotion role" of RPM and predict that the performance benefits of RPM in this role are an increasing function of the *ex ante* probability of promotion. That is, we expect that the extent of RPM use and the *ex ante* probability of promotion will positively interact to affect employee performance.

We use proprietary archival and survey data from the internal audit department of a large organization to test this prediction. In our setting, subordinate auditors are subjectively evaluated by supervisory auditors, which allowed for variation in the extent of RPM use by individual supervisors. We exploit this feature of our setting by collecting supervisors' responses to questions regarding the extent to which they assess the performance of one auditor relative to the performance of other auditors when formulating subjective ratings; that is, we measure the extent to which a given supervisor's performance rating of subordinates is based on RPM. In addition to the survey data, we collect proprietary data on individual auditor performance, salary and bonus compensation, and promotion decisions that enable us to examine the performance effects of RPM at the individual level.

We first estimate each auditor's *ex ante* probability of promotion based on their prior performance and current level within the organizational hierarchy. We find that a one point increase in the prior period performance rating (on a scale of 1–5) is associated with a threefold increase in the odds of being promoted, on average. We also show that the probability of promotion decreases as auditors advance in the organizational hierarchy. Specifically, the

odds of promotion at a given level are about one-quarter the odds at the next lower level.

We then test the association between the supervisor's extent of RPM use and individual auditor performance, and whether this association depends on the *ex ante* (*i.e.*, predicted) probability of promotion for the auditor. We predict and find that the performance effects of RPM increase with the *ex ante* probability of promotion; that is, there is a positive interaction between RPM use and the *ex ante* probability of promotion in determining current auditor performance. These findings hold whether we measure performance as each auditor's performance rating or their performance rank within their level. Results also hold for a pooled sample of disaggregated measures of current performance along different dimensions (as opposed to overall performance).

Our study makes several contributions to the literature. Despite the fundamental and important role of promotion prospects in motivating performance, there is limited empirical research on promotion-based incentives (Gibbs, 1996). An exception is a field study by Campbell (2008), which shows a positive association between individual absolute performance and market area characteristics (used as a proxy for the probability of promotion). Campbell (2008) provides evidence on the effect of promotion incentives on performance as theorized in earlier research (*i.e.*, Lazear and Rosen, 1981). We contribute to this research by estimating the *ex ante* probability of promotion at the individual level, and, more importantly, by documenting an additional interactive role for the *ex ante* probability of promotion in the relation between RPM and performance.

We also contribute to the extant relative performance evaluation literature in two ways. First, while the relative performance evaluation literature focuses on the use of RPM in incentive contracting, we document a second performance-enhancing role for RPM, the promotion role. This role of RPM has largely been ignored in prior research due to data limitations on promotion decisions. Second, we contribute to insights of prior research regarding cross-sectional differences in the performance benefits of RPM. Matsumura and Shin (2006) provide field evidence that the performance benefits of a newly implemented compensation plan with RPM are increasing in the extent of uncertainty common to employees being evaluated. Nalebuff and Stiglitz (1983) show analytically that tournament incentives, of which promotions are one example, are more effective in settings in which participants are more similar; Casas-Arce and Martínez-Jerez (2009) provide field evidence consistent with this. We contribute to this research by showing that the performance benefits of RPM vary depending on promotion prospects.

Finally, most RPM research in accounting has focused on the executive level; we extend prior research by examining the use and consequences of RPM for lower-level employees. Moreover, we provide evidence on the role of RPM in an auditing setting, which is of particular interest to accounting academics.

The remainder of the study is organized as follows: Section 2 formalizes the research hypotheses. Section 3 describes the research setting. Section 4 describes the data and the measurement of the variables. Section 5 presents the empirical specifications used to test the hypothesis, and the results of the tests. Section 6 summarizes the results including their limitations and implications.

2. Theory and hypothesis development

2.1. RPM and uncertainty reduction

Relative performance measurement (RPM) is the assessment of agent performance relative to a peer group. Economic theory analytically examines the role of RPM in a setting with unobserv-able agent effort. The observed performance outcome for agent i is a function of unobservable effort (μ_i), and two sources of uncertainty, θ and ϵ_i. The first, θ, denotes common uncertainty (with variance σ_θ^2) arising from the environment and is shared by all agents. The second, ϵ_i, denotes idiosyncratic uncertainty and varies among agents (with variance σ_ϵ^2) (Lazear and Rosen, 1981; Nalebuff and Stiglitz, 1983). RPM filters out the common source of uncertainty, θ, from the agent's performance evaluation, leaving the agent accountable only for his individual uncertainty (ϵ_i), and thereby confers a significant advantage in settings where θ is large. Examples of common uncertainty include activity, firm, or industry-specific risks such as task/job difficulty, industry conditions, and random variations that affect the entire system, such as macro-economic conditions, and firm-level factors such as noisy measurement systems. Examples of idiosyncratic uncertainty include an agent's ability and skills. RPM can improve performance in two important ways. First, when used in incentive contracting, RPM mitigates the effect of common uncertainty on incentive pay (the incentive contracting role). Second, RPM can be used as a sorting mechanism for promotion decisions (the promotion role) (Lazear and Rosen, 1981; Nalebuff and Stiglitz, 1983).

RPM improves incentive contracting by eliminating common uncertainty and increasing the association between effort and performance outcomes (Holmstrom, 1982). Because employees only have compensation risk arising from idiosyncratic uncertainty (ϵ_i), use of RPM in incentive contracting reduces the risk premium that must be paid and encourages higher employee effort in settings where there is common uncertainty (Lazear and Rosen, 1981; Nalebuff and Stiglitz, 1983). A number of accounting studies examine the use of RPM in incentive contracting as a means of improving contracting efficiency (*i.e.*, what is typically thought of as the "relative performance evaluation (RPE)" literature; see, for example, Albuquerque, 2009; Gong et al., 2011; Vrettos, 2013). Empirical research in accounting also documents experimental (*e.g.*, Frederickson, 1992; Hannan et al., 2008) and archival (*e.g.*, Matsumura and Shin, 2006; Casas-Arce and Martínez-Jerez, 2009) evidence of a positive effect of RPM on effort and performance.[1]

2.2. RPM and promotion-based incentives

A second and equally important benefit of RPM is that it can be used in promotion decisions within the organizational labor market (Milgrom and Roberts, 1992). Performance-based promotion provides a powerful motivating force for individuals to exert effort (Milgrom and Roberts, 1992). From a theoretical standpoint, performance-based promotion systems create a tournament-like system within the firm, in which promotion is the prize awarded to the tournament winner. Promotions provide increased monetary rewards arising from advancement within the organization, as well as recognition, prestige, and increased power.

There are theoretical reasons to expect that the *ex ante* probability of a promotion will induce effort, thereby leading to improved performance. A promotion provides a substantial, discontinuous, and persistent increase in compensation. While the increase in compensation may or may not reflect the marginal productivity of the employee who has been promoted, it still serves as a motivator for employees lower in the hierarchy seeking a future promotion (Lazear and Shaw, 2007). As Lazear and Rosen (1981, p. 847) note:

> On the day that a given individual is promoted from vice-president to president, his salary may triple. It is difficult to argue that his skills have tripled in that 1-day period . . . It is not

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[1] Research has also studied the benchmarking effects of RPM (*e.g.*, Northcott and Llewellyn, 2003).