Pay and Productivity: Wage Determination within the Firm

In the simplest model of the demand for labor (presented in chapters 3 and 4), employers had few managerial decisions to make; they simply found the marginal productivity schedules and market wages of various kinds of labor and hired the profit-maximizing amount of each kind. In a model like this, there was no need for employers to design a compensation policy.

Most employers, however, appear to give considerable attention to their compensation policies, and some of the reasons have already been explored. For example, employers offering specific training (see chapter 5) have a zone into which the wage can feasibly fall, and they must balance the costs of raising the wages of their specifically trained workers against the savings generated from a higher probability of retaining these workers. Likewise, when the compensation package is expanded to include such items as employee benefits or job safety (see chapter 8), employers must decide on the mix of
EXAMPLE 11.1

The Wide Range of Possible Productivities: The Case of the Factory That Could Not Cut Output

In 1987, a manufacturer of airguns ("BB guns") in New York State found that its sales were lagging behind production. Wanting to cut production by about 20 percent without engaging in widespread layoffs, the company decided to temporarily cut back from a five-day to a four-day workweek. To its amazement, the company found that, despite this 20 percent reduction in working hours, production levels were not reduced—its workers produced as many airguns in four days as they previously had in five!

Central to the problem of achieving its desired output reduction was that the company paid its workers on the basis of the number of items they produced. Faced with the prospect of a temporary cut in their earnings, its workers reduced time on breaks and increased their pace of work sufficiently to maintain their previous levels of output (and earnings). The company was therefore forced to institute artificial caps on employee production; when these individual output quotas had been met, the worker was not allowed to produce more.

The inability to cut output, despite cutting back on hours of work, suggests how wide the range of possible worker productivity can be in some operations. Clearly, then, careful attention by management to the motivation and morale of employees can have important consequences, both privately and socially.

wages and other valued items in the compensation package. We have also seen that under certain conditions, employers will behave monopsonistically, in which case they set their wages rather than take them as given.

This chapter will explore in more detail the complex relationship between compensation and productivity. Briefly put, employers must make managerial decisions rooted in the following practical realities:

1. Workers differ from each other in work habits that greatly affect productivity but are often difficult (costly) to observe before, and sometimes even after, hiring takes place;
2. The productivity of a given worker with a given level of human capital can vary considerably over time or in different environments, depending on his or her level of motivation (see Example 11.1);
3. Worker productivity over a given period of time is a function of innate ability, the level of effort, and the environment (the weather, general business conditions, or the actions of other employees);
4. Being highly productive is usually not just a matter of slavishly following orders, but rather of taking the initiative to help advance the employer’s objectives.¹

Employers, then, must choose management strategies and compensation policies to obtain the right (that is, profit-maximizing) kind of employees and offer them the optimum incentives for production. In doing so, they must weigh the costs of various policies against the benefits. The focus of this chapter is on the role of firms’ compensation policies in optimizing worker productivity.

**Motivating Workers: An Overview of the Fundamentals**

Employers and workers each have their own objectives and concerns, and the incentives imbedded in the employment relationship are critical to aligning these separate interests. We first present an overview of the key features of this relationship before moving on in later sections to analyses of various compensation schemes that employers can adopt to induce high productivity among their workers.

**The Employment Contract**

The employment relationship can be thought of as a contract between the employer (the “principal”) and the employee (the “agent”). The employee is hired to help advance the employer’s objectives in return for receiving wages and other benefits. Often there are understandings or implied promises that if employees work hard and perform well, they will be promoted to higher-paying jobs as their careers progress.

**FORMAL CONTRACTS** The agreement by an employee to perform tasks for an employer in return for current and future pay can be thought of as a contract. A formal contract, such as one signed by a bank and a homeowner for the repayment of a loan, lays out quite explicitly all that each party promises to do and what will happen if either party fails to perform as promised. Once signed, a formal contract cannot be abrogated by either party without penalty. Disputes over performance can be referred to courts of law or other third parties for resolution.

**IMPLICIT CONTRACTS** Unlike formal contracts, most employment contracts are incomplete and implicit. They are usually incomplete in the sense that rarely are all the specific tasks that may be required of employees spelled out in advance. Doing so would limit the flexibility of employers in responding to changing conditions, and it would also require that employers and employees renegotiate their employment contract when each new situation arises—which would be costly to both parties.

Employment contracts are also implicit in the sense that they are normally a set of informal understandings that are too vague to be legally enforceable. For example, just what has an employee promised to do when she has agreed to “work hard,” and how can it be proved she has failed to do so? Specifically, what has a firm promised to do when it has promised to “promote deserving employees as opportunities arise”? Further, employees can almost always quit a job at will, and employers often have great latitude in firing employees; hence, the employment
contract is one that usually can be abrogated by one party or the other without legal penalty.\textsuperscript{2}

The severe limits on legal enforceability make it essential that implicit contracts be self-enforcing. We turn now to a discussion of the difficulties that must be surmounted in making employment contracts self-enforcing.

**Coping with Information Asymmetries**

It is often advantageous for one or both parties to cheat by reneging on their promises in one way or other. Opportunities for cheating are enhanced when information is asymmetric—that is, when one party knows more than the other about its intentions or performance under the contract. For example, suppose an insurance company promises a newly hired insurance adjuster that she will receive a big raise in four years if she "does a good job." The company may later try to refuse her the raise she deserves by falsely claiming her work was not good enough. Alternatively, the adjuster, who works out of the office and away from supervisory oversight most of the time, may have incentives to "take it easy" by doing cursory or overly generous estimates of client losses. How can these forms of cheating be avoided?

Of course, sanctions against cheating are embedded in the formal agreements made by employers and employees. Employers who break the provisions of agreements they have signed with their unions can be sued or legally subjected to a strike, for example, but this requires that cheating actually be proved. How can we reduce the chances of being cheated when contracts are informal and the threat of formal punishment is absent?

**DISCOURAGING CHEATING: SIGNALING** One way to avoid being cheated is to transact with the "right kind" of person, and to do this, we must find a way to induce the other party to reveal—or signal—the truth about its actual characteristics or intentions. Suppose, for example, that an employer wants to hire employees who are willing to defer current gratification for long-term gain (that is, it wants employees who do not highly discount the future). Simply asking applicants if they are willing to delay gratification might not evoke honest answers. There are ways, however, an employer could cause applicants to signal their preferences indirectly.

As pointed out in chapter 8, the employer could offer its applicants relatively low current wages and a large pension benefit upon retirement. Potential applicants with relatively high discount rates would find this pay package less

\textsuperscript{2}The doctrine of \textit{employment-at-will}, under which employers (and employees) have the right to terminate an employment relationship at any time, has historically prevailed in the United States. Those not subject to this doctrine in the United States have included unionized workers with contract provisions governing discharges, tenured teachers, and workers under some civil service systems. A number of state courts also have adopted public policy and/or implicit contract exceptions to the doctrine. For a discussion of these issues, see Ronald Ehrenberg, "Workers' Rights: Rethinking Protective Labor Legislation," in \textit{Rethinking Employment Policy}, ed. Lee Bawden and Felicity Skidmore (Washington, D.C.: Urban Institute Press, 1989).
attractive than applicants with low discount rates, and they would be discouraged from either applying for the job or accepting an offer if it were tendered.

Another way this firm could induce applicants to signal something about their true discount rate is to require a college degree or some other training investment as a hiring standard. As noted in chapter 9, people with high discount rates are less likely to make investments of any kind, so the firm's hiring standard should discourage those with high discount rates from seeking offers.

The essence of signaling, then, is the voluntary revelation of truth in behavior, not just statements. Many of the compensation policies discussed in the remainder of this chapter are at least partially aimed at eliciting truthful signals from job applicants or employees.³

DISCOURAGING CHEATING: SELF-ENFORCEMENT Even the "right kind" of people often have incentives to underperform on their promises. Economists have come to call this type of cheating opportunist behavior, and it occurs not because people intend from the outset to be dishonest but because they generally try to advance their own interests by adjusting their behavior to unfolding opportunities. Thus, the challenge is to adopt compensation policies that more or less automatically induce both parties to adhere to their promises.⁴

The key to a self-enforcing agreement is that losses are imposed on the cheater that do not depend on proving a contract violation has occurred. In the labor market, the usual punishment for cheating on agreements is that the victim severs the employment relationship; consequently, self-enforcement requires that both employer and employee derive more gains from honest continuation of the existing employment relationship than from severing it. If workers are receiving more from the existing relationship than they expect to receive elsewhere, they will automatically lose if they shirk their duties and are fired. If employers profit more from keeping their existing workers than from investing in replacements, they will suffer by reneging on promises and having workers quit.

CREATING A SURPLUS Incentives for both parties to live up to an implicit agreement are strongest when workers are getting paid more than they could get in alternative employment, yet less than the value of their marginal product to the firm. The gap between their marginal revenue product to the firm and their alternative wage represents a surplus that can be divided between employer and employee. This surplus must be shared if the implicit contract is to be self-enforcing, because if one party receives the entire surplus, the other party has nothing to lose by terminating the employment relationship. A graphic representation of the division

³For a formal model that uses educational attainment as a signal for innate ability (which is difficult for an employer to observe directly), refer back to chapter 9. For a thorough review of signaling theory, see John G. Riley, "Silver Signals: Twenty-Five Years of Screening and Signaling," Journal of Economic Literature 39 (June 2001): 432–478.

of a surplus is given in Figure 11.1, where we see that attempts by one party to increase its share of the surplus will reduce the other party's losses from terminating the employment relationship.

Surpluses are usually associated with some earlier investment by the employer. In chapter 5, we saw that investments by the firm in specific training or in the hiring/evaluation process enabled workers' productivity and wages to exceed their alternatives. Firms can also create a surplus by investing in their reputations. For example, an employer that is well known for keeping its promises about future promotions or raises can attract workers of higher productivity at lower cost than can employers with poor reputations. (A firm with a poor reputation for performing on its promises must pay a compensating wage differential to attract workers of given quality away from employers with good reputations.) Because the good reputation increases productivity relative to the wage paid, a surplus is created that can be divided between the firm and its workers.

Motivating Workers

Beyond the issue of enforceability, employment contracts address the employer's need to motivate workers. Workers can be viewed as utility maximizers, and "putting forth their best efforts" may entail working hard when they are sick or distracted by personal problems, or it may involve a work pace that they find taxing. Employ-
ees can be assumed to do what they feel is in their own interests unless induced to do otherwise by the employer’s system of rewards. How can we create rewards that give employees incentives to work toward goals of their employers?

**PAY FOR PERFORMANCE** The most obvious way to motivate workers is to pay them based on their individual output. Linking pay to output creates the presumption of strong incentives for productivity, but there are two general problems that incentive pay schemes must confront.\(^5\) One problem is that using output-based pay has both benefits and costs to an employer, and both are affected by the extent to which a worker’s output is influenced by forces outside his or her control. Jane, for example, may be willing to put forth 10 percent more effort if she can be sure her output (and pay) will rise by 10 percent. If machine breakdowns are so common, however, that she can only count on a 5 percent increase, she may decide that the extra 10 percent of effort is not worth it. From the employer’s perspective, then, output-based pay might provide only weak incentives if Jane’s effort and the resulting output are not closely linked.

From Jane’s perspective, a weak link between output and her own effort also puts her earnings at risk of variations that she cannot control—and she may be unwilling to take a job with such a pay scheme unless it pays a compensating wage differential. Thus, unless a worker’s output and effort are very closely associated, output-based pay may have small benefits to the employer and yet come at added cost.\(^6\)

The second problem facing pay-for-performance plans is the need to pick an output measure that coincides with the employer’s ultimate objective. Quantitative aspects of output (such as the number of complaints handled by a clerk in the customer service department) are easier to measure than the qualitative aspects of friendliness or helpfulness—and yet the qualitative aspects are critical to building a loyal customer base. As we will see, imperfectly designed performance measures can backfire by inducing employees to allocate their effort toward what is being measured and away from other important aspects of their jobs.\(^7\)

**TIME-BASED PAY WITH SUPERVISION** An alternative pay scheme is to compensate workers for the time they work. This reduces the risk of having Jane’s pay—to continue our example—vary on a weekly basis, but guaranteeing her a wage without reference to her actual output creates a problem of moral hazard: why should she work hard if that effort is not rewarded? (See Example 11.2 for

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\(^7\)A recent analysis of the two sets of incentive issues discussed in this section can be found in George Baker, “Distortion and Risk in Optimal Incentive Contracts,” *Journal of Human Resources* 37 (Fall 2002): 728–751.
EXAMPLE 11.2
Calorie Consumption and the Type of Pay

We noted in the text that time-based pay raises the question of moral hazard; that is, because workers are paid regardless of their output, they may not put forth their best efforts. An interesting examination of this question comes from Bukidn in the Philippines, where it is common for workers to hold several different farming jobs during a year. In some of these jobs, they are paid by the hour, and in some, they are paid directly for their output. Therefore, we are able to observe how hard the same individual works under the two different types of pay systems.

A recent study discovered clear-cut evidence that the workers put forth much less effort in these physically demanding jobs when paid by the hour rather than for their output. Measuring effort expended by both weight change and calorie consumption, the study found that workers consumed 23 percent fewer calories and gained more weight per calorie consumed when they were paid by the hour. Both facts suggest that less physical effort was put forth when workers were paid by the hour than when they were paid for their output.


a comparison of actual work effort under output- and time-based pay.) The danger that workers might only "put in their time" means that employers must closely monitor their behavior.

The problem with close supervision is that it is costly. Tasks in almost any workplace are divided so that the economies afforded by specialization are possible, and workers must continually adjust to changing situations within their areas of responsibility. Extremely close supervision would require supervisors to have the same information, at the same time, on the situations facing all their subordinates, in which case they might as well make all the decisions themselves! In short, detailed supervision can destroy the advantages of specialization.

Motivating the Individual in a Group

If workers seek to maximize utility by increasing their own consumption of valued goods, then focusing on the link between each individual's pay and performance is sufficient in developing company policy. However, the concern for one's standing in a group is often a factor that also affects a worker's utility. The importance of the group in motivating individuals presents both problems and opportunities for the employer.

ISSUES OF FAIRNESS People's concern about their treatment relative to others in their reference group means that fairness is an issue that pervades the employment relationship. A worker who obtains a 7 percent wage increase during a year in which both price and wage increases average 4 percent might be quite happy until he finds out that a colleague working in the same job for the same employer received a 10 percent increase. Workers who feel unfairly treated may quit, reduce their effort
Motivating Workers: An Overview of the Fundamentals

level, steal from the employer, or even sabotage output in order to "settle the score." Unfortunately for employers, however, the fairness of identical policy decisions often can be perceived differently depending on their context.

For example, a sample of people was asked to consider the case of two small companies that were not growing as planned and therefore had a need to cut costs. Each paid workers $10 per hour, but Employer A paid that in salary and Employer B paid $9 in salary and $1 in the form of a bonus. Most respondents said it would be unfair for A to cut wages by 10 percent, but they thought it fair if B were to eliminate its bonus. Apparently, pay framed as "salary" connotes a greater entitlement than pay framed as "bonus."

Consider a second example from the same survey. A majority of respondents thought it would be unfair for a successful house painter to cut wages from $9 to $7 if he discovered that reliable help could be hired for less. However, they felt that if he quit painting and went into landscaping (where wages were lower), paying a $7 wage would be justified. Clearly, the employer is included among the reference groups used by workers in judging fairness, and the context of an employer's decision matters as much as its content!

GROUP LOYALTY Besides concern for their own levels of consumption and their relative treatment within the group, employees are also typically concerned with the status or well-being of the entire group. While there are always temptations to "free ride" in a group by taking it easy and enjoying the benefits of others' hard work, most people are willing to make at least some sacrifices for their team, school, work group, community, or country. Because the essence of "doing a good job" so frequently means taking the initiative in many small ways to advance the organization's interests, employers with highly productive workers almost universally pay attention to policies that foster organizational loyalty. While many of the steps employers can take to nurture this loyalty go beyond the boundaries of economics, some compensation schemes we will analyze relate pay to group performance quite directly.


Compensation Plans: Overview and Guide to the Rest of the Chapter

Along with the employer's hiring standards, supervisory policies, and general managerial philosophy, its compensation plan greatly affects the incentives of employees to put forth effort. While a detailed discussion of many managerial policies is outside the scope of this text, the incentives created by compensation schemes fall squarely within the purview of modern labor economics. In what follows, therefore, we use economic concepts to analyze the major characteristics of compensation plans.

Three elements broadly characterize an employer's compensation scheme: the basis on which pay is calculated, the level of pay in relation to pay for comparable workers elsewhere, and—for employers with internal labor markets—the sequencing of pay over workers' careers. The remainder of the chapter is devoted to analyses of these elements.

Productivity and the Basis of Yearly Pay

Workers can be paid for their time, their output, or some hybrid of the two. Most in the United States are paid for their time, and we must ask why output-based pay is not more widely used. Because compensation plans must satisfy both the employer and the employee, we organize our analysis around the considerations relevant to each side of the labor market.

Employee Preferences

Piece-rate pay, under which workers earn a certain amount for each item produced, is the most common form of individually based incentive pay for production workers. Another system linking earnings to individuals' output is payment by commission, under which workers (usually salespeople) receive a fraction of the value of the items they sell. Gainsharing plans, which have grown in popularity recently, are group-incentive plans that at least partially tie earnings to gains in group productivity, reductions in cost, increases in product quality, or other measures of group success. Profit-sharing and bonus plans attempt to relate workers' pay to the profits of their firm or subdivision; this form of pay also rewards work groups rather than individuals. Under all these systems, workers are paid at least somewhat proportionately to their output or to the degree their employer prospers.

VARIABILITY OF PAY If employees were told that their average earnings over the years under a time-based payment system would be equal to their earnings under an output-based pay plan, they would probably prefer to be paid on a time basis. Why? Earnings under output-based pay plans clearly vary with whatever measure of output serves as the basis for pay. As mentioned earlier, many things that affect individual or group output depend on the external environment, not just on the level of energy or commitment the individual worker brings to the job. The number of items an individual produces in a given day is affected by the age and condition of machinery, interrupted flows of supplies owing to strikes or snow-
storms, and the worker's own illness or injury. Commissions earned by salespeople are clearly affected by the overall demand for the product being sold, and this demand can fluctuate for a number of reasons well beyond the control of the individual salesperson. Earnings that are dependent on some measure of group output will also vary with the level of effort expended by others in the group.

The possible variations in earnings under output-based pay are thought to be unappealing to workers because of their presumed risk aversion (that is, workers' preference for earnings certainty, even if it means somewhat lower pay). Most workers have monthly financial obligations for rent, food, insurance, utilities, and so forth. If several low-income pay periods are strung together, they might have difficulty in meeting these obligations, even if several high-income pay periods were to follow.

Because of their anxiety about periods of lower-than-usual output, employees prefer the certainty of time-based pay, other things (including the average level of earnings) equal. To induce risk-averse employees to accept output-based pay, employers would have to pay a compensating wage differential.

**WORKER SORTING** Worker risk aversion aside, it is interesting to consider which workers will be attracted to piece-rate or commission pay schemes. Because time-based plans pay the same, at least in the short run, to high and low producers alike, workers who gain most from piece rates or commissions are those whose levels of motivation or ability are above average. Thus, employees who choose to work under compensation plans that reward individual productivity signal that they believe themselves to be above-average producers. For example, when an American company that installs glass in automobiles went from time-based pay to piece rates in the mid-1990s, the individual output of incumbent employees who stayed with the firm rose by 22 percent. However, because changing to piece rates allowed the company to attract and retain the fastest workers, the overall increase in worker productivity was in the neighborhood of 44 percent!11

**PAY COMPARISONS** There are three reasons to expect that workers paid for their output might earn more than those paid for their time: incentive pay motivates employees to work harder, it attracts the most productive workers, and it involves risk that may call forth a compensating wage differential. One study of pay in some apparel industries found that workers paid a piece rate earned about 14 percent more than workers paid by the hour. The study estimated that about one-third of this disparity was a compensating differential, with the remainder being related to the incentive and sorting effects.12

**Employer Considerations**

The willingness of employers to pay a premium to induce employees to accept piece rates depends on the costs and benefits to employers of incentive pay schemes. If

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workers are paid with piece rates or commissions, it is they who bear the consequences of low productivity, as noted above; thus, employers can afford to spend less time screening and supervising workers. If workers are paid on a time basis, the employer accepts the risk of variations in their productivity; when workers are exceptionally productive, profits increase and, when they are less productive, profits decline. Employers, however, may be less anxious about these variations than employees are. They typically have more assets and can thus weather the lean periods more comfortably than individual workers can. Employers also usually have several employees, and the chances are that not all will suffer the same swings in productivity at the same time (unless there is a morale problem in the firm). Thus, employers may not be as willing to pay for income certainty as workers are.

The other major employer consideration in deciding on the basis for pay concerns the incentives for employee effort. The considerations related to three major types of incentive plans in use are discussed below.

PAY FOR OUTPUT: INDIVIDUAL INCENTIVES From the employer’s perspective, the big advantage of individually based output pay is that it induces employees to adopt a set of work goals that are directly related to output. Indeed, as with the increased output of incumbent workers at the automobile glass installer, mentioned earlier, the estimated increases in an individual’s productivity associated with switching from time-base pay to piece rates in the forestry industry have been in the range of 20 percent.13 There are disadvantages, however.

First, the need to link output-based pay to some measure that can be objectively observed means that workers might be induced to allocate their efforts away from aspects of their performance that are not being measured. If they get paid only for the quantity of items they individually produce or sell, they may have minimal regard for quality, safety procedures, or the performance or professional development of others on their work team.14 These problems can create a need for costly quality-control supervision unless workers can be induced to monitor quality themselves. Self-monitoring of quality is only easily induced when a particular item or service can be traced to the worker responsible. For example, the auto glass installer mentioned earlier requires workers who have installed a windshield improperly (which usually results in its breaking) to pay for the replacement glass and then to re-install it on their own time.

A second problem is that workers may be induced to work so quickly that machines and tools are damaged through lack of proper maintenance or use. While this problem is mitigated to the extent that production downtime can cause the

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14Robert Gibbons, “Incentives in Organizations,” Journal of Economic Perspectives 12 (Fall 1998): 115–132, provides a summary of this issue, with extensive citations to the literature. For a discussion of “gaming” induced by piece rates (that is, engaging in behaviors that increase the measure upon which pay is based, while not actually increasing output), see Pascal Courty and Gerald Marschke, “An Empirical Investigation of Gaming Responses to Explicit Performance Incentives,” Journal of Labor Economics 22 (January 2004): 23–56.
worker’s earnings to drop, it is of enough concern to employers that they frequently require piece-rate workers to provide their own machines or tools.

How can firms create pay schemes with the proper incentives when the overall value of individual output is difficult to measure? In the remainder of this section, we explore two options. One is payment based on some measure of group output, and the other bases pay at least partly on the subjective judgments of supervisors.

**PAY FOR OUTPUT: GROUP INCENTIVES** When individual output is difficult to monitor, when individual incentive plans are detrimental to output quality, or when output is generated by teams of interdependent workers, firms sometimes adopt group incentive pay schemes to more closely align the interests of employee and employer. These plans may tie at least a portion of pay to some component of profits (group productivity, product quality, cost reductions), or they may directly link pay with the firm’s overall profit level. In still other cases, workers might own the firm and split the profits among themselves.

One drawback to group incentives is that groups are composed of individuals, and it is at the individual level that decisions about shirking are ultimately made. A person who works very hard to increase group output or the firm’s profits winds up splitting the fruits of his or her labor with all the others, who may not have put out extra effort. Thus, free-rider opportunities give workers incentives to cheat on their fellow employees by shirking. (Another downside of group incentives occurs when they attract the wrong sort of workers, and the good workers leave. One extreme case is discussed in Example 11.3.)

In very small groups, cheating may be easy to detect, and peer pressure can be effectively used to eliminate it. When the group of workers receiving incentive pay is large, however, employers may have to devise managerial resources to building organizational loyalties if shirking is to be discouraged. Interestingly, despite free-rider problems, studies have found that there is a positive correlation between profit sharing and organizational output.

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EXAMPLE 11.3

Poor Group Incentives Doom the Shakers

The Shakers were an unusual religious sect. They required strict celibacy and practiced communal ownership of property, with all members sharing the group's income equally—receiving the average product. They arrived in the United States in 1774 and numbered around 4,000 by 1850, but their membership dwindled thereafter. Their decline is generally attributed to their failure to reproduce and to their declining religious fervor, but economic historian John Murray argues that their group compensation plan was another important reason for their demise.

Those members with a higher-than-average marginal productivity would receive less than the value of their output—and usually less than they could make elsewhere. Thus, high-productivity members had an incentive to quit. Conversely, outsiders with a low marginal productivity had an incentive to join, receiving more than the value of their output and more than they could elsewhere.

Murray proxies marginal productivity by literacy. When the Shaker communities were established in Ohio and Kentucky, their members were full of religious zeal, which may have initially overcome the incentive problems. These members had a literacy rate of almost 100 percent, far above that of the surrounding population. By the time of the Civil War, however, illiterates were joining the group in significant numbers, and the sect's literacy rates fell below the rates in the surrounding areas. Likewise, Murray finds that literate members were 30 to 40 percent more likely to quit the community (becoming "apostates") than were illiterate members.

Contemporaries began to question the sincerity of the new entrants: they were "bread and butter Shakers," intent on free-riding on their more productive brothers and sisters. Many had been unable or unwilling to provide for themselves in the world outside the commune. Eventually, the changing composition of the Shaker communities caused a crisis in the communes: the average product of the group fell, and the group was wracked by diminishing enthusiasm, internal stress, and declining membership.


GROUP INCENTIVES AND EXECUTIVE PAY  Compensation for top executives provides an interesting example of the potential and the problems of basing pay on group results. Executives run a company but do not own it, and like other employees, they want to advance their own interests. How can companies align the interests of these key players with those of the owners (shareholders)?

Because firms are trying to maximize profits, we might consider basing executive pay on the firm's profits. But over what time period should profits be measured? Basing this year's pay on current-year profits might create the same adverse incentives discussed earlier with piece rates. A focus on current-year profits could induce executives to pursue only short-run strategies (or accounting tricks), which run counter to the firm's long-run interests, in the hopes they can "take the money

19As noted in chapter 3's discussion of the demand for labor under monopoly, executives can buy some peace and quiet on the job by forgoing profit maximization, when possible. For an example, see Marianne Bertrand and Sendhil Mullainathan, "Is There Discretion in Wage Setting? A Test Using Takeover Legislation," RAND Journal of Economics 30 (Autumn 1999): 535–554.
and run" to another corporation before the long-run consequences of their decisions are fully observed.

The strongest way to align the interests of corporate executives and company owners may be to pay them with company stock or the options to buy it. This seemingly rewards top executives for efforts that increase company wealth and punishes them for actions that reduce it. However, because stock prices are also influenced by overall investor "bullishness," executives paid with stock are rewarded for luck as well as effort—and they may elect to reduce effort and take a free ride when stock prices are rising in general. Beyond reducing incentives, economy-wide fluctuations in stock prices also cause executives' pay to vary because of things beyond their control, which may force firms to pay them a compensating differential for the added riskiness of their pay.

In practice, the compensation of chief executive officers (CEOs) in the United States has become increasingly responsive to shareholder value. In 1984, 17 percent of CEO pay was in the form of stock or stock options, while in 1996, the comparable figure was 23 percent. (The remainder of CEO pay was in the form of salary, benefits, and bonuses based on current-year profits.) One study found that, in 1994, if the value of a firm's stock rose by 10 percent, the typical CEO's wealth rose by $1.25 million. Companies in industries with higher volatility in sales—and thus for whom pay based on profits or share values exposes CEO incomes to greater variations beyond their control—rely more on salary payments, and less on company performance, to attract top executives.

It appears that paying CEOs with stock or stock options does work. Generally speaking, those firms with executive compensation plans more heavily weighted toward stock or stock options have tended to enjoy greater increases in corporate wealth. There is some evidence, however, that tying pay to stock-market values might make CEOs excessively worried about fluctuations in their own income, causing them to shy away from risky projects even when the projects appear profitable.

Recent scandals involving CEOs have raised another concern about aligning their incentives with those of stockholders. The issue is whether CEOs use their close relationship with members of their board of directors (many of whom have been with the company a long time) to negotiate compensation packages that are excessive. More precisely, do they use their "insider" relationship with those who set their pay to receive compensation that is greater than is consistent with maximizing shareholder value? While researchers differ in their answers to this

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question, most agree that collusion between CEOs and directors is a potential problem, and that greater use of "outside" directors or the presence of well-informed stockholders (institutional investors, say) is a critical ingredient in aligning incentives.²⁴

**PAY FOR TIME, WITH MERIT INCREASES** Given employee risk aversion and the problem of devising appropriate measurable outcomes for individual- and group-incentive plans, most employers opt for some form of time-based pay. While satisfying employees' desires for pay stability, time pay creates an incentive problem because compensation and output are not directly linked. Employers often try to cope with this problem through the use of merit-pay plans, which award larger pay increases to workers whose supervisors rate them as the better performers.

On the one hand, basing pay on supervisory ratings has the potential to create superior incentives for workers, because these ratings can take account of the more subjective aspects of performance (friendliness, being a team player) that may be critical to the welfare of the employer. On the other hand, merit-based pay still faces two incentive problems similar to those with output-based pay.

If supervisors are told to base their ratings on worker contributions toward actual output, merit pay runs up against the (by now familiar) problem that individual effort and output may not correlate well, owing to forces beyond the control of workers. For this reason, supervisors are often asked to rate their subordinates relative to each other, on the theory that all face the same external forces of snowstorms, machine breakdowns, and so forth.

The problem of relative rankings for merit-pay purposes is that the effort induced among employees may not be consistent with the employer’s interests. For example, one way to enhance one’s relative status is to sabotage the work of others. Finding pages torn out of library books on reserve shortly before major examinations is not unknown at colleges or universities, where grading is often based on relative performance. Somewhat less sinister than sabotage, but equally inconsistent with employer interests, is noncooperation; one study has shown that the stronger the rewards based on relative performance, the less likely employees are to share their equipment and tools with fellow workers.²⁵

Because relative performance ratings usually have a subjective component, another kind of counterproductive effort may take place: politicking.²⁶ Workers may

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spend valuable work time “marketing” their services or otherwise ingratiating themselves with their supervisors. Thus, efforts are directed away from productivity itself to generate what is, at best, the appearance of productivity.27

Productivity and the Level of Pay

Given difficulties created for both employers and employees by pay-for-performance plans (including merit pay), employers are often driven to search for other monetary incentives that can be used to motivate their workers. In this section, we discuss motivational issues related to the level of pay.

Why Higher Pay Might Increase Worker Productivity

Paying higher wages is thought to increase worker productivity for several reasons. One involves the type of worker the firm can attract; the others are related to the productivity that can be elicited from given workers.

ATTRACTING BETTER WORKERS Higher wages can attract better employees by enlarging the firm’s applicant pool. A larger pool means that the firm can be more selective, skimming the cream off the top to employ only the most experienced, dependable, or highly motivated applicants.28

BUILDING EMPLOYEE COMMITMENT The reasons higher wages are thought to generate greater productivity from given workers all relate to the commitment to the firm they build. The higher the wages are relative to what workers could receive elsewhere, the less likely it is that the workers will quit; knowing this, employers are more likely to offer training and more likely to demand longer hours and a faster pace of work from their workers. Employees, on their part, realize that even though supervision may not be detailed enough to detect shirking with certainty, if they are caught cheating on their promises to work hard and are fired as a result, the loss of a job paying above-market wages is costly both now and over their remaining work life.

PERCEPTIONS OF EQUITY A related reason higher wages might generate more productivity from given employees arises from their concern about being treated fairly. Workers who believe they are being treated fairly are likely to put forth effort.

27While we discuss individually the tools that can be used to motivate workers—incentive pay, supervision, stock ownership, or profit sharing, for example—they should all be seen as part of a firm’s system for motivating its workers. For example, see Casey Ichmowski and Kathryn Shaw, “Beyond Incentive Pay: Insiders’ Estimates of the Value of Complementary Human Resource Management Practices,” Journal of Economic Perspectives 17 (Winter 2003): 155–180.
while those who think their treatment is unfair may “get even” by withholding effort or even engaging in sabotage.  

One comparison workers make in judging their treatment is the extent to which they see the employer as profiting from their services. It is often considered unfair if a highly profitable employer is ungenerous in sharing its good fortune with its workers, even if the wages it pays already are relatively high. Likewise, workers who are asked to sacrifice leisure and put forth extraordinary effort on the job are likely to expect the firm to make an extraordinary financial sacrifice (that is, the offer of high pay) to them in return.  

Employees also judge the fairness of their pay by comparing it with what they could obtain elsewhere. Raising compensation above the level that workers can earn elsewhere, of course, has both benefits and costs to the employer, as we discuss in the following section.

**Efficiency Wages**

While initial increases in pay may well serve to increase productivity and therefore the profits of the firm, after a point, the costs to the employer of further increases will exceed the benefits. The above-market pay level at which the marginal revenues to the employer from a further pay increase equal the marginal costs is the level that will maximize profits; this has become known as the **efficiency wage** (see Example 11.4).  

The payment of efficiency wages has a wide set of implications that, in recent years, have begun to be explored by economists. For example, the persistence of unemployment is thought by some to result from the widespread payment of above-market wages (see chapter 15). Further, persistently different wage rates

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EXAMPLE 11.4

Did Henry Ford Pay Efficiency Wages?

The 1908-1914 period saw the introduction of "scientific management" and assembly-line production processes at the Ford Motor Company. The change in production methods led to a change in the occupational composition of Ford's workforce, and by 1914, most of its workers were relatively unskilled and foreign born. Although these changes proved extremely profitable, worker dissatisfaction was high. In 1913, turnover rates reached 370 percent (370 workers had to be hired each year to keep every 100 positions filled), which was high even by the standards of the Detroit automobile industry at the time. Similarly, absenteeism typically averaged 10 percent a day. However, while Henry Ford was obviously having difficulty retaining and eliciting effort from workers, he had little difficulty finding replacements: there were always long lines of applicants at the factory gates. Hence, Ford's daily wage in 1913 of about $2.50 was at least at the competitive level.

In January 1914, Ford instituted a $5-a-day wage; this doubling of pay was granted only to workers who had been employed at the company for at least six months. At roughly the same time, residency in the Detroit area for at least six months was made a hiring standard for new job applicants. Since the company was limiting the potential applicant flow and was apparently not screening job applicants any more carefully after the pay increase, it appears the motivation for this extraordinary increase in wages was not to increase the quality of new hires.

It is clear, however, that the increase did affect the behavior of existing employees. Between March 1913 and March 1914, the quit rate of Ford employees fell by 87 percent and discharges fell by 90 percent. Similarly, the absentee rate was reduced by a factor of 75 percent during the October 1913 to October 1914 period. Morale and productivity increased and the company continued to be profitable.

There is some evidence that at least initially, however, Ford's productivity gains were less than the wage increase. Historians have pointed to the noneconomic factors that influenced Ford's decision, including his paternalistic desire to teach his workers good living habits. (For workers to receive these increases, investigators from Ford first had to certify that they did not pursue lifestyles that included behavior like excessive gambling or drinking.) While the wage increase thus probably did not lead to a wage level that maximized the company's profits (a smaller increase probably would have done that), the policy did have a substantial positive effect on worker turnover, effort, morale, and productivity.


paid to qualitatively similar workers in different industries are the hypothesized result of efficiency-wage considerations. 33

For our purposes here, however, the most important implications of efficiency wages relate to their effects on productivity, and two types of empirical studies are of interest. One set of studies infers the effects of efficiency wages on produc-

Productivity and the Sequencing of Pay

Employers with internal labor markets have options for motivating workers that grow out of their employees' expected careers with the organization. Applicants to, and employees of, employers with internal labor markets are concerned with the present value of career compensation. This "lifetime" perspective increases employers' options for developing compensation policies, because both the pay levels at each step in one's career and the swiftness of promotion to given steps can be varied by the firm while still living within the constraint of having to offer an attractive present value of career compensation. In this section, we analyze several possibilities for sequencing pay over workers' careers that are thought to provide incentives for greater productivity.


Underpayment Followed by Overpayment

It may be beneficial to both employer and employee to arrange workers' pay over time so that employees are "underpaid" early in their careers and "overpaid" later on. This sequencing of pay, it can be argued, will increase worker productivity and enable firms to pay higher present values of compensation than otherwise, for reasons related both to worker sorting and to work incentives. An understanding of these reasons takes us back to the problem of avoiding cheating on an implicit contract in the presence of asymmetric information.

WORKER SORTING Pay plans that delay at least a part of employees' compensation to a time later in their careers have an important signaling component. They will appeal most (and perhaps only) to those workers who intend to stay with the employer a long time and work hard enough to avoid being fired before collecting their delayed pay. In the absence of being able to predict which workers intend to stick around and work diligently, an employer might find an underpay-now, overpay-later compensation plan attractive because of the type of workers likely to sort themselves into their applicant pool.

WORK INCENTIVES A company that pays poorly to begin with but well later on increases the incentives of its employees to work industriously. Once in the job, an employee has incentives to work diligently in order to qualify for the later overpayment. The employer need not devote as many resources to supervision each year as would otherwise be the case, because the firm has several years in which to identify shirkers and withhold from them the delayed reward. Because all employees work harder than they otherwise would, compensation within the firm tends to be higher also.

CONSTRAINTS One feasible compensation-sequencing scheme would pay workers less than their marginal product early in their careers and more than their marginal product later on. This scheme, however, must satisfy two constraints. First, the present value of the earnings streams offered to employees must be at least equal to alternative streams offered to workers in the labor market; if not, the firm cannot attract the workers it wants.

Second, the scheme must also satisfy the equilibrium conditions that the firm maximizes profits and does not earn supernormal profits. If profits are not maximized, the firm's existence is threatened; if firms make supernormal profits,

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37The lower turnover rate among workers who have been promised larger pensions upon retirement is apparently mostly the result of self-selection, not the threat of lost pension wealth; see Steven G. Allen, Robert L. Clark, and Ann A. McDermed, "Pensions, Bonding, and Lifetime Jobs," Journal of Human Resources 28 (Summer 1993): 463–481.
new firms will be induced to enter the market. Thus, in neither case would equilibrium exist.

These two conditions will be met if hiring is done until the present value of one’s career-long marginal product equals the present value of one’s career earnings stream. (This career-long condition is the multiyear analogue of the single-year profit-maximization conditions discussed in chapter 3.) Thus, for firms choosing the "underpayment-now, overpayment-later" compensation scheme to be competitive in both the labor and the product markets, the present value of the yearly amounts by which marginal revenue product \( (MRP) \) exceeds compensation early on must equal the present value of the later amounts by which \( MRP \) falls short of pay.

**GRAPHICAL ANALYSIS** The above compensation plan is diagrammed in Figure 11.2. We assume that \( MRP \) rises over a worker’s career but that in the first \( t^* \) years of employment, compensation remains below \( MRP \). At some point in the worker’s career with the firm—year \( t^* \) in the diagram—compensation begins to exceed \( MRP \). From \( t^* \) until retirement in year \( r \) is the period during which diligent employees are rewarded by receiving compensation in excess of what they could receive elsewhere (namely, their \( MRP \)). For the firm to be competitive in both the labor and the product markets, the present value of area \( A \) in the diagram must equal the present value of area \( B \). (Area \( B \) is larger than area \( A \) in Figure 11.2 because sums received further in the future are subjected to heavier discounting when present values are calculated.)

**RISKS** To be sure, there are risks to both parties in making this kind of agreement. On the one hand, employees agreeing to this compensation scheme take a chance that they may be fired without cause or that their employer may go bankrupt before they have collected their reward in the years beyond \( t^* \). It is easy to see that employers will have some incentives to renegae, since older workers are being paid a wage that exceeds their immediate value (at the margin) to the firm.
Productivity and the Sequencing of Pay

On the other hand, employers who do not wish to fire older people face the risk that these "overpaid" employees will stay on the job longer than is necessary to collect their reward—that is, stay on longer than time $t$ in Figure 11.2. Knowing that their current wage is greater than the wage they can get elsewhere, since it reflects payment for more than current output, older employees will have incentives to keep working longer than is profitable for the firm.

**EMPLOYEE SAFEGUARDS** Some safeguards for employees can be built into the employment contract when this type of pay sequencing is utilized. Employers can guarantee seniority rights for older workers, under which workers with the shortest durations of employment with the firm are laid off first if the firm cuts back its workforce. Without these seniority rights, firms might be tempted to lay off older workers, whose wages are greater than $MRP$, and keep the younger ones, who are paid less than $MRP$ at this point in their careers.

Employees can also be protected later in their careers by obtaining part of their overpayment in the form of vested pension rights. Once vested (within five years of service, under federal law), employees covered by pension plans have rights to a benefit upon retirement even if they are separated from their employer before retirement age.

Ultimately, however, the best protection older workers have may be the employer's need to recruit younger workers. If a certain employer gains a reputation for firing older workers despite an implicit agreement not to do so, that employer will have trouble recruiting new employees. However, if the company is in permanent decline, if it faces an unusually adverse market, or if information on its employment policies is not easily available, incentives to renege on its promises could be very strong.

**EMPLOYER SAFEGUARDS** Before 1978, many employers had mandatory retirement ages for their employees, so that they could enforce retirement at point $t$, for example. However, amendments to the Age Discrimination in Employment Act in 1978 and 1986 precluded mandatory retirement for most workers. Age-discrimination legislation also makes it very difficult for employers to reduce the wages of workers who stay past point $t$. Thus, employers with underpay-overpay plans are now faced with greater difficulties in getting employees to retire.

One action employers with these plans have taken is to offer large inducements for workers to retire at a certain age. For example, a study of pension plans in 190 of the largest companies in the United States (employing about one-quarter of all workers) found that it is common for the present value of pension benefits, summed over the expected lifetime of the retirees, to decline as retirement is postponed. This study discovered that for workers with typical earnings and years of service, the present value of pension benefits was over 25 percent greater if retirement occurred five years before, rather than at, normal retirement age.38

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WHO ADOPTS DELAYED COMPENSATION? One implication of the under-payment-overpayment compensation scheme is that it is more likely to exist for jobs in which close supervision of workers is not feasible. Indeed, a study that separated jobs into those that were conducive to close supervision and those that were not found that jobs in the latter category were more likely to have relatively high wages for older workers, and (in the past, at least) mandatory retirement rules.39

Promotion Tournaments

Another form of worker motivation within the context of internal labor markets might best be called a promotion tournament. Tournaments have three central features: who will win is uncertain, the winner is selected based on relative performance (that is, performance compared with that of the other “contestants”), and the rewards are concentrated in the hands of the winner so that there is a big difference between winning and losing. Not all promotions within firms satisfy this definition of a tournament, largely because the rewards are relatively small and the winners are easy to predict. For example, one study found that promotions were typically associated with increased wage growth of 2 to 3 percent, and those who received their first promotion most quickly tended to be promoted most quickly later on as well.40

Promotions to very senior leadership positions, however, often take place through a process that fits the description of a tournament.41 The fortunate vice presidents who are promoted above their rivals to CEO in America’s largest corporations, for example, can expect to receive an addition to lifetime income that is in excess of $4 million.42 The magnitude of this payoff suggests it is a prize offered at the end of a tournament; after all, if one vice president were actually that much more productive than all the others, he or she would have been promoted (or the others fired) long ago! What determines a tournament’s strength of incentives, and what are the problems that promotion tournaments must address?

INCENTIVES FOR EFFORT In any tournament, athletic or otherwise, the contestants must decide how much effort to devote to winning. In tennis, for example,


42Bognanno, “Corporate Tournaments,” 299 (adjusted for inflation).
a player must decide how much to risk injury by diving or straining for a ball that is difficult to reach. In the corporate world, parents need to consider whether working another week of nights at the office (on a project, say) is worth sacrificing the time with their children. We can hypothesize that contestants will decide to expend the extra effort if the marginal benefits they expect to gain exceed the added risk, inconvenience, or disutility.

The marginal benefit that the extra effort produces is a function of two things: the increased probability of winning and the value (including prestige) of the winner’s prize. The extent to which one’s chances of winning are improved depends on the now familiar issue of how closely effort is linked to output. If winning is largely a matter of luck, for example, spending extra effort may have little effect on the outcome.43

The value of the winner’s prize, of course, depends on the disparity between what the winner and losers receive. Tournaments designed to elicit effort that entails great personal sacrifice, or that have so many contestants that extra effort improves one’s chances only to a small degree, require a large prize to create incentives.

Tournaments also enhance output because of their sorting value. People who have confidence in their own abilities and a willingness to sacrifice now for a shot at the prize are much more likely to enter a tournament than others. Thus, employees self-select into (or out of) promotion tournaments, and by so doing they signal things about themselves that employers might otherwise find difficult to judge.

**PROBLEMS** One problem with tournaments is that, as with merit pay based on relative performance, contestants may allocate effort away from increasing their own output and toward reducing the output of their rivals. Sabotage benefits them but not their employer. Another incentive problem is that, once the tournaments are over and the winners and losers have been identified, the winners may rest on their laurels and the losers may no longer have incentives to work hard—which means that the employer will have to use other means to maintain their effort (see Example 11.5).

Organizations running promotion tournaments also have to be concerned about how to treat the losers. A large disparity in earnings produces large incentives during tournament play, but it also means that the losers do relatively badly. If a firm is perceived as treating losers callously, it will have problems attracting contestants in the first place (after all, most contestants lose). Thus, the firm has to specify a disparity that is large enough to provide incentives but small enough to provide contestants!

Promotion-related incentive plans face additional problems, however, when employees find it feasible to seek careers outside their current organization and are able to send at least some signals of their productivity to other potential employers. We turn now to an analysis of situations in which the career concerns of employees might orient their efforts toward seeking employment elsewhere.

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43For a paper that analyzes the criteria firms set for winning a tournament in the context of (a) stimulating effort among executives while (b) discouraging them from undertaking programs that place the firm at excessive risk, see Hans K. Hvide, “Tournament Rewards and Risk Taking,” *Journal of Labor Economics* 20 (October 2002): 877–898.
EXAMPLE 11.5

Demanding Employers, Overworked Employees, and Neglected Families

Salaried workers often put in very long hours at work, frequently on short notice, or are expected to travel or even relocate their families at the wishes of their employers. Many believe they are required to enthusiastically respond to the unanticipated needs of their employers without the employers feeling a reciprocal obligation to support them when needs arise at home. Is this imbalance the result of powerful employers exploiting helpless workers? Maybe, but the considerations of this chapter suggest an alternative explanation: perhaps these workers are receiving efficiency wages or have chosen to compete in promotion tournaments.

There are two reasons employees who receive efficiency wages or are in tournaments work so hard. One reason is that their employers have the ability to make heavy demands, and the other is that their employers have an incentive to be demanding.

Their employers have the ability to demand long hours on short notice, say, because the employees receive a reward for remaining with the firm. Workers who quit a firm that offers efficiency wages face the prospect of another job at a lower wage, and those who quit a tournament obviously forfeit their chances of winning.

Incentives for the employers to be demanding stem from their need to distinguish applicants who are inherently work oriented from those who are not. Firms offering tournaments need to attract those who are inherently work oriented, because they do not want either the winners or the losers to slack off after the competition is over and the winner is announced. Firms paying efficiency wages must be careful to employ only those who will become worth their above-market wages with relatively little supervisory effort. The problem is how to identify those who are truly work oriented, either at the time of application or shortly thereafter.

All applicants will claim to be hard workers, of course, and even those who have strong preferences for leisure can pretend to be work oriented for a time after hire. Employers therefore need to elicit a signal from their applicants or employees about their true work orientation, and one way to do this is to announce to all applicants that long hours and uncompromising loyalty are expected. The expectations obviously must be reasonable enough that the firms can generate applicants, but in terms of our signaling discussion in chapter 9, the announced work requirements must be demanding enough to discourage pretenders from applying for, or accepting, employment with these firms.

Unfortunately, however, while employers offering efficiency wages and promotion tournaments will strive to make themselves unattractive to those with relatively strong preferences for leisure, they will also make themselves unattractive to anyone with significant household responsibilities!


Career Concerns and Productivity

Employees often define themselves more as members of a profession or field than as members of a particular organization. As such, they may be as motivated to impress other employers (in the hopes of receiving future offers) as they are their own. What are the implications of these "career concerns"?
THE DISTORTION OF EFFORT Other employers can observe objective measures of performance more easily than subjective measures ("quality," for example). As a result, employees with career concerns have an incentive to allocate their efforts toward measurable areas of performance and deemphasize areas that other employers cannot observe. As discussed earlier, executives looking for opportunities elsewhere have incentives to pursue strategies that yield short-run profits (which are highly visible) even if doing so harms the long-term interests of their current employer.44

PIECE RATES AND EFFORT While job possibilities with other employers can distort workers' allocations of their effort, they can also solve yet another problem with piece-rate pay. In a world in which products and technologies are constantly changing, piece rates must be continually reset. In establishing a piece rate, the employer makes a guess about how long it takes to complete the task and calibrates the piece rate so that the average hourly earnings of its workers are attractive enough to recruit and retain a workforce.

Management, however, can never know for sure just how long it takes to complete a task, given a reasonably high level of effort by production workers. Moreover, as noted earlier, workers have incentives to "go slow" in trial runs so that management will overestimate the time it takes to complete the task and set a relatively high piece rate. If workers know that the estimated time for task completion is too high, they may deliberately work slowly out of fear that the firm will later reduce the piece rate if it finds out the truth.

Employees who are mobile across firms, however, will be less concerned about their current employer's future actions. They are more likely to decide to work at top speed, so that other employers are sufficiently impressed to hire them in the future. Where workers' pay is at least partially based on a piece rate, then, career concerns can be helpful in eliciting maximum effort from one's employees.

THE SEQUENCING OF EFFORT For employees who are concerned about future promotions, whether with their current employer or elsewhere, there are usually two general incentives for high productivity: one's current pay and the chances of future promotion. When career (that is, promotion) concerns are strong, employers may not need much in the way of current pay-for-performance incentives to motivate their employees. As career concerns weaken, firms may need to adopt more current incentives to maintain worker effort.45

44When workers' current employers can observe their true productive characteristics better than outsiders can, outsiders (that is, other employers) wanting to make "talent raids" may reasonably infer who are the most valuable employees from observing who is promoted. Thus, promotion itself sends information to other employers, which may help the employee who is promoted but harm his or her current employer. Several papers have addressed this issue, among which are Dan Bernhardt, "Strategic Promotion and Compensation," *Review of Economic Studies* 62 (April 1995): 315–339; and Derek Laing, "Involuntary Layoffs in a Model with Asymmetric Information Concerning Worker Ability," *Review of Economic Studies* 61 (April 1994): 373–392.

Workers are more likely to be motivated by career concerns, and less by pay for current performance, when they are inexperienced. Paying them for current performance runs into the problem that output is a function of ability, effort, and luck—and when workers are young, their abilities are unknown to themselves and their employers. Relating pay to the performance of inexperienced workers may not increase their incentives much because, with ability unknown, the connection between effort and output is unclear. The incentive to work hard is strong for those with career concerns, however, because they realize that employers are observing them to estimate their abilities and their willingness to put forth effort.

Moreover, the inability of employers (especially outside employers) to closely monitor workers’ efforts can, in the presence of career concerns, lead to more effort. Employees realize that future promotions depend in part on employers’ beliefs about their ability. Because some of their efforts can be hidden, inexperienced workers have incentives to put in extra, hidden effort in an attempt to mislead employers about their ability. For example, an employee expected to work 50 hours a week may put in an extra 20 hours at home to boost performance in an attempt to raise employers’ perceptions of his or her ability.

As one’s career progresses, however, ability becomes known with more certainty and the career-based incentives for extraordinary effort decline. Fortunately, as noted above, the case for performance-based current pay also becomes stronger. Indeed, one study found that older CEOs were paid more on the basis of current performance than were younger CEOs.46

Applications of the Theory: Explaining Two Puzzles

The conceptual issues outlined in this chapter can help to shed light on two compensation questions that puzzle labor economists: why pay increases with seniority, and why larger employers pay higher wages. In both cases, multiple theoretical or data-related reasons can be called upon to explain the empirical phenomenon; some of these were presented in this chapter and some were introduced earlier. This section briefly summarizes these reasons and, where relevant, reviews the results of empirical studies to evaluate which ones seem most relevant.

Why Do Earnings Increase with Job Tenure?

Earnings rise with age and general labor market experience, as we saw in chapter 9; however, within age groups, wages additionally rise as tenure with one’s employer increases. Why does the length of time with one’s employer matter? There are three sets of explanations for why wage increases should be associated with job tenure, holding age (or general labor market experience) constant.47

The simplest assumption is that workers are paid wages equal to their marginal revenue product at all times—see panel (a) in Figure 11.3—so that wages and

46Gibbons and Murphy, “Optimal Incentive Contracts in the Presence of Career Concerns.”
47A review of this puzzle and the early empirical work on it can be found in Robert Hutchens, “Seniority, Wages, and Productivity: A Turbulent Decade,” Journal of Economic Perspectives 3 (Fall 1989): 49–64.
Applications of the Theory: Explaining Two Puzzles

**FIGURE 11.3**
Alternative Explanations for the Effect of Job Tenure on Wages

(a) General Human Capital

\[ W = MRP_L \]

Years of Tenure

(b) Firm-Specific Human Capital

\[ MRP_L \]

Years of Tenure

(c) Delayed-Compensation Incentives

\[ W \]

Years of Tenure

productivity rise together as length of time with an employer increases. Clearly, if general training, which is useful to a number of potential employers, is taking place, wages will rise with age—but our question is why they additionally rise as tenure with an employer rises. A reason explored in chapter 5 is related to the matches between the job and the worker. With many potential employers for any given worker, and with the costs entailed in any job search, it is very unlikely that all workers will quickly find the job that puts their skills to the highest-value (and therefore best-paying) use. Some will get lucky early on, of course, and the lucky ones will tend to stay with their employers and cease further searching. Those who are not so lucky will continue searching for better jobs (and pay) and will therefore have shorter job tenures. Thus, it can be argued that longer tenure and higher wages both reflect the same phenomenon: better (more productive) matches between the job and the worker.

The second explanation asserts that firm-specific investments are jointly undertaken by workers and their employers (see chapter 5). The joint investment creates a surplus that is shared by the worker and the firm; therefore, workers generally receive wage increases that are less than the increase in their productivity. As illustrated in panel (b) of Figure 11.3, with firm-specific investments, wages are below—and rise more slowly than—marginal revenue productivity.

Finally, this chapter has offered yet a third explanation for rising wage profiles: they may be part of a delayed-compensation incentive system designed to attract and motivate workers who have long-term attachments to their employers. Under this third explanation, which is depicted in panel (c), wages rise faster than marginal revenue productivity and ultimately rise above it.48

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48A variant of this third explanation is that employers offer rising wage profiles because employees prefer them. It is argued in Robert H. Frank and Robert M. Hutchens, "Wages, Seniority, and the Demand for Rising Consumption Profiles," *Journal of Economic Behavior and Organization* 21 (August 1993): 251–276, that employees' utility is in part a function of their wage increases (not only their wage level). Therefore, to be competitive in the labor market, employers are induced to offer them wage profiles that start lower and rise faster than they otherwise would.
Economists have been interested in devising empirical analyses that distinguish among these competing theories, but directly measuring productivity is not generally feasible. Therefore, most studies have identified workers for whom theory suggests that one or another of the above explanations is very likely (or unlikely), and then compares their wage profiles with those of other workers. Support for an explanation can be inferred if the relative wage profiles display their predicted patterns. For example, delayed-compensation plans are unnecessary if the output of a worker is easily monitored or if the worker is self-employed or paid a piece rate. If we can find evidence that wages for these workers rise more slowly than average, it would lend support for the existence of delayed-payment schemes. Likewise, if tenure profiles are steepest during periods when workers are most likely to be receiving training, support for the human capital explanations could be inferred. To date, the best of the explanations for rising tenure profiles has by no means been discovered—and, of course, it may be that each correctly provides a partial explanation for the increase of earnings with job tenure.

Why Do Large Firms Pay More?

Roughly one-fourth of all American private sector employees work in firms with fewer than 20 workers, while another one-fifth work in firms with more than 500. Workers in the latter group, however, are much better paid; it has been estimated that they earn 12 percent more than those with the same measured human capital characteristics who work in the smallest firms. It also is the case that wages rise faster with experience in the largest firms.


The explanations that have been offered for why larger firms pay higher wages are rooted in claims that they need better workers and/or that they have better opportunities to make their workers more productive. One potential explanation, for example, is that there are economies of scale in job training; larger firms are therefore more likely to offer it and, of course, have greater need to attract workers willing to undertake it.

A second possible explanation is that large firms more often use highly interdependent production processes, which require that workers be exceptionally dependable and disciplined (one shirking worker can reduce the output of an entire team). Workers in a highly interdependent production environment are more regimented and have less ability to act independently, and their higher wages can be seen as a compensating wage differential for the unattractiveness of a job requiring rigid discipline.

A third hypothesis is that larger firms find job vacancies more costly. They tend to be more capital-intensive and, as noted above, have more interdependent production processes. Therefore, an unfilled job or an unexpected quit could more severely disrupt production in larger firms and, by idling much of its labor and capital, impose huge costs on the firm. In an effort to reduce quits and ensure that vacancies can be filled quickly, larger firms thus decide to pay higher wages—even when the work environment is not unattractive and efficiency wages are otherwise unnecessary (because other work incentives exist).

A fourth hypothesis argues that workers in larger firms are more productive because larger firms have more options for allocating workers to various tasks and machines efficiently. They have enough capital, labor, and customers, so the argument goes, that their workers experience less idleness and the most productive workers can be paired with the newest and most productive machines.

The remaining hypotheses are rooted in concepts discussed in this chapter. One is that large firms make available to workers many steps in a career ladder, so that long-term attachments between worker and employer are more attractive than in smaller firms. As has been noted in this chapter, employers whose workers are seeking long-term attachments have more options for using pay to motivate


Are Workers Willing to Pay for Fairness? Using Laboratory Experiments to Study Economic Behavior

When discussing the problems of motivating individuals in a group, we noted that opinion surveys of both workers and human-resource managers suggest that perceptions of fairness will affect the productivity of employees. Can we obtain independent evidence on whether workers derive utility just from their own earnings and the consumption such earnings permit, or whether their earnings relative to those of others also affect their utility? Putting the question differently, do workers care only about their absolute level of earnings, or does their concern for fairness cause them also to care about how their earnings level compares with that of others?

If fairness is something workers value, economic theory predicts that they should be willing to pay a price to obtain it. Finding natural experiments that test this prediction is difficult, so some economists have turned to laboratory experiments as a way to gain insights into what motivates people.

Consider the following game conducted with 112 economics and business students at the University of Wisconsin, Madison. The students were anonymously paired (they never found out with whom they were paired). One was designated the "proposer" and the other the "responder." The objective of the game was to divide up to $12. The proposer indicated how each dollar was to be divided, and the responder then chose how many dollars (zero to 12) were to be divided.

If the proposer indicated, for example, that he or she would keep 75 percent of all dollars divided, the responder could walk away with at most $3—by proposing to split the whole $12. In this case, the proposer would receive $9. If responders cared only about their own gains and not about rewards to others, they would not choose to shrink the pool. However, if responders cared so much about their relative payoffs that they were willing to give up some gains to retaliate against what they considered unfair treatment by the proposer, they could do so by shrinking the pool. For example, if a responder thought the 75/25 split was unfair, he or she might shrink the pool to $8, in which case the responder would walk away with $2 and the proposer would receive only $6. In this case, we would observe responders giving up $1 for the utility gained by inflicting $3 of loss on the proposer.

The results of the above laboratory experiment indicated that about half of the responders accepted whatever split was proposed, concerned primarily with self-interest, and the other half were concerned with issues of fairness...
was proposed and did not choose to shrink the pool. That is, roughly half were concerned only about their own, absolute payments.

Among the roughly half who were concerned enough about fairness to pay something to retaliate, how much were they willing to pay? The average proposal was for the responder to receive about 40 cents of each dollar split, and with proposals of a 60/40 split, those who were willing to retaliate shrunk the pool by about $3. With a pool now shrunk by $3, these responders indicated that they were willing to give up $1.20 (0.4 × $3) to inflict a loss of $1.80 (0.6 × $3) on the proposer.

While we might question whether the players chosen for the game and the amounts of money at risk accurately portray preferences of real workers in real jobs, laboratory experiments such as this one do offer a major advantage over opinion surveys. The players are not merely responding hypothetically to questions; rather, they are engaging in actual behavior that has a consequential (monetary) outcome. In recent years, laboratory experiments have become an accepted tool for gaining insight into economic behavior when it is difficult or infeasible to generate behavioral data from real markets.


productivity. Efficiency wages are a more effective motivator when there is an expected long-term attachment, because workers’ losses from being terminated rise with both their wage level and the length of their future expected tenure. Deferred-compensation schemes and promotion tournaments obviously can be used only in the context of long-term attachment.

While large firms have more opportunities for adopting efficiency wages, deferred-compensation plans, or promotion tournaments, they may also have a greater need to adopt one or more of these schemes. Owing to sheer size, it is argued, they find it more difficult to monitor their employees and thus must turn to other methods to motivate high levels of effort. One study concluded that the firm-size effect is more related to the presence of efficiency wages than to compensating wage differentials for a demanding work environment. 57

Review Questions

1. Explain the underlying principle and the necessary conditions for implicit contracts in the labor market to be self-enforcing.

2. The earnings of piece-rate workers usually exceed those of hourly paid workers performing the same tasks. Theory suggests three reasons why. What are they?

3. Suppose that as employment shifts out of manufacturing to the service sector, a higher proportion of workers are employed in small firms. What effect would this growth of employment in small firms have on the types of compensation schemes used to stimulate productivity?

4. Suppose two soft-drink bottling companies employ drivers whose job it is to deliver cases of drinks to stores, restaurants, and businesses. One company pays its drivers an hourly wage, and the other pays them by the number of cases delivered each day (which can be affected by efforts of drivers to visit and sell to new customers). Which company is more likely to experience higher rates of traffic accidents among its drivers? Why?

5. “The way to get power over workers is to underpay them.” Comment.

6. Some real estate brokers split the commission revenues generated by each sale with the responsible agent. Others, however, require their agents to pay them (the brokers) money up front, and then allow the agents to keep the entire commission from each sale they make. Which agents would you predict to have the larger volume of sales, those who split all commissions with their employer or those who pay an upfront fee to their employer and then keep the entire commission? Explain.

7. In recent years, many plants have closed, forcing thousands of workers out of their jobs and into new ones. Studies of wage loss suffered by these displaced workers find that, among groups of workers with exactly the same skills and types of training, workers who had been with the firm for many years and were in the 55-64 age range had greater wage losses than those in the 25-34 age range. How might a compensation scheme designed to enhance worker motivation lead to this result?

8. A recent magazine article on Japan’s economic problems stated: “As the post-war baby-boomers reach their 50s, Japan’s lifetime-employers are carrying the cost of paying their senior workers more than they are worth.” Is this comment consistent with economic theory? Explain.

Selected


