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Using Fixed Wages for Management Control: An Intra-Firm Test of the Effect of Relative Compensation on Performance

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ABSTRACT: Efficiency wage theory predicts employers can elicit better employee performance *ex post* by paying higher fixed compensation *ex ante*, relative to the market wage. Relative compensation may thereby constitute an alternative control mechanism when performance-based compensation is difficult to implement. Using proprietary data from 436 hotels in a U.S. lodging chain, we find that relative compensation is positively associated with performance, and additional profits associated with higher compensation exceed the wage increase. Relative compensation has a larger impact on profit when tasks are more complex and a smaller impact on profit, revenue, and quality when chain monitoring is stronger. Finally, the magnitude of the relation between relative compensation and financial performance (nonfinancial) is larger (the same) for employees earning more than the median wage compared with those earning less. Overall, our results are consistent with assertions that higher relative compensation attracts more capable candidates and mitigates shirking, but provide little support for reciprocity.

Data Availability: The confidentiality agreement with the firm that provided data for this study precludes revealing its identity and disseminating data.

Keywords: efficiency wage; selection; shirking; reciprocity; monitoring; task complexity; rank-and-file employee compensation.

I. INTRODUCTION

Efficiency wage theory predicts that higher relative wages *ex ante* elicit performance-enhancing behavior *ex post* by attracting higher-quality applicants (selection model), disciplining employees (shirking model), or inducing reciprocal behavior (gift-exchange model) (Yellen 1984). Relative wage refers to the fixed wage offered compared to the market wage for the same job. From a management control perspective, this form of compensation provides an alternative to the traditional pay-for-performance approach (Chen and Sandino 2012; Hansen 1997), which is effective only when restrictive conditions are met (Prendergast 1999). Although efficiency wage theory has been investigated in both the accounting and economics literatures, there have been few attempts to test the link between relative wages and actual unit-level performance or to quantify the impact of relative compensation on profitability. Further, no studies investigate potential moderators of the relation between relative compensation and unit-level performance, and few archival studies measure if behavioral responses to

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relative compensation changes are contingent upon whether the worker earns less than the median wage, or more. Together, these gaps in prior literature hinder researchers from understanding how fixed wages can be used for management control. We use a proprietary data set to address these gaps and offer exploratory evidence on the relative importance of the mechanisms underlying efficiency wages.

We begin by leveraging a unique field setting to provide robust tests of the efficiency wage prediction that higher relative compensation leads to better performance. We examine the performance of hotel managers working in 436 geographically dispersed hotels in a single U.S. lodging firm. The hotels are operationally identical, and managers performing the same job are subject to the same compensation policy. They are paid a fixed salary and housed in a rent-free apartment on hotel property; therefore, compensation is the sum of the salary and the value of housing. Relative compensation is estimated by comparing a manager's compensation to that of lodging managers working in comparable hotels nearby who receive their entire compensation in salary. The company's salary policy, combined with differences in housing costs and wages across hotel locations, creates exogenous variation in relative compensation for the same job. These characteristics help address the identification problem that has been a limitation of prior relative wage studies whereby higher wages may be either the cause, or the result, of better financial performance (Cappelli and Chauvin 1991; Levine 1992; Wadhwani and Wall 1991). Consistent with efficiency wage theory, performance (measured as hotel revenue, profit, and quality) is significantly and positively associated with relative compensation.

We also investigate the efficiency wage proposition that employers increase wages until the marginal benefit of higher wages offsets the increase in the wage bill. Prior unit-level archival studies do not link relative wages to profitability (Cappelli and Chauvin 1991; Chen and Sandino 2012). In our setting, managers' decisions and actions directly affect hotel profitability, enabling us to assess the impact of higher relative compensation on profits. For the average hotel with $509,458 in pre-tax profits, we estimate that a 1 percent increase in compensation ($493) results in an additional $1,213 in pre-tax profits. This suggests the firm, which is very close to optimal pay levels, could further increase profits by raising wages.

Next, we examine whether task complexity and monitoring intensity moderate the relation between relative compensation and performance, and thereby provide insight into the relative importance of the selection, shirking, and reciprocity mechanisms. Studies find that as tasks become more complex, outcomes are more sensitive to ability and less sensitive to effort (Bonner, Hastie, Sprinkle, and Young 2000). Thus, the expected effect of task complexity on the relative compensation-performance relation depends upon whether relative compensation attracts higher-ability individuals (selection model) or incentivizes greater effort (shirking and gift-exchange models). Theories on monitoring predict that greater monitoring intensity should reduce the magnitude of the compensation-performance relation if higher compensation disciplines employees (shirking model) (Gordon 1994; Shapiro and Stiglitz 1984). Our results indicate that task complexity magnifies the effects of relative compensation on revenue, while monitoring intensity attenuates the relations between relative compensation and revenue, profit, and quality.

Finally, we test whether the magnitude of the relative compensation-performance relation is the same for individuals earning less than the market wage and those earning more. Experimental research on reciprocity reports a larger relative compensation-performance relation for individuals who make less than the median wage, which suggests the propensity to "punish" bad behavior is stronger than the propensity to reward "good" behavior (Charness and Rabin 2002; Hannan 2005; Offerman 2002). This research, however, does not consider the effects of selection and shirking on the symmetry of the relative compensation-performance relation. We find that the magnitude of the relation between relative compensation and financial performance (quality) is larger (the same) for managers earning more than the market wage compared with those earning less.

This study makes multiple contributions to the accounting and labor economics literatures. First, we provide robust tests of the efficiency wage hypothesis and find the benefits are at least as large as the costs. While we cannot completely rule out endogeneity, we perform various robustness tests to help alleviate this concern. Second, we contribute to the extensive literature on compensation contracts by exploring an alternative to performance-based pay that is widely used with rank-and-file employees. Although pay-for-performance is a powerful paradigm, the efficacy of high-powered incentives is limited by the extent to which job tasks and performance measures conform to assumptions and parameters established in theoretical models (Prendergast 1999). Offering a higher wage *ex ante* to obtain higher productivity *ex post* may then provide a viable, cost-effective complement to formal control mechanisms relying on monitoring. Third, this study complements a stream of compensation literature that explores the roles of task complexity and monitoring in compensation contract design, and thereby provides guidance to principals in structuring fixed-wage contracts (e.g., Baiman and Demski 1980; Bonner et al. 2000; Kanodia 1985; Lambert 2001; Liang, Rajan, and Ray 2008). Our results indicate that managers should consider task complexity and monitoring capability in choosing fixed compensation levels, because wage premiums provide greater benefit when tasks are more complex and when it is more difficult for the firm to monitor agents. Fourth, the results are relevant to experimental research that suggests negative reciprocity has a stronger impact on employee performance than positive reciprocity (e.g., Charness and Rabin 2002; Hannan 2005; Hatfield and Sprecher 1984; Offerman 2002). Our findings suggest that in long-term employment relationships, economic incentives overcome workers' tendency to rationalize away

overpayments, while underpaid employees who engage in misconduct are terminated before their actions harm unit-level performance. Understanding how individuals react to wage deficits and premiums determines whether managers can use relative compensation to improve performance or only to avoid performance declines.

Taken together, our findings provide insight into the three mechanisms underlying efficiency wage theory. In our setting, the selection of higher-ability workers drives the positive relation between profit and relative compensation, while higher relative compensation deters shirking. We find some evidence that below-market wages lead to misconduct, which is consistent with negative reciprocity and the selection of low-ability workers.

In Section II, we review the literature and develop hypotheses. Section III discusses the data and the research design. Section IV presents the empirical analyses and results. Section V concludes the paper.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

From an economic perspective, performance-based pay helps mitigate both adverse selection and moral hazard. Contingent compensation attracts candidates confident in their ability to excel (Akerlof 1981; Fehrenbacher, Kaplan, and Pedell 2017; Hales, Wang, and Williamson 2015) and aligns the interests of principals and agents (Holmstrom 1979; Jensen and Meckling 1976). Performance-based compensation, however, requires satisfactory contractual performance metrics (Alok and Gopalan 2018; Bai, Coronado, and Krishnan 2010; Moers 2006; Nagar 2002). Further, it may lead to dysfunctional behaviors (Holmstrom and Milgrom 1994; Prendergast 1999), crowd out intrinsic motivation, weaken social enforcement mechanisms (Fuster and Meier 2010), and communicate inadequate behavioral norms (Cardinaels and Yin 2015). Given the potential problems induced by performance-based incentives, fixed wages may be preferable in some settings.[1] In the remainder of the paper, the term relative compensation refers to the fixed amount of compensation relative to the median market level of compensation for a given job.

Traditional approaches to compensation contracts in the accounting literature assume fixed wages mitigate adverse selection but not moral hazard (Lambert 2001). The efficiency wage hypothesis suggests a more complex relation between fixed wages and performance because it posits that paying workers *ex ante* higher wages enhances employee selection and/or motivation, and thereby raises productivity *ex post*. Employers should thus increase wages until the marginal cost of higher wages offsets the marginal benefit, i.e., the wage is "efficient" (Yellen 1984). Three models explain the relationship between relative compensation and performance: the selection model (Weiss 1980), the shirking model (Shapiro and Stiglitz 1984; Stiglitz 1974), and the reciprocity model (Akerlof 1982, 1984; Akerlof and Yellen 1990). The first focuses on reducing adverse selection, and the last two explain how higher wages can mitigate moral hazard as well.

Relative Compensation and Performance

The selection model assumes the employer is unable to perfectly determine an employee's ability prior to employment, and only after monitoring the employee for a period of time is the employer able to discern actual ability. The model predicts that firms paying a relatively higher wage attract more capable workers with higher reservation wages (Weiss 1980). In addition, paying relatively higher compensation sends a signal about the firm's expectations and may deter applicants willing to work for less. Thus, by offering a higher wage, employers are more likely to hire more skilled employees out of a better pool of applicants (Weiss 1980). Higher relative compensation also increases the probability that the firm retains more capable workers once they have been hired (Salop 1979; Weiss 1980; Yellen 1984).

Shapiro and Stiglitz's (1984) shirking model of efficiency wages posits that above-market wages induce workers to put forth greater effort by making the job more valuable, and its loss, more costly. Workers exercise discretion in the amount of effort exerted because contracts are incomplete, it is costly for employers to monitor employees, and performance measures do not perfectly capture employees' effort (Yellen 1984). In this situation, paying a wage that exceeds the market-clearing wage increases the penalty incurred if shirking is detected and sanctioned. Above-market wages provide workers with the incentive to maintain high effort levels to avoid losing the wage premium.

Sociological theories on reciprocity and gift exchange posit that relative wage levels determine employees' perceptions of whether they are being treated fairly, which, in turn, influence employees' effort levels (Akerlof 1982, 1984; Akerlof and Yellen 1990; Fehr and Gächter 2000). Workers develop a conception of what constitutes a fair wage by comparing their compensation to that received by workers in the same or similar jobs. If workers perceive they are being paid more (less) than a fair wage, they will engage in positive (negative) reciprocation by putting forth more (less) effort.

Archival research investigates the combined effects of selection, shirking, and reciprocity. Several empirical studies find positive associations between relative compensation and perceptual measures related to individual performance, including

[1] The term wage encompasses all forms of compensation unrelated to performance, both cash and noncash.

higher levels of self-reported effort and commitment (Levine 1993), worker satisfaction (Akerlof, Rose, and Yellen 1988; Levine 1993; Pfeffer and Langton 1993), and performance ratings (Holzer 1990).

Few studies examine whether above-market compensation improves firm-level performance or test whether the benefits of higher compensation exceed the costs. In a cross-firm study, Leonard (1987) regresses sales on wages and finds no relation. In a sample of 219 U.K. manufacturing firms, Wadhwani and Wall (1991) regress sales on relative wages and a set of production-related variables and find a positive correlation. Levine (1992) regresses changes in sales on changes in wages and finds a positive association in a sample of 369 business units. These studies suffer from several limitations. Neither Wadhwani and Wall (1991) nor Levine (1992) conclusively determines whether relative wages are the cause, or consequence, of sales growth. Firms may use performance-based incentives or share the proceeds of greater productivity with workers by increasing wages. Huang, Hallam, Orazem, and Paterno (1998) also raise the concern that observed positive correlations between changes in sales and wages arise because wage premiums and industry wages tend to be positively correlated. Another limitation is that these studies average wages across jobs. Thus, they do not address differences in job requirements, job characteristics, or wage-productivity relationships within or across firms. Finally, these studies focus on the impact of relative wages on revenue. They are silent on other possible benefits of relative wages, such as cost savings and quality improvements. Whether the benefits of higher wages offset their costs remains an unanswered empirical question.

Two studies investigate relative wages earned by workers in different units of the same firm or highly similar firms. In a sample of 78 automotive plants owned by the same firm, Cappelli and Chauvin (1991) find that the relative wage for low-skill and unskilled factory workers is negatively correlated with the number of disciplinary actions resulting in dismissal. They estimate that the plant-wide increase in wages necessary to reduce disciplinary actions is $121,000 per action, which far exceeds the benefit of a higher wage. Chen and Sandino (2012) examine cashier theft in a sample of 76 convenience stores owned by the same chain and 251 stores owned by 31 different chains. They find that the relative wage is significantly and negatively associated with shrinkage and cash shortages. Their results suggest that firms can reduce theft by raising wages; however, the estimated savings from reductions in theft covers only 39 percent of the cost of the wage increase. These studies are unable to determine whether the benefits of higher wages exceed the cost because they do not measure all the potential benefits associated with higher wages, such as increased productivity and improved quality. We build upon these studies by investigating the effect of relative wages on revenues, profits, and quality.

While archival research addresses the combined effects of selection, shirking, and reciprocity, experimental studies exclusively examine worker effort arising from reciprocity. Laboratory experiments generally report that workers offered a salient "gift," in the form of an unanticipated wage increase, reciprocate by choosing higher effort levels (Charness 2004; Fehr and Gächter 2000; Hannan, Kagel, and Moser 2002). However, several recent field experiments report little or no evidence of reciprocity when hiring undergraduate students for field experiments (Al-Ubaydli, Andersen, Gneezy, and List 2015; Esteves-Sorenson 2018; Hennig-Schmidt, Sadrieh, and Rockenbach 2010; Kube, Maréchal, and Puppe 2012). Gneezy and List (2006) find that increases in productivity in response to wage rate increases occur only during the first few hours of a day-long field experiment. Gilchrist, Luca, and Malhotra (2016) report that the saliency of the gift, and not the gift *per se,* triggers reciprocity in their field experiment.

In summary, archival evidence on efficiency wage theory is inconclusive and experimental findings are mixed. Yet, given the compelling theory on efficiency wages, we predict that relative compensation will be positively correlated with performance, as stated in the first hypothesis, H1.

H1: Relative compensation is positively associated with unit-level performance.

Moderating Effects of Task Complexity and Monitoring

The selection, shirking, and reciprocity models make different claims about the manner in which relative compensation affects performance. These models are not mutually exclusive and can coexist in practice. They are, however, unlikely to be equally strong in all situations because different risks (adverse selection versus moral hazard) and causal mechanisms are involved. Among potential moderators, task complexity and monitoring are of particular interest to accounting researchers. Multiple behavioral accounting studies have investigated the impact of task complexity on the effectiveness of financial incentives (see Bonner et al. [2000] for a review). Monitoring, on the other hand, is central to the design of pay-for-performance contracts (see Lambert [2001] for a review). No studies, however, have investigated whether task complexity and monitoring moderate the relation between relative compensation and performance. Since these moderations are likely to differ depending on whether the relative compensation-performance relation is driven by ability or effort, they can provide insight into the relative importance of the selection, shirking, and reciprocity mechanisms.

Task Complexity

Task complexity broadly refers to the amount of cognitive demand a task places on the individuals performing the task, either because of the amount of information to be processed or the level of structure provided (Bonner et al. 2000; Bonner and Sprinkle 2002; Campbell 1988; Wood 1986). The effects of task complexity depend on whether the relative compensation-performance relation is driven by ability (selection model) or effort (shirking and reciprocity models). Prior research suggests that, as complexity increases, performance is more sensitive to an individual's ability (Awasthi and Pratt 1990; Bonner 1994; Boudreau 1992; Libby and Lipe 1992; Locke and Latham 1990; Trevor, Gerhart, and Boudreau 1997) and less sensitive to individual effort (Bonner et al. 2000; Bonner and Sprinkle 2002).

Ability encompasses the organization of knowledge around meaningful concepts, which can facilitate the search for relevant information, problem representation, and generation of initial hypotheses (Bonner and Sprinkle 2002). Employees with greater ability are able to access and process a larger amount of information, which enables them to perform better on less-structured tasks. When task complexity is low, all workers have the necessary cognitive capacity to perform the task; therefore, there is little difference in task performance between low- and high-ability workers. In complex tasks, however, only high-ability workers possess the skills and knowledge required to adequately complete the task. Consistent with this premise, Chang, Ho, and Liao (1997) find that participants with more general experience and training outperform those with less general experience and training in complex tasks, but not in simple tasks. Awasthi and Pratt (1990) report that additional effort induced by financial incentives increases performance only for high-ability experiment participants. Jobs offering higher wage premiums attract higher-ability individuals, who, in turn, are more likely to possess the requisite skill and knowledge to complete complex tasks. If ability drives the positive relative compensation-performance relation, the magnitude of this relation should be larger when tasks are complex.

The shirking and reciprocity models assume relative compensation impacts performance through workers' effort alone. Research indicates that performance is less sensitive to individual effort in more complex jobs. Even if wage premiums induce workers to exert more effort, this is unlikely to translate into improved performance unless individuals possess the requisite skills and knowledge. Consistent with this premise, Bonner et al.'s (2000) analysis of 131 experiments shows that task complexity attenuates relations between effort and performance.

Since the impact of complexity on the relative compensation-performance relation depends upon whether this relation is driven by ability or effort, we do not state a direction for H2.

H2: The magnitude of the positive relation between relative compensation and performance is associated with task complexity.

Monitoring

The effect of monitoring on the relative compensation-performance relation is ambiguous if shirking drives this relation. The likelihood an agent will shirk is the product of the probability shirking will be detected and the magnitude of the penalty incurred if detected (i.e., value of the agent's job) (Kanodia 1985). *Ceteris paribus,* if the principal intensifies monitoring, she increases the probability of detection and, hence, the agent's expected loss from shirking. Therefore, at all wage levels, as the principal increases monitoring intensity, the agent will work harder to avoid detection. This reasoning suggests the magnitude of the relative compensation-performance relation will be larger when the principal undertakes more monitoring. Another view is that the wage premium and monitoring are alternative control mechanisms. A wage premium is then interpreted as buying self-supervision to replace external supervision (Leonard 1987). Increasing monitoring intensity should reduce the incremental benefits obtained from higher wages, and higher wages should reduce the need for monitoring (Gordon 1994; Holmstrom 1979; Shapiro and Stiglitz 1984). This reasoning suggests the performance effect of paying a higher wage is smaller when it is easier to monitor the agent.

Selection and gift-exchange models also predict that wage premiums can be substituted for monitoring, although for a different reason than that given by shirking models. In contrast with shirking models, monitoring is not necessary to motivate workers in the selection and gift-exchange models. Instead, firms monitor employees to coordinate their activities and ensure quality *ex post* (Rebitzer 1995). To the extent that high-ability employees are better able to perform a job than low-ability workers, less monitoring is necessary for oversight and coordination. Similarly, to the extent the "gift" of a wage premium is successful in inducing employees to reciprocate by working harder, less monitoring is necessary for control.

Prior empirical research provides some evidence that higher wages can act as a substitute for monitoring (Groshen and Krueger 1990; Leonard 1987; Osterman 1994; Rebitzer 1995). Hansen (1997) demonstrates analytically that firms should use a wage premium or monitoring, but not both. There are, however, no studies measuring the impact of monitoring on the relative compensation-performance relation. Given prior evidence that wage premiums and monitoring are substitutes, our third

hypothesis predicts that the magnitude of the relative compensation-performance relation will be smaller when principals can more effectively monitor agents.

H3: The magnitude of the positive association between relative compensation and performance is smaller when the principal can more effectively monitor the agent.

Symmetry in the Relative Compensation-Performance Relation

Finally, we investigate whether the magnitudes of relative compensation-performance relations are the same whether an agent's compensation is above or below the median. Economic theories on selection and shirking predict no difference in magnitudes. The correlation between relative compensation and the ability of the job applicant pool should be constant across all wage levels. If monitoring, and therefore the probability of detection, is held constant, the level of effort the agent exerts is determined by the value of the agent's job, which is directly proportional to relative compensation. Assuming constant returns to effort, the relationship between relative compensation and performance should be the same for all wage levels.

Theories on reciprocity predict that relative compensation-performance relations will be smaller for workers who make more than the median wage (overpaid) compared with those who make less (underpaid); that is, increasing wages for overpaid workers has less impact than decreasing wages for underpaid workers. One explanation is that the propensity to punish harmful behavior (negative reciprocity) is stronger than the propensity to reward friendly behavior (positive reciprocity). Experimental studies find that a negative response to a harmful action is significantly more common, or larger, than a positive response to a helpful action (Charness and Rabin 2002; Offerman 2002; Hannan 2005). A second explanation arises from the manner in which workers reduce perceived inequity when the wage offered is not equivalent to the labor input supplied (Akerlof and Yellen 1990; Gneezy and List 2006; Hatfield and Sprecher 1984). People who initially believe they are overpaid, tend to raise their evaluation of the value of their own inputs to restore fairness rather than supply more effort. Underpaid workers are more likely to restore fairness by reducing the amount of labor supplied or quitting.

There is little archival evidence on the symmetry of the relative compensation-performance relation. In a study of 52 U.S. firms, Levine (1993) reports that increases in pay satisfaction and commitment from above-market wages significantly exceed decreases arising from below-market wages. He finds no difference in intentions to quit or job satisfaction between overpaid and underpaid workers. Chen and Sandino (2012) find that the significant negative relation between relative compensation and theft in their sample is predominantly driven by overpaid workers.

Given the conflicting predictions of economic and behavioral theories, and the limited archival evidence on the symmetry of the relative compensation-performance relation, we state our last hypothesis in the null form:

H4: The magnitude of the relation between relative compensation and performance is the same for agents who make less than the median market wage compared with those who make more.

III. RESEARCH DESIGN

Research Setting

To test our hypotheses, we obtain data on over 400 hotels in an economy lodging chain of a large U.S. hospitality firm. Company data include income statements, customer satisfaction scores, and property characteristics for the year 2010. We also gather local unemployment and wage data from the Bureau of Labor Statistics (BLS) and housing market data from Zillow and the 2010 Census.[2] After matching hotel data with demographic variables, the sample consists of 476 observations. We eliminate properties staffed by general managers (GMs) with fewer than six months' tenure because it typically takes a new GM six months to learn the job. We remove observations in markets dominated by premium hotels because the market wage for lodging managers in these areas is not likely to be an appropriate reference wage for managers of economy lodging properties.[3] Finally, we remove eight observations that have undue influence on the results, as determined by Cook's distances and studentized residuals. The final sample contains 436 observations.

All hotels are owned by the chain and managed by general managers (GMs) who are employees of the firm. In a typical hotel property, the GM oversees a head housekeeper, a maintenance worker, six housekeepers, and four front desk attendants.

[2] Bureau of Labor Statistics data are at https://www.bls.gov, Zillow data are at https://www.zillow.com/research/data, and Census data are at https://www.census.gov.

[3] We classify markets in which the average minimum daily hotel room rate exceeded $140 as being dominated by premium hotels. We used multiple room rate cutoffs ($120 and $160) and obtained similar results. Room rate data were obtained from the TripAdvisor website.

Before hiring a new GM, the company screens applicants' employment histories, conducts interviews, verifies references, reviews credit scores, and performs criminal background checks.

GMs, who live in an apartment on site, directly affect hotel profitability. GMs recommend pricing strategy, conduct sales calls, and advertise the property locally. They hire, train, and schedule employees. GMs can control costs by, for example, scheduling housekeeping shifts to minimize idle time, monitoring expenditures on room amenities, and prudently contracting with local providers for maintenance.

GMs substantially affect the customer experience. Most customer complaints relate to housekeeping; good GMs ensure that housekeepers maintain the company's cleanliness standards. In one of the authors' visits to a hotel, the director of quality identified several items in a guest room that did not meet standards (e.g., failure to vacuum under beds), pointing out that effective supervision makes the difference between clean and dirty rooms. GMs also influence customer perceptions by timely and appropriate responses to customer complaints and requests, and by promptly addressing repair issues to prevent future complaints.

A unique firm policy is the requirement that GMs live on the hotel property.[4] Most lodging chains do not require managers to live on site. Our research site has long had this policy because management believes it leads to better supervision of the property. A resident GM is aware of crime, noise, and other factors that detract from the guest experience, even during her "off" time. Resident GMs are more likely to immediately address concerns by, for example, calling police or evicting customers. Further, in the event of an emergency, the manager is on site, ready to work with headquarters' risk management and public safety employees. Finally, a resident GM is more invested in exterior upkeep, maintenance, and cleanliness.

Our research site provides an empirically powerful setting for tests of the efficiency wage hypothesis for several reasons. First, GMs are highly autonomous, and their decisions and actions directly affect hotel profitability and quality. The efficiency wage hypothesis is relevant only when employees exercise significant discretion in the choice of effort levels and their effort levels materially affect profitability (Akerlof 1982; Shapiro and Stiglitz 1984; Weiss 1980; Yellen 1984). Second, properties are similar in size, and the production and delivery of services is identical for each hotel. This is a major advantage relative to cross-industry studies where differences in technology, production functions, and work environments alter the benefits firms derived from higher wages (Huang et al. 1998). Third, corporate managers cannot directly observe GM actions. Regional managers, who oversee GMs, typically visit properties only once per month. Regional managers use customer feedback, revenue, profit, and internal audit to evaluate GM performance, but these are imperfect measures of effort. Finally, the company does not use high-powered, performance-based incentives with the GMs.[5,6] A major impediment to testing efficiency wage predictions is finding a setting in which compensation is not substantially contingent on performance and worker actions materially affect profitably.

Models

To test H1–H3, we estimate the model below:

$$\begin{aligned} Performance_i = {} & \beta_0 + \beta_1 Relative\,Compensation + \beta_2 Competition \times Relative\,Compensation \\ & + \beta_3 Monitoring \times Relative\,Compensation + \beta_4 Competition + \beta_5 Monitoring + \beta_6 Bonus \\ & + \beta_7 Rental\ Vacancies + \beta_8 Average\,House\,Value + \beta_9 Housing\,Permits + \beta_{10} Unemployment \\ & + \beta_{11} Property\,Age + \beta_{12} Renovated + \beta_{13} Property\,Size + \varepsilon_i \end{aligned} \quad (1)$$

where $Performance_i$ is *Revenue, Profit,* or *Quality*. Model variables are described below and in Appendix A. Models are estimated using seemingly unrelated regression (SUR) because it enables us to perform a joint test of the null hypothesis that the coefficient on *Relative Compensation* is 0 in all three equations.

[4] Based on discussions with hotel management and GMs, GMs viewed the rent-free apartment as a form of compensation. Some likened it to serving in the military or working on a remote construction project that provides housing. The requirement to live on the property, however, limits the pool of applicants for the job. In our tests, we assume that GMs view rent as a perfect substitute for cash. Economic research finds that individuals prefer cash to all other cash substitutes (e.g., food stamps, reduced rent, bus passes). To the extent that GMs value the rent-free apartment at something less than its full cash equivalent, the measure of relative compensation will be understated.

[5] Discussion with firm executives revealed several reasons the company did not directly tie pay to customer feedback, revenues, and profit. First, large incentives impose a risk that GMs will be unable to pay for basic needs. Mean total GM compensation ($48,642) is below U.S. median income ($50,502). Second, most GMs come from outside the hotel industry and stay with the company only three years, which makes it difficult for them to reasonably evaluate risks associated with performance-based pay. Third, firm executives believed it would be too difficult to control for the many factors, beside GM effort, that affect revenues and profits. Moreover, GMs are likely to be more risk averse than the typical executive studied in the performance-based compensation literature due to lower absolute wealth.

[6] Career advancement provides little incentive for GMs because GMs do not usually obtain promotions by moving to larger hotels, or to hotels in more desirable locations. Average GM tenure with the company is 2.9 years.

Variables

Dependent Variables

Hotel performance is measured with revenue, profit, and quality. Revenue per available room (*Revenue*) is total revenue divided by available rooms. Profit per available room (*Profit*) is total revenues less controllable expenses (which exclude GM salary), divided by available rooms. Controllable expenses include labor, supplies, and other expenses corporate management has determined are the responsibility of the GM. Quality (*Quality*) is measured with an online customer satisfaction survey question that asks guests to rate their overall experience on a ten-point, Likert-type scale anchored by "Extremely Satisfied" and "Extremely Dissatisfied." It is highly correlated ($r = -0.71$) with customer complaints, a measure of customer dissatisfaction, which suggests *Quality* is a robust measure of customers' perceptions.

Our models test for contemporaneous associations between relative compensation and performance. While prior literature documents a lag between customer satisfaction and financial performance, the lag is small in the hotel industry due to the immediate and wide dissemination of travelers' reviews online (Gretzel and Yoo 2008).

Relative Compensation

GM compensation is composed of a cash salary (*GM Salary*), the value of company-provided housing (*Housing*), and a modest cash bonus. *Relative Compensation* is the sum of *GM Salary* and *Housing,* divided by the BLS median wage (*Median Wage*) for lodging managers in the property's core-based statistical area (CBSA).[7] A value greater (less) than 1.0 for *Relative Compensation* indicates that a GM's fixed compensation (*Total Fixed Compensation*), which is the sum of *GM Salary* and *Housing*, is above (below) the median compensation for lodging managers in her area. Each compensation component is discussed below.

Regional managers set cash salaries (*GM Salary*). When hiring GMs, regional managers start with the previous GM's salary and factor in salaries at the firm's other hotels. According to firm management, regional managers do not explicitly value the housing component when setting cash salaries; and, they do not update salaries based on changing rental values. The housing component makes it difficult for regional managers to accurately benchmark compensation with similar lodging firms. The initial cash salary offered is not adjusted based on the qualifications of the job candidates, and it is not increased in subsequent years based on GM performance or tenure.[8] If a regional manager cannot find suitable candidates for the position at the initial salary offered, she will increase the salary offered as the search continues. To rule out the concern that better-performing GMs are rewarded with salary increases, we examine data on the 275 properties in our sample that had the same GM for all of 2010 and 2009. We regress changes in cash salary on changes in *Profit* and find that salary changes are not significantly associated with profit changes.

The firm provides GMs with a fully furnished apartment and pays for all utilities. Apartments average 900 square feet and have two bedrooms, a kitchen, living room, and bathroom. The value of company-provided housing is estimated by summing the median rental value of two-bedroom apartments in a ZIP Code (*Median Rent*) with state-wide estimates of utilities costs (*Utility Costs*), which include electricity, water, and natural gas. Taxes are not paid on the value of housing received; therefore, the before-tax value of housing is estimated as follows:

$$Housing = \frac{Median\,Rent + Utility\,Costs}{1 - (Estimated\,Federal\,Tax\,Rate + Estimated\,State\,Tax\,Rate)} \quad (2)$$

The *Estimated Federal Tax Rate* is the 2020 U.S. federal income tax rate for individuals. The *Estimated State Tax Rate* is the income tax rate charged by a particular state.

Table 1 provides means and correlations on *GM Salary, Housing, Median Wage,* and *Relative Compensation*. *Median Wage* has a much lower correlation with *GM Salary* (0.254) than it does with *Housing* (0.358). The low correlation between *Median Wage* and *GM Salary* reflects the difficulty regional managers encounter in determining a cash salary that keeps total compensation aligned with the market wage. It is this difficulty that creates differences between the market wage and total GM compensation that are captured by *Relative Compensation*.

Inclusion of *Housing* in GM compensation raises the concern that local housing costs and economic conditions drive the relation between relative compensation and financial performance because both housing costs and room rates are higher in more expensive areas.[9] While total GM compensation is higher in more expensive regions, *Relative Compensation* is not

[7] BLS median wage does not include noncash compensation. Since most lodging chains do not require managers to live on site, they pay their GMs a higher salary than GMs at our site. GM compensation for owner-managed hotels is not included in the BLS data. Finally, most franchised hotels are owner managed.

[8] The correlation between GM pay and tenure is 0.07 and not significant.

[9] This concern is minimized by our sample criteria, which exclude from our analysis properties located in areas dominated by premium hotels.

TABLE 1

Descriptive Statistics and Correlations for Components of the Relative Compensation Measure

	Mean	SD	1	2	3	4	5
1. *GM Salary*	33.171	5.933		0.330	0.274	0.425	0.857
2. *Housing*	16.163	4.992	0.229		0.442	0.150	0.727
3. *Median Wage*	48.365	10.089	0.254	0.358		–0.623	0.424
4. *Relative Compensation*	1.049	0.212	0.415	0.207	–0.659		0.394
5. *Total Fixed Compensation*	49.334	8.583	0.824	0.740	0.384	0.407	

Pearson (Spearman) correlations shown below (above) the diagonal. All correlations are significant at $p < 0.05$. Financial figures are in thousands (000s).

because the BLS median wage (the denominator for *Relative Compensation*) is also higher in more expensive areas. *Relative Compensation* is higher in areas with lower *Median Wage* ($r =$ is -0.67; $p < 0.01$), and areas with lower wages also tend to have lower rental values.

Finally, GMs can earn a modest cash bonus. Bonuses are distributed primarily based on guest satisfaction and internal audit scores. The bonus is not included in calculating *Relative Compensation* because it is meant to incentivize performance, and we are interested in capturing the effects of fixed wages. Further, bonuses exhibit little variation among GMs, which suggests they do little to elicit or reward performance. All GMs who had been with the company for an entire year received a bonus in 2010, with approximately 75 percent earning bonuses between 5 and 6 percent of cash salary. The bonus is significantly correlated with only one of the three performance measures, *Quality* (Spearman's rho $= 0.13$; $p < 0.05$).

Potential Moderators: Complexity and Monitoring

H2 predicts task complexity affects the relation between relative compensation and performance. Task complexity is proxied with competition. *Competition* is calculated as the natural log of 10,000 divided by the Herfindahl-Hirschman index (HHI). HHI is the sum of the squared market shares of all economy lodging hotels within each property's local area. Competition increases complexity because the GM needs to act strategically to attract and retain customers in more competitive markets. The GM must devise ways to differentiate the property from competitors and be creative in reaching her target market. For example, the GM might use customer demographic data to direct marketing efforts or cultivate relationships with local businesses that have out-of-town clients. Competition complicates pricing because there are more competitors to monitor and demand is more elastic. To test H2, we include the interaction term, *Competition* × *Relative Compensation,* in all models. Both variables in the interaction term are demeaned to prevent this term from being highly correlated with the main effects.

H3 predicts that more effective monitoring attenuates the relation between relative compensation and performance. Our proxy for management's ability to monitor GMs is the number of the firm's properties in a 50-mile radius, denoted *Monitoring*. Corporate managers indicated that geographic proximity facilitates monitoring because hotels that are close together operate in the same, or similar, markets. Regional managers can use information on the performance of nearby properties to evaluate the GM. Further, it takes less time for regional managers to visit hotels that are clustered together. To test H3, we include the interaction term, *Monitoring* × *Relative Compensation,* in the models. Both variables in the interaction term are demeaned to prevent this term from being highly correlated with the main effects.

Independent Variables: Controls

We include controls for the GM's bonus, the housing market, unemployment, and the property's physical condition and size. The GM's bonus as a percent of salary (*Bonus*) controls for the incentives provided by *ex post* rewards. We control for housing market conditions with ZIP-Code-level rental vacancy rates (*Rental Vacancies*), average home values (*Average House Value*), and housing permits issued (*Housing Permits*). Vacancy rates measure the availability of rental housing, average home values measure housing price levels, and housing permits proxy for new housing development. *Unemployment,* the natural logarithm of the county unemployment rate (*Unemployment Rate*), captures local labor market conditions. When unemployment is high, Majerczyk (2018) finds that it is more costly for employers to use above-market wages to control employee behavior. We control for a property's physical condition with *Property Age* and *Renovated,* because newer and recently renovated properties tend to attract more customers, command higher rates, and achieve higher customer satisfaction scores. *Property Age* is the square root of the number of years that the hotel has been operated by the company, and *Renovated*

TABLE 2

Descriptive Statistics

Variable	n	Mean	SD	Minimum	Maximum	Median
Revenue	436	25.811	5.938	11.358	42.692	25.397
Profit	436	12.352	5.060	–2.155	26.712	11.936
Quality	436	7.418	0.615	4.426	9.095	7.493
Relative Compensation	436	1.049	0.212	0.568	1.710	1.049
HHI	436	1,078.361	673.956	258.78	10,000.000	955.552
Competition	436	2.345	0.469	0.000	3.654	2.348
Monitoring	436	7.094	8.277	0.000	35.000	4.000
Bonus	436	5.481	1.566	0.002	11.452	5.538
Rental Vacancies	436	9.508	4.857	2.200	45.100	8.400
Average House Value	436	218.508	132.002	47.200	769.800	179.55
Housing Permits	436	3.380	4.426	0.074	22.330	2.118
Unemployment Rate	436	9.948	2.961	3.600	25.300	9.35
Unemployment	436	2.257	0.284	1.281	3.231	2.235
Age	436	22.433	9.951	1.000	47.000	21.000
Property Age	436	4.589	1.174	1.000	6.856	4.583
Renovated	436	0.101	0.302	0.000	1.000	0.000
Rooms Available	436	113.202	18.596	76.000	160.000	114.000
Property Size	436	10.603	0.877	8.718	12.649	10.677

See Appendix A for variable definitions.

is an indicator variable equaling 1 if the property was renovated in the last three years.[10] Property size (*Property Size*), which controls for potential differences in GM responsibility, is the square root of the number of rooms.

To test H4, we estimate Equation (1) with two additional terms: an interaction term, *Above Median* × *Relative Compensation,* and a main effect, *Above Median. Above Median* equals 1 (0) for GMs whose compensation is above (below) the BLS median wage. We use robust standard errors and demean both variables in the interaction term to mitigate multicollinearity. Since measurement of the housing component of GM compensation is an estimate, we exclude GMs whose *Relative Compensation* is between 0.98 and 1.02 to allow for measurement error.[11] Excluding these observations minimizes the likelihood that GMs are incorrectly classified relative to the BLS median wage. The coefficient for *Relative Compensation* captures the impact of relative compensation on performance for GMs *below* the BLS median wage. The sum of the coefficients for *Relative Compensation* and the interaction term is the impact of relative compensation upon performance for managers *above* the BLS median wage.

IV. RESULTS

Descriptive Statistics

Table 2 provides descriptive statistics on all variables. The dependent variables exhibit significant variation. The mean value of our main variable of interest, *Relative Compensation,* is 1.049, indicating that average GM compensation is almost 5 percent above that of comparable lodging managers. Mean and median values of *Monitoring* are 7.094 and 4.00, respectively. This reflects a concentration of hotels in large, urban markets. High mean and median values for *Competition* indicate that most of the hotels are in very competitive markets.

Table 3 contains Pearson and Spearman correlations for all variables. *Relative Compensation* is significantly ($p < 0.05$) and positively correlated with all three performance measures: *Revenue* ($r = 0.15$), *Profit* ($r = 0.19$), and *Quality* ($r = 0.15$). We also observe significant correlations ($p < 0.05$) between *Relative Compensation* and *Competition* ($r = 0.15$), *Renovated* ($r = -0.10$), *Unemployment* ($r = 0.12$), and *Property Size* ($r = 0.12$). Significant correlations between the housing market measures (*Rental Vacancies, Average House Value, Housing Permits*) and both *Revenue* and *Profit* indicate these variables are strong controls for local housing markets.

[10] Most hotels undergo renovations at five- to seven-year intervals; therefore, a property renovated within the last three years is in the earlier half of its renewal cycle.

[11] Excluding observations with *Relative Compensation* values above 0.95 and below 1.05 yields highly similar results.

TABLE 3

Correlation Matrix

Panel A: *Revenue–Housing Permits*

	1	2	3	4	5	6	7	8	9	10
1. *Revenue*		**0.93**	0.06	**0.17**	0.00	**0.20**	**0.20**	**–0.36**	**0.38**	–0.05
2. *Profit*	**0.95**		**0.14**	**0.20**	–0.03	**0.19**	**0.19**	**–0.35**	**0.41**	–0.06
3. *Quality*	0.08	**0.17**		**0.12**	0.09	**0.20**	**0.20**	0.03	**0.11**	**0.11**
4. *Relative Compensation*	**0.15**	**0.19**	**0.15**		**0.19**	–0.05	–0.05	–0.05	**0.13**	**–0.22**
5. *Competition*	–0.04	–0.07	0.08	**0.15**		0.04	0.03	–0.07	–0.07	0.02
6. *Monitoring*	**0.31**	**0.28**	**0.22**	0.03	0.09		0.02	**–0.12**	**0.47**	**0.45**
7. *Bonus*	–0.04	–0.06	0.08	–0.04	0.03	0.00		0.03	0.05	0.01
8. *Rental Vacancies*	**–0.24**	**–0.23**	0.03	–0.02	–0.07	–0.09	–0.01		**–0.40**	**0.21**
9. *Average House Value*	**0.47**	**0.49**	**0.15**	**0.18**	–0.05	**0.54**	–0.03	**–0.26**		0.04
10. *Housing Permits*	**–0.10**	**–0.10**	**0.12**	**–0.26**	0.00	**0.28**	0.03	**0.34**	0.07	
11. *Unemployment*	0.01	0.00	**0.13**	**0.12**	0.06	**0.30**	**0.13**	0.08	**0.24**	**–0.12**
12. *Property Age*	0.03	0.01	–0.09	–0.06	**0.11**	0.02	–0.02	–0.06	0.02	**–0.15**
13. *Renovated*	0.04	0.04	**0.13**	**–0.10**	0.04	0.01	–0.03	0.05	–0.09	**0.24**
14. *Property Size*	**–0.13**	0.01	0.04	**0.12**	**–0.10**	0.13	0.03	**0.10**	**0.16**	**0.19**

Panel B: *Unemployment–Property Size*, continued from Panel A

	11	12	13	14
1. *Revenue*	0.04	0.00	0.05	**–0.13**
2. *Profit*	0.01	–0.01	0.04	0.03
3. *Quality*	**0.12**	–0.07	**0.16**	0.08
4. *Relative Compensation*	**0.10**	–0.03	**–0.11**	**0.11**
5. *Competition*	0.04	0.07	0.05	–0.07
6. *Monitoring*	**0.34**	**–0.10**	0.05	**0.24**
7. *Bonus*	**0.10**	–0.01	–0.03	0.06
8. *Rental Vacancies*	0.02	–0.03	0.01	0.08
9. *Average House Value*	**0.31**	0.00	**–0.12**	**0.16**
10. *Housing Permits*	–0.05	**–0.15**	**0.11**	**0.24**
11. *Unemployment*		**0.11**	**–0.22**	0.06
12. *Property Age*	**0.13**		0.02	**–0.17**
13. *Renovated*	**–0.18**	0.03		0.04
14. *Property Size*	0.06	**–0.22**	0.05	

Pearson (Spearman) correlations shown below (above) the diagonal. Significant correlations ($p < 0.05$) are shown in bold.
See Appendix A for variable definitions.

Results of Hypotheses Tests

Results of the hypothesis tests are provided in Table 4. All models are statistically significant ($p < 0.01$), with R^2 values ranging from 0.134 for *Quality* to 0.332 for *Revenue*.

Tests of the Relative Compensation-Performance Relation (H1)

Consistent with H1, *Relative Compensation* is positively and significantly associated with *Revenue* ($p < 0.05$, one-tailed), *Profit* ($p < 0.01$, one-tailed), and *Quality* ($p < 0.01$, one-tailed). The joint test for significance of *Relative Compensation* across all three models indicates that the coefficient is significant (Chi-square = 12.30; $p < 0.01$). The relative wage coefficients are large and economically significant, providing strong support for H1.[12]

[12] In untabulated results, we analyze *Revenue*'s components, price and occupancy. *Relative Compensation* is positively and significantly associated with occupancy, but not with price, suggesting that GMs with above-market compensation generate higher revenues by attracting more guests, not by raising room rates.

TABLE 4

Seemingly Unrelated Regression Models Estimating Relations between Relative Compensation and Financial Performance

	Pred. Sign	*Revenue* Coeff. (t-statistic)	*Profit* Coeff. (t-statistic)	*Quality* Coeff. (t-statistic)
Relative Compensation	+	2.853**	2.802***	0.390***
		(2.24)	(2.57)	(2.60)
Competition × Relative Compensation	?	4.557*	4.890**	0.364
		(1.66)	(2.07)	(1.12)
Monitoring × Relative Compensation	–	–0.419**	–0.400***	–0.045**
		(–2.30)	(–2.55)	(–2.10)
Competition		–0.959*	–0.862*	0.058
		(–1.84)	(–1.93)	(0.95)
Monitoring		0.150***	0.099***	0.012***
		(3.75)	(2.87)	(2.58)
Bonus		0.072	0.020	0.035*
		(0.47)	(0.15)	(1.91)
Rental Vacancies		–0.108**	–0.082*	0.003
		(–1.97)	(–1.73)	(0.47)
Average House Value		0.018***	0.017***	0.000
		(7.94)	(8.47)	(1.47)
Housing Permits		–0.120*	–0.124**	0.007
		(–1.65)	(–1.98)	(0.84)
Unemployment		–2.373**	–2.433***	0.207*
		(–2.54)	(–3.03)	(1.88)
Property Age		–0.130	–0.080	–0.062**
		(–0.62)	(–0.44)	(–2.50)
Renovated		1.831**	1.350*	0.292***
		(2.25)	(1.93)	(3.04)
Property Size		–1.366***	–0.336	–0.029
		(–4.70)	(–1.35)	(–0.85)
Constant		41.212***	17.354***	6.547***
		(10.49)	(5.15)	(14.14)
Chi-square		216.75***	206.98***	67.34***
R^2		0.332	0.322	0.134
n		436	436	436

***, **, * Indicate two-tailed significance levels of 0.01, 0.05, and 0.10, respectively, and one-tailed significance where there are predictions.
Unstandardized coefficients.
See Appendix A for variable definitions.

To quantify the overall impact of relative compensation, we calculate the elasticity of *Relative Compensation* as 0.238 at model variable means. This means that a 1 percent increase in compensation increases *Profit* by 0.238 percent.[13] In dollar values, a 1 percent increase in mean GM compensation ($493) corresponds to a $1,213 increase in pre-tax profits (excluding GM salary). In our setting, higher wages do indeed pay for themselves. A 1 percent increase in GM compensation for the average hotel (mean profit of $509,458) provides an additional $720 in pre-tax profits. These modest figures suggest that the firm is close to paying an optimal wage. Given the fluctuations in rental housing prices, which affect GM compensation, it would be virtually impossible for the firm to achieve a perfectly efficient wage.

[13] The marginal effect of a one dollar increase in compensation cannot be computed directly from the coefficient on *Relative Compensation* ($2.802 in Table 4, for the *Profit* model) because the relative wage is *not* measured in dollars. Instead, we calculate the increase in profit (0.238 percent) associated with a 1 percent increase in *Relative Compensation* to estimate economic impact. Mean daily profit per available room ($12.352), multiplied by mean rooms per hotel (113), multiplied by 365 yields an average annual profit of $509,458. Multiplying compensation elasticity (0.238 percent) by $509,458 yields $1,213.

Tests of the Moderating Effect of Task Complexity (H2)

The interaction term, *Competition* × *Relative Compensation,* is positive and marginally significant ($p < 0.10$, two-tailed) in the *Revenue* model, significant ($p < 0.05$, two-tailed) in the *Profit* model, and not significant in the *Quality* model. The joint test of significance fails to reject the null hypothesis that the coefficient is 0 across all three models (Chi-square = 5.45; $p = 0.14$). These results provide some support for H2, which predicts task complexity affects the relation between relative compensation and performance. Higher relative compensation leads to greater profitability when the agent's task is more complex, and thus suggests that ability drives the relation between relative compensation and profit.

Tests of the Moderating Effect of Monitoring (H3)

Our results provide strong support for H3, which posits that the magnitude of the relative compensation-performance relation is smaller for hotels that management can more effectively monitor.[14] The interaction term, *Monitoring* × *Relative Compensation,* is significant ($p < 0.01$ or $p < 0.05$, one-tailed) and negative in all models, and is jointly significant (Chi-square = 10.10; $p < 0.05$) across all three models. These results suggest that monitoring and relative compensation work as alternative control mechanisms.

Tests for Symmetry in the Relative Compensation-Performance Relation (H4)

H4 proposes that the magnitude of the relation between relative compensation and performance is the same for workers who make more than the BLS median wage and those who make less. Table 5 contains results. In the *Revenue, Profit,* and *Quality* models, the coefficient for the main effect (*Relative Compensation*) is not significant. The coefficient on the interaction term (*Above Median* × *Relative Compensation*) is positive and significant ($p < 0.05$, two-tailed) in the *Revenue* and *Profit* models, but not in the *Quality* model. This indicates that *Relative Compensation* affects *Revenue* and *Profit* when GMs make more than the median wage, but not when they make less. Thus, we reject the null hypothesis for financial performance, but fail to reject the null hypothesis for quality.

Overall, results indicate that wage premiums have at least as large an impact on performance as wage deficits. These findings are consistent with archival studies (Levine 1993; Chen and Sandino 2012), but differ from laboratory experiments that show negative reciprocity is stronger than positive reciprocity (Charness and Rabin 2002; Hannan 2005; Offerman 2002). Our findings likely differ because archival studies capture the effects of selection, shirking, and reciprocity, while laboratory experiments isolate the effects of reciprocity. Further, these results suggest that, in long-term employment relationships, economic incentives overcome workers' tendency to rationalize away overpayments.

We further investigate differences in the below- and above-median-wage subsamples by examining GM terminations in 2011, the year following our study period (Table 6). Of the 239 GMs in the above-median subsample in 2010, 84.1 percent were on the job for all of 2011 (*Employed*), while only 76.1 percent of GMs in the below-median subsample were employed throughout 2011. This significant difference ($p < 0.05$) in employment rates arises from involuntary terminations for misconduct (*Involuntary − Misconduct*) or poor performance (*Involuntary − Performance*). GMs in the below-median subsample are significantly ($p = 0.013$) more likely to be fired for misconduct (theft, falsifying company documents, etc.). In the below-median (above-median) subsample, 4.3 (1.3) percent of GMs are terminated for poor performance, a difference that is marginally significant ($p = 0.055$). By paying a lower wage, the company has a greater likelihood of hiring low-skill workers or "bad apples" who engage in misconduct. The low wage may also induce workers who perceive they are being underpaid to reciprocate by violating company policy. Under either mechanism, the actions of "underpaid" workers may not affect unit-level performance in archival studies because these workers are terminated before their actions can harm performance.

Our results provide exploratory evidence on the mechanisms underlying efficiency wage theory. When it is more difficult for the firm to monitor GMs, *Relative Compensation* has a significantly larger impact on all three performance measures. This suggests that wage premiums provide GMs with the incentive to work hard to maintain their high level of compensation and supports the shirking model as a key mechanism in our setting. As task complexity increases, *Relative Compensation* has a significantly larger impact on financial performance, but not on *Quality,* thus providing evidence that the selection of high-ability workers affects performance. Finally, selection of low-ability workers and/or negative reciprocity potentially explains why underpaid workers are more likely to be fired for misconduct.

[14] Our proxy for monitoring may also reflect selection effects. The firm likely located more hotels in markets in which it was most successful. However, almost all of the chain's hotels in existence in 2010 had been in place for several years. The brand is in a "mature" stage of its lifecycle, and there had been little new development in the decade prior to 2010.

TABLE 5

Models Estimating the Performance Effects of Relative Compensation when Compensation Is above and below the Median Wage

	Revenue Coeff. (t-statistic)	*Profit* Coeff. (t-statistic)	*Quality* Coeff. (t-statistic)
Relative Compensation	–3.080	–1.149	–0.035
	(–0.85)	(–0.36)	(–0.08)
Above Median × Relative Compensation	9.585**	7.352**	0.710
	(2.26)	(1.97)	(1.40)
Competition × Relative Compensation	3.667	4.274*	0.295
	(1.25)	(1.77)	(1.00)
Monitoring × Relative Compensation	–0.359*	–0.342	–0.047***
	(–1.79)	(–2.10)	(–2.65)
Above Median	0.538	0.123	0.018
	(0.54)	(0.14)	(0.15)
Competition	–0.680	-0.635	0.054
	(–1.20)	(–1.33)	(0.84)
Monitoring	0.153***	0.098***	0.014***
	(3.29)	(2.54)	(3.52)
Bonus	0.122	0.056	0.028
	(0.81)	(0.45)	(1.24)
Rental Vacancies	–0.106*	–0.095*	0.005
	(–1.77)	(–1.78)	(0.71)
Average House Value	0.018***	0.016***	0.000
	(7.14)	(7.48)	(1.63)
Housing Permits	–0.142*	–0.137**	0.003
	(–1.87)	(–2.10)	(0.31)
Unemployment	–3.007***	–2.939***	0.201**
	(–3.14)	(–3.64)	(2.05)
Property Age	–0.065	–0.029	–0.064**
	(–0.28)	(–0.15)	(–2.23)
Renovated	1.658**	1.153*	0.290***
	(2.18)	(1.66)	(3.14)
Property Size	–1.325***	–0.278	–0.024
	(–4.74)	(–1.15)	(–0.69)
Constant	46.073***	20.518***	6.921***
	(9.85)	(4.99)	(12.03)
F-test	13.67***	13.32***	4.13***
R^2	0.347	0.341	0.138
n	402	402	402

***, **, * Indicate two-tailed significance levels of 0.01, 0.05, and 0.10, respectively.
Observations are categorized as *Below* (*Above)* if they are less than (greater than) 98 percent (102 percent) of BLS median wage. Unstandardized coefficients. Robust standard errors.
See Appendix A for variable definitions.

V. CONCLUSION

This study uses proprietary data on 436 individually managed hotels in a U.S. lodging chain to address four questions relating to the use of fixed compensation for management control. First, is unit-level performance increasing in the relative compensation paid to employees? Second, do higher wages pay for themselves? Third, does task complexity and the principal's monitoring capability moderate the relation between relative compensation and performance? Finally, is the relation between relative compensation and performance the same regardless of whether fixed compensation is above or below the median market wage? By addressing these questions, this study informs our understanding of the relation between relative

TABLE 6

GM Terminations Partitioned by whether Relative Compensation Is above or below BLS Median Wage

	Below		*Above*			
2011 Employment Status	**n**	**Percent**	**n**	**Percent**	**z-statistic**	**p < |z|**
Employed	124	76.1%	201	84.1%	-2.008	0.045
Voluntary	17	10.4%	27	11.3%	-0.274	0.784
Involuntary—Misconduct	15	9.2%	8	3.3%	2.482	0.013
Involuntary—Performance	7	4.3%	3	1.3%	1.921	0.055
Total	163	100.0%	239	100.0%		

Observations are categorized as *Below (Above)* if total compensation is less (greater) than 98 percent (102 percent) of BLS median wage.
z-statistic for two-sample test of proportions.
See Appendix A for variable definitions.

compensation and performance, and the circumstances in which relative compensation constitutes an effective control mechanism.

We find that higher relative compensation is significantly associated with greater revenue, profit, and quality. The additional profit arising from higher fixed compensation exceeds the incremental cost of higher compensation, indicating that our particular research site is close to optimizing its wage policy. This result extends the accounting and labor economics literatures by providing field evidence that paying higher wages *ex ante* can lead to better actual unit-level performance *ex post,* and, that the marginal benefit of higher wages justifies the cost.

Regarding moderators, results indicate that financial performance is more sensitive to relative compensation when the agent's task is more complex; financial performance and customer satisfaction are less sensitive to relative compensation when the principal can more effectively monitor the agent. Our findings complement a stream of compensation literature that explores the roles of task complexity and monitoring in pay-for-performance contracts and provides guidance to managers on structuring fixed-compensation contracts.

On the symmetry of the relative wage-performance relationship, we find the magnitude of the relation between relative compensation and financial (quality) performance is larger (the same) for managers earning more than the market wage compared with those making less. Our results suggest that, in long-term employment relationships, economic incentives overcome workers' tendency to rationalize away overpayments. Studies differentiating between the effects of selection, shirking, and reciprocity mechanisms on employees' reaction to wage premiums and deficits would be a useful avenue for future research.

Our findings are subject to limitations. Endogeneity is a concern in cross-sectional tests in general, and in tests of the efficiency wage hypothesis in particular. The structure of the GM's compensation contract, controls for local economic conditions, robustness tests, and the highly significant relations between *Relative Compensation* and nonfinancial measures (*Quality* and involuntary terminations) help alleviate concerns regarding endogeneity, but we cannot rule it out. Our calculation of the costs and benefits associated with higher wages is sensitive to model specification and estimation errors inherent in measuring the housing component of total GM compensation, yet it still brings tentative evidence that our firm is close to optimizing its compensation policy. The use of a single job in one firm and one industry improves internal validity of our study, but limits applicability to other settings. Differences in the environment, strategy, size, technology, structure, and culture are likely to affect the strength of selection, shirking, and reciprocity mechanisms, and, therefore, the strength of the relative compensation-performance relation (Chenhall 2003; Otley 1980, 2016). Despite these limitations, we provide new evidence on the use of fixed-wage contracts for management control.

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APPENDIX A
Variable Definitions

Revenue = total revenue divided by available rooms.

Profit = controllable profit divided by rooms available. Controllable profit excludes numerous expenses that are not controllable by the general manager (e.g., property taxes, insurance, and corporate allocations). We also exclude the GM's cash salary.

Quality = mean response to a question regarding the customer's overall guest experience, gathered from an online survey of customers.

Relative Compensation = the sum of the general manager's fixed cash salary and noncash compensation divided by the Bureau of Labor Statistics median wage for lodging managers in the property's core-based statistical area (CBSA). Cash compensation is the GM's annual salary. Noncash compensation is the value of the housing *(Housing*) described below.

Median Rent = the median rental value for two-bedroom apartments for the ZIP code.

Utility Costs = average total cost for water, electricity, natural gas, cable TV, and internet for each state.

Estimated Federal Tax Rate = 2010 U.S. federal income tax rate for individuals.

Estimated State Tax Rate = 2010 individual income tax rate charged by each state.

Housing = estimated value of the housing benefit received by GM. Calculated as the median rental value for two-bedroom apartments for the ZIP Code, plus average utility costs for the state, divided by the sum of estimated state and federal tax rates.

GM Salary = annual cash salary of GM.

Median Wage = Bureau of Labor Statistics median wage for lodging managers based on CBSA.

Total Fixed Compensation = the sum of the GM's cash salary (*GM Salary*) and the value of company-provided housing (*Housing*).

Monitoring = number of hotels owned by the firm within a 50-mile radius.

HHI = Herfindahl-Hirschman index, computed as the sum of the squared market shares of the economy lodging properties within each sample property's local tract.

Competition = natural logarithm of 10,000 divided by the Herfindahl-Hirschman index (HHI). The transformation makes higher numbers indicative of greater competition and removes a right skew. The lodging industry has tracts that are similar, but not identical, to metropolitan statistical areas.

Bonus = cash bonus divided by cash salary.

Rental Vacancies = the rental vacancy rate, by ZIP Code.

Average House Value = mean house value for the ZIP Code.

Housing Permits = number of housing permits issues, by ZIP Code.

Unemployment Rate = BLS unemployment rate, expressed as a percentage, for a county.

Unemployment = the natural log of the county unemployment rate.

Age = number of years the chain has operated the property.

Property Age = square root of the number of years the chain has operated a property.

Renovated = indicator variable that equals 1 if the property has been renovated within the last three years, and 0 otherwise.

Rooms Available = Number of rooms available for sale at a property for the year.

Property Size = square root of the number of available rooms at a property for the year.

Voluntary = employee voluntarily left job or quit.

Involuntary–Misconduct = employee was fired for misconduct.

Involuntary–Performance = employee was fired for unsatisfactory performance.