1

SETTING HIRING STANDARDS

When you're around someone good, your own standards are raised.

—Ritchie Blackmore, 1973

*I*n this chapter our goal is twofold: to introduce the topic of recruitment and to introduce the economic approach used in the textbook. Let's ease into both by considering an example.

AN EXAMPLE: HIRING RISKY WORKERS

New Hires as Options

Imagine that you are a partner in an investment bank in the City (financial district) in London and are deciding between two candidates to fill a position as an associate (junior) investment banker. Gupta has the standard background of most of the applicants that you see, including a degree in economics, a few years of experience as a financial analyst, an MBA with a focus in finance, and a summer internship at an investment bank. You feel that his productivity is highly predictable, and that he can produce £200,000 of value per year. Svensen, however, has a very unusual background compared to other applicants. She has a strong track record and appears quite talented, but does not have much experience related to investment banking. Thus, you feel that her success is much less predictable. She may turn out to be a star, in which case she will produce £500,000 per year, but she may also turn out to be a disaster, actually losing £100,000 per year. Suppose that each of these outcomes for Svensen is equally likely (50 percent odds). Then *expected* (average) output from Svensen in any given year is exactly the same as the output from Gupta:

Expected output from Svensen $= \frac{1}{2} \cdot £500{,}000 - \frac{1}{2} \cdot £100{,}000 = £200{,}000.$

FIGURE 1.1
HIRING A RISKY OR PREDICTABLE WORKER
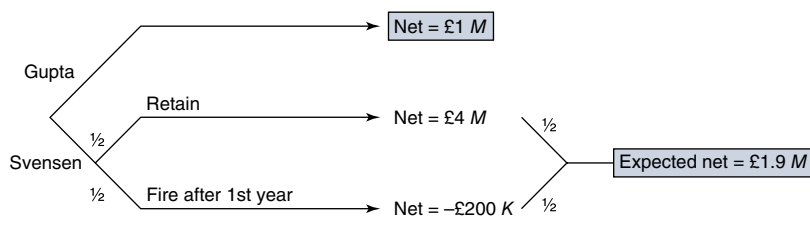
If the cost (wages and benefits) of both employees is the same, which is the better hire? The answer might seem counterintuitive, but often the firm should hire the *riskier* worker.

Suppose that both Svensen and Gupta can be expected to work at your firm for 10 years. Suppose further that it takes one full year to determine whether Svensen is a star. The salary is £100,000 a year, and for the moment let us assume that this will be the salary for the foreseeable future.[1] In that case, your firm earns a profit of £100,000 per year from Gupta, for a total value of £1 million over 10 years. The top branch of Figure 1.1 shows this choice.

Alternatively, you can hire Svensen. With probability equal to ½ that Svensen is a star, producing £500,000 per year, your firm earns profits of £400,000 from employing her for 10 years, netting £4 million. With probability equal to ½ that Svensen loses money for your firm, you can terminate her at the end of the year, so the total loss is £200,000, including her salary. These two outcomes are the remaining branches in Figure 1.1. Thus, the expected profit from hiring Svensen is:

Expected profit from Svensen = ½ · £4,000,000 − ½ · £200,000 = £1,900,000.

Svensen is therefore almost twice as profitable to hire as Gupta! Even though the two candidates have the same expected value, Svensen is worth much more. The firm can keep her if she turns out to be a good employee and dismiss her if she turns out to be a bad one. The firm has the option of firing poor workers and keeping the good ones.

This is the argument that is sometimes made for hiring workers with potential over conservative, proven ones. With the more proven worker, the firm gets a solid performer. With the risky worker, the firm may find that it made a mistake, but this can be remedied relatively quickly. It may also find that it has a diamond in the rough. In such a situation, it may make sense for the firm to *lower* (or broaden) recruiting standards and consider some less conventional candidates.

---

[1] In this example, we ignore issues of present value by assuming that the interest rate is zero to keep things simple. When we do this in examples in this book, it is always the case that the intuition that is developed would be identical if we used discounted present values. Similarly, all examples in this text use inflation-adjusted figures, since inflation does not affect the conclusions.

This simple example can be quite surprising to many students, since it seems to contradict the intuition that, if expected values are equal, risk is always a bad thing. However, risk is not a bad thing in the case of real options such as hiring employees. It is a nice example because it illustrates how formal economic analysis can lead to better decisions. Our intuition tends to be the opposite of the correct answer in this case.

Analysis

The structure developed here suggests several other factors that are important in deciding whether to take a chance on a risky hire.

Downside Risk

The value of taking a chance on a risky candidate can be so large that it is often the better strategy even if the safe worker has a higher expected value per year. Even if Svensen might have been a total disaster, destroying £1,000,000 of value with a probability of ½, it would have paid to take a chance on her. However, the more the potential there is for an employee to destroy value, the less likely is it to be optimal to take a chance on a risky worker.

Upside Potential

Svensen was potentially valuable because she could generate high profits if she turned out to be a star. The greater those profits, the greater the option value from a risky hire. Thus, in jobs where small increases in talent lead to large increases in value creation, hiring risky candidates will be even more valuable (as long as there is no increased downside risk as well). Think of an entrepreneur assembling a new management team. There is little to lose, but there may well be much to gain. In such a case, it will make more sense to take a chance on a risky candidate.

Our analysis applies better to job applicants with more uncertainty about their potential performance. Little is known about a recent graduate with a short resume, but someone who has 20 years of experience may have more predictable performance. Firms might take more chances on new labor market entrants. Similarly, a job applicant who is changing occupations may be worth considering.

Finally, firms should consider the upside potential of the specific candidate. An applicant with an unusual background, but with evidence of adaptability to different situations, creativity, and strong abilities, may be a good person to consider for a risky hire.

Termination Costs

The more costly it is to fire a worker, the more costly is a risky candidate. Nevertheless, it may still pay to hire the risky worker and terminate in the case that the worker does not turn out to be a good fit, even if there are high termination costs. In most countries, firms are prevented from terminating workers at will. Legal or social restrictions can make the option of firing a worker after one year costly. Consider the extreme case where hiring is for life. If the firm is risk neutral (is willing to accept any risks, as long as expected values are equal), as long as Svensen's expected productivity is equal to or greater than Gupta's, it will be a profitable bet to hire Svensen. More generally, the benefits from the

case where Svensen turns out to be a star are so high that it would often be worth hiring Svensen even if firing costs were high.

Risk Aversion

If the firm is risk averse, it may still be optimal to hire Svensen. Svensen will now be costly to the firm in a different way, because she is risky. However, the differences in expected productivity are quite large and should more than compensate for typical levels of risk aversion.

AN IMPLEMENTATION PROBLEM

◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆

The issue of risk aversion raises an interesting point. When managers and recruiting specialists are taught this example, their typical response is to reject its conclusions, saying that they would be more conservative in hiring. Why is this the case? Is the theory wrong or are the managers wrong? Quite possibly, neither. Rather, the analysis assumes that the firm is relatively risk neutral. However, decision makers are typically risk averse, and this will affect their decisions. For example, they might expect that they will be criticized or receive a poor evaluation if they hire a bad candidate for the job. The more risk averse they are, the more they will make decisions to avoid such an outcome.

To the extent that a manager's risk aversion is different from that of the employer, this is an incentive problem or a conflict of interest. This is a topic that we will address in Chapters 9–12. In the meantime, if those who make hiring decisions are too conservative, a possible solution to the problem would be to try to avoid punishing them when they make mistakes in hiring. Another would be to appoint less conservative managers to handle recruitment.

Length of Evaluation

The time that it takes to evaluate whether Svensen is a star or a disaster affects the value of hiring a risky candidate. If the evaluation takes 10 years, in our example there is no value to hiring Svensen. If the evaluation takes only one year, the firm can limit its cost of a disastrous hire to only one year of pay and poor productivity.

Length of Employment

The value of hiring Svensen would have been even greater if the firm could have employed Svensen for more than 10 years. For example, if Svensen was 30 years old when hired and stayed at your company (for the same salary) until retirement, the profit from hiring Svensen would be £14 million if she turned out to be a star (£400,000 per year × 35 years). This suggests that the value of a risky hire will usually be larger the younger the new hire and the lower the turnover in the company (so that employees tend to stay with the firm longer).

A Counterargument

Our conclusions are only as good as the assumptions behind them. An important element of the economic approach to personnel is careful consideration of when the assumptions do or do not apply and of what the effect would be of changing key assumptions. In the model above, the conclusion rested primarily on one key assumption: that we can profit when we find a star employee. Let us reconsider this assumption.

If Svensen turns out to be a star, is it safe to assume that we can continue to pay her £100,000? Might she try to bargain for a better salary? Might other employers try to hire her away from us? What would happen to our argument if these considerations applied?

These questions bring up a crucial consideration throughout this book: The firm always has to match an employee's outside market value. More precisely, the firm offers a job *package* with many characteristics, including the type of work, extent of effort required to do the work, degree of training, pay and other benefits, possibility for further advancement, and job security. The employee will consider all elements of the package in valuing the job and compare it to alternative jobs offered by competing employers. Firms must make sure that their job offers match those of competing employers in terms of pay and other characteristics.

For now, let us keep things simple and focus on pay and productivity. Suppose that other employers can observe how productive Svensen is. Moreover, assume that Svensen's productivity as a star or a disaster would be the same at any other investment bank. These are reasonable starting assumptions for investment banking; the work is often quite public and is similar at most firms.

When this is the case, if Svensen is revealed to be a star, other investment banks will be willing to pay her more than £100,000 per year. In fact, they should be willing to pay as much as £500,000 per year, since that is her productivity. Labor market competition will tend to drive competing employers toward zero profit from hiring Svensen.

If Svensen is a disaster, no investment bank should be willing to hire her. She is likely to find better employment in a different industry where her productivity is not negative.

What is the benefit to your firm of hiring Svensen in this case? There is none. In order to retain her if she is a star, you have to compete with other firms and would end up paying about £500,000 per year. In other words, our conclusion that it would pay to hire a risky candidate rested on our ability to earn a profit from Svensen if she turned out to be a star.

How can we benefit from Svensen? There are two possibilities.

Asymmetric Information

Competing firms may not figure out Svensen's productivity, at least not immediately. Even though investment banking is often quite public work, some of it is not, and the work is also generally done in teams. Outside firms may find it difficult to estimate Svensen's individual contribution because of these factors. This implies that in industries where productivity is less individualistic and less public, hiring a risky candidate is more likely to be worthwhile. Furthermore, to the extent that your firm can delay

the ability of the labor market to figure out who your stars are, it can profit from the informational advantage. Therefore, your firm may want to avoid public recognition of Svensen's contribution.

Firm-Specific Productivity

Svensen's productivity may be higher at your firm than at other firms. To the extent that this is true, Svensen may be a star at your firm, but less so or not at all at other firms. Then they will not bid up Svensen's market value as much, and there may be profit to your firm from employing Svensen. In Chapter 3, we will discuss two important reasons why Svensen's productivity may be higher at your firm than elsewhere: firm-specific job matches or human capital. The more important is either, the more likely is it to be profitable to hire a risky candidate.

One last issue here: Even if there is profit from hiring Svensen compared to what she can earn from other employers, there is still a question of how that profit is split between Svensen and the firm. That raises the question of bargaining. We will not focus on that issue in this text. However, we do discuss it briefly in Chapter 3 when we analyze how to share investments in firm-specific human capital.

GOOGLE'S UNUSUAL APPROACH TO RECRUITING

Google, a leading Internet search engine, competes with many high-technology companies for talent. It desires talented, creative employees that fit with its geeky and informal culture. To distinguish itself from other recruiters, Google has been famous for its unusual methods.

In one case, it inserted an "aptitude" test in technology magazines. It included questions such as, "How many different ways can you color an icosahedron with one of three colors on each face?" In another case, it placed billboards that read only "(first 10-digit prime found in consecutive digits of e).com." The correct answer took you to a Web site seeking resumes of job applicants.[2]

Such tactics serve three purposes. One is to provide information to recruits about the type of candidate that fits at Google. Another is to set the tone for future employees, because Google has a distinctive corporate culture. Recruiting is a crucial point at which to start defining the implicit contract, a concept that is discussed in later chapters. Finally, the tactics get Google valuable attention in the press—and in textbooks.

Although these tactics generated attention, Google analyzed data on its recruits and employee performance and concluded that it focused too much on technical expertise

---

[2]An icosahedron has 20 sides, so you can color it with three colors as many as 3^{20} ways (allowing for some that use only one or two colors). That equals 3,486,784,401. The first 10-digit prime number in consecutive digits of *e* is 7,427,466,391.

and graduating from an elite university. The company also decided to use different hiring criteria for technical and nontechnical roles. Now they also try to assess applicants on criteria such as the applicant's ability to learn, humility, and emergent leadership (ability to effectively lead a work team toward a successful achievement of goals).

Source: New York Times, February 22, 2014

The example of risky hires is a good introduction to the economic approach to studying personnel issues. We used a simple model to analyze a complex decision. The model was useful in guiding us to important issues to consider in making this kind of hiring decision. Once the structure was set up, we were able to study the problem formally, even expressing some ideas in a few simple equations. The equations can be an effective way to rigorously express certain ideas. We will use these techniques throughout the book.

Simplification of a complex problem makes it easier to solve the problem and get concrete answers. Of course, too much or inappropriate simplification can lead to incorrect answers, so one must be careful. But when applied intelligently, simple economic modeling can lead to powerful and practical analyses.

When we analyze organizational issues in this textbook, we will see the same set of economic ideas appearing over and over again. By the end of the book, we will have an economic toolbox that can be used to analyze all sorts of personnel problems. You will see examples in Chapter 4, where we use the principles discussed in the first three chapters to analyze some specific personnel policies. Economic concepts that we use in analyzing risky hires include labor market competition (for employees), prices (salary), asymmetric information, and incentives. For those who have studied economics, this will be familiar territory: It is microeconomics applied to how firms are designed and their employees are contracted with.

SETTING HIRING STANDARDS

Let us now step back and think about what hiring standards the firm would like to establish, before it actually begins recruiting employees. In the following, keep in mind that the firm's objective is to maximize profit. We assume that there are no constraints on the firm's ability to hire as much labor as it desires. Finally, we also assume that the price at which the firm sells its output and the price per hour it pays employees are constants.

Balancing Benefits Against Costs

Managers often say that their goal in hiring is to obtain the best quality workers. It sounds like a good idea—but is it? The most productive workers are also likely to be the most expensive. Should the goal instead be to hire the least expensive workers? A simple analysis resolves this question.

TABLE 1.1
PRODUCTIVITY AND EDUCATION OF HYPOTHETICAL EMPLOYEES

Worker ID	Monthly Sales	Education
A	$100,000	HS
B	$108,333	College
C	$125,000	HS
D	$125,000	HS
E	$133,333	College
F	$141,667	HS
G	$166,667	College
H	$175,000	College
I	$175,000	College
J	$183,333	College

Average, HS grad = $122,917
Average, college grad = $156,944

Consider the hypothetical productivity data in Table 1.1. These data indicate that college graduates are about 28 percent more productive than high school graduates.

Now consider the data on monthly wages for high school and college graduates in Table 1.2. College graduates cost more than high school graduates.

If the firm has to pay its workers approximately the wages shown in the last row of Table 1.2, then both a high school and college graduate would be profitable to employ, because their productivity is higher than their compensation. (In a complete

TABLE 1.2
WAGES FOR HIGH SCHOOL AND COLLEGE GRADUATES, UNITED STATES

Year	Monthly Wage		Ratio
	High School	College	
2012	2,719	5,013	1.84
2011	2,708	4,951	1.83
2010	2,584	4,802	1.86
2009	2,552	4,722	1.85
2008	2,607	4,884	1.87
2007	2,607	4,765	1.83
2006	2,589	4,732	1.83
2005	2,454	4,557	1.86
2004	2,386	4,297	1.80
2003	2,326	4,267	1.83
2002	2,273	4,266	1.88
2001	2,233	4,219	1.89
2000	2,141	4,133	1.93

Wages are expressed in 2012 dollars.
Source: U.S. Current Population Survey

analysis we would add in any other costs of employing them, such as fringe benefits and workspace. This example is simplified to focus on the general point.) Moreover, it would be more profitable to employ a single college graduate compared to a single high school graduate:

Monthly profit from hiring HS graduate = $122,917 − $2,719 = $120,198,

Monthly profit from hiring college graduate = $156,944 − $5,013 = $151,931.

However, this analysis is misleading. Suppose that your firm wants to hire enough workers to produce $1 million in monthly sales. This would require 6.4 college graduates at a cost of $32,083 each, or 8.1 high school graduates at a cost of $22,024 each.[3] Employing high school graduates would actually be more profitable, because high school graduates have lower cost per unit of output. Referring to the wage as W, output as Q, and letting subscripts refer to high school or college graduates:

$$\frac{W_H}{Q_H} < \frac{W_C}{Q_C}.$$

In this example, high school graduates cost about $22 per $1,000 of monthly sales, while college graduates cost about $32. As long as the expression holds, it is more profitable to hire high school graduates. If the inequality were reversed, it would be more profitable to hire college graduates instead. The most cost-effective employee has the lowest ratio of salary to output. The firm should choose this type and hire enough of them to reach the desired level of output.

This illustrates two simple but important economic principles. The first is to *always think in terms of tradeoffs between costs and benefits*. In this example, the desire for high-quality workers must be balanced against their higher cost. Many questions boil down to assessing the benefits of a given policy against the costs.

The second general principle is to *always compare your approach to your best alternative*. In this case, college graduates are profitable, but less so than high school graduates.

Foreign Competition

This analysis is useful for thinking about globalization of labor markets and the role of foreign competition. It is often argued that countries with low labor costs drive companies in countries with high labor costs out of business. Is that accurate? Table 1.3 shows representative statistics on pay and productivity (GDP, gross domestic product) for several nations. Argentina has the lowest labor costs, while Norway has the highest. However, the real issue is not whether labor is cheaper, but whether it is more cost effective. For example, U.S. labor costs are the highest, but productivity is also among the highest. In fact, the United States has the second lowest labor cost per dollar

[3]Do not be troubled by the fact that this may require hiring a fraction of a worker. It is possible to hire a fraction of a worker—by hiring someone part time or allocating an employee to other tasks part of the time. Moreover, the larger the scale of the firm, the less consequential are such issues of indivisibility.

TABLE 1.3
PRODUCTIVITY AND PAY OF MANUFACTURING WORKERS, SELECTED COUNTRIES

	GDP per Worker	Annual Salary, Manufacturing	Cost per $ of GDP
Mexico	$35,156	$12,280	0.349
United States	$101,473	$68,200	0.672
New Zealand	$57,822	$40,840	0.706
Argentina	$34,722	$25,540	0.736
United Kingdom	$76,900	$58,220	0.757
Japan	$68,220	$63,500	0.931
Australia	$80,400	$79,360	0.987
Sweden	$80,750	$87,020	1.078
Norway	$104,600	$115,320	1.103

Assumes 2000 hours worked per year. 2010 U.S. dollars.
Source: World Bank, U.S. Bureau of Labor Statistics

of productivity. A firm that had a choice between hiring U.S. or Argentinean workers would prefer the more expensive, but also more productive, U.S. workers.

These numbers are meant to be illustrative, rather than definitive.[4] Still, they make clear the point that cheap labor is not necessarily low-cost labor. Similarly, high-productivity labor is not necessarily the most profitable labor. You should seek low cost per unit of output, whether that arises from low wages, high productivity, or both.

The Method of Production

So far, we have proceeded as if production was independent across employees. In reality, production is interdependent across employees. We now consider three scenarios representing different approaches to production to see what effect the method of production has on our analysis. In the first, production is independent across workers. In the second, a worker's production depends on the skills of coworkers. In the third, a worker's production depends on the capital that worker uses on the job.

1. Productivity is independent of coworkers

A manager describes production in his unit as follows:

My team is a sales force. Each salesperson works independently. The organization consists of my salespeople and me. What kind of worker should I hire?

Here each worker's sales depend on his or her own ability and effort, irrespective of the efforts of other salespeople. This fits closely with the situation described above, so the choice between college and high school graduates is exactly the one that we have focused on so far. The simplicity of this case is best seen by comparing it to the next example.

---

[4]The numbers may contain some aggregation error. Wages are from manufacturing, but productivity is for the economy as a whole.

2. Productivity depends on coworkers

A second manager describes her production as follows:

This firm manufactures small appliances. We find it better to have a combination of worker types. High school graduates are cheaper and more cost effective in the short run, but we find that we can't keep their skill levels up without some college graduates around. The high school graduates forget what they knew. The college graduates keep the high school graduates sharp. So we like to have both kinds of workers. The problem is that I'm not sure about the appropriate balance.

Here workers interact with one another. This is much more typical than the first case, since in most workplaces many jobs are interdependent. College graduates affect the output of high school graduates and vice versa. Since college graduates are not only producing appliances, but also act as part-time teachers, part of their output consists of their effect on high school graduates.

The analysis above still holds, but output must be defined carefully. When measuring the output of college graduates, the number of high school graduates must be specified. Table 1.4 provides an example of the kind of information needed.

It is easy to see that output of a college graduate depends on the number of high school graduates working. For example, if 100 of each type are employed, total output is 63.1 units. If the number of college graduates is increased from 100 to 110, the gain in output is 3.7 units. However, if 150 high school graduates are employed, the gain in total output in going from 100 to 110 college graduates is 4.2. The gain from adding 10 college graduates is larger when there are more high school graduates around. Because college graduates train high school graduates, their services are more valuable when the firm has more potential "students" for them to teach. The larger the number of high school graduates in the workforce, the higher the value of adding college graduates to the workforce.

TABLE 1.4
PRODUCTIVITY (PER WORKER) OF HIGH SCHOOL AND COLLEGE GRADUATES WORKING TOGETHER

		Number of College Graduates Employed					
		100	110	120	130	140	150
		Output					
	100	63.1	66.8	70.4	73.9	77.2	80.5
Number of	110	64.9	68.8	72.4	76.0	79.5	82.8
High School	120	66.6	70.6	74.4	78.0	81.6	85.0
Graduates	130	68.3	72.3	76.2	79.9	83.5	87.1
Employed	140	69.8	73.9	77.9	81.7	85.4	89.0
	150	71.3	75.5	79.5	83.4	87.2	90.9

Similarly, the more valuable that high school graduates are, the more college graduates are employed. High school graduates are more valuable when the "classroom" in which they learn is less crowded. Thus the firm wants a balance of college and high school graduates. This example reveals the importance of interaction. This can be stated as follows: *When workers interact on the job, a worker's contribution to output includes the effect on coworkers' output. As a result, it pays to hire better qualified workers when output is interdependent.*

3. Productivity is independent of coworkers, but depends on capital

A third manager describes the production process as follows:

We are a large clothing company that has our men's dress shirts produced by a factory in Malaysia. Each worker uses a sewing machine, which costs us $7.50 per day to rent. We can use skilled labor, which produces an average of four shirts per day, or professional labor, which produces an average of six shirts per day. Skilled labor costs $7.50 per hour and professional labor costs $12 per hour. The sewing machine company says that it will rent us a new machine that doubles output per worker, but the better machine costs $16.50 per day to rent. Should I rent the new machine? What kind of labor should I hire?

The analysis is easy once the relevant data are compiled, as in Table 1.5. First, consider the old machines. Without looking at the table, the manager might be tempted to not rent the new machines, since they double productivity but cost more than double compared to the old machines. But this ignores the fact that producing a shirt involves both machines and labor. Adding a new machine more than doubles the capital cost, but it does not double the total cost. There is no doubt that the firm should use the new machines.

Furthermore, given that the firm is using the new machines, it should hire professional rather than skilled workers. When old machines are used, the cost per shirt is higher with professionals than with skilled labor. But when the new machines are used, the cost

TABLE 1.5
ANALYSIS OF PRODUCTIVITY USING NEW OR OLD MACHINES

	Output	Labor Cost	Capital Cost	Total Cost	Cost/Output
Old Machines					
Skilled	4	$60.00	$7.50	$67.50	$16.88
Professional	6	$96.00	$7.50	$103.50	$17.25
New Machines					
Skilled	8	$60.00	$16.50	$76.50	$9.56
Professional	12	$96.00	$16.50	$112.50	$9.38

per shirt is lower with professionals than with skilled labor. When expensive capital is employed, it may be cost effective to use it intensively. Professionals use the machines more efficiently, which leads us to conclude the following: *A firm should improve the quality of workers that it employs as it increases the amount or quality of its capital stock. More specifically, the optimal level of skill rises as the use of capital relative to labor increases.*

This helps explain why the president of a firm should be very highly skilled. His or her labor is combined with the entire capital stock of the firm, in a sense. It makes no sense to waste the capital by placing it under the stewardship of a low-skilled individual.

We will see later in this book that the labor market has valued highly skilled workers relatively more over time. One explanation for this is that firms have made increasing use of valuable, and very productive, capital in the form of new information technology.

How Many Workers to Hire?

The answer to this question is straightforward. The firm should continue to hire workers so long as the incremental profit from hiring an additional worker is positive.

In our example at the beginning of this section, both college and high school graduates were profitable to employ, but high school graduates were more profitable—they produced more output for the same amount of compensation. We can combine the two decision rules: Hire the type of worker who provides the greatest output per dollar of pay, or least cost per unit of output. (When doing so, take into account the effects of interdependencies with coworkers or capital, of course.) Continue to do so until the point where hiring more of that type of worker is no longer profitable.

This approach implies that there is a limit to the number of workers the firm should hire, because of the principle of *diminishing marginal productivity*. As more and more workers are added to an organization, the value of an additional one falls. Why would marginal productivity fall as you hire more workers? The main reason is that workers are combined with other resources: computers, machines, your time as their manager. The more workers that you hire, holding other resources fixed, the more thinly those resources are spread across each worker. For example, if you have a small office with you, your staff, and three computers, as you hire more workers, each one gets less time on one of the computers and less supervision by you, which tends to reduce their productivity. This logic holds for *any* resource that is increased while keeping another resource fixed.

Consider Table 1.6. As more workers are hired for the office, the marginal productivity (extra sales) from each additional worker declines. That is a typical pattern in any business. The table also illustrates the principle that you should hire workers up to the point where they are no longer profitable; that is, when marginal productivity is less than or equal to marginal labor cost.

The next-to-last column shows the marginal cost (compensation and other benefits) from hiring an extra worker. If this is less than the marginal productivity, profit rises from hiring more workers. If marginal productivity is below marginal cost (the lowest rows), profit can be increased by laying off some workers.

16 • **Setting Hiring Standards**

TABLE 1.6
MARGINAL PRODUCTIVITY AND MARGINAL COST OF HIRING AN ADDITIONAL WORKER

Number of Employees	Total Sales	Marginal Productivity of Employee	Total Labor Cost	Marginal Cost of Employee	Profit
0	$0	$0	$0	$0	$0
1	$100,000	$100,000	$14,404	$14,404	$85,596
2	$141,421	$41,421	$28,808	$14,404	$112,613
3	$173,205	$31,784	$43,212	$14,404	$129,993
4	$200,000	$26,795	$57,616	$14,404	$142,384
5	$223,607	$23,607	$72,020	$14,404	$151,587
6	$244,949	$21,342	$86,424	$14,404	$158,525
7	$264,575	$19,626	$100,828	$14,404	$163,747
8	$282,843	$18,268	$115,232	$14,404	$167,611
9	$300,000	$17,157	$129,636	$14,404	$170,364
10	$316,228	$16,228	$144,040	$14,404	$172,188
11	$331,662	$15,434	$158,444	$14,404	$173,218
12	$346,410	**$14,748**	$172,848	**$14,404**	**$173,562**
13	$360,555	**$14,145**	$187,252	**$14,404**	**$173,303**
14	$374,166	$13,611	$201,656	$14,404	$172,510
15	$387,298	$13,132	$216,060	$14,404	$171,238

The general result is familiar to anyone who has studied economics: Profit is maximized by using any resource, including employees, up to the point where the marginal benefits just equal the marginal costs.

Other Factors

Availability of Workers

In many communities, more high school graduates than college graduates are available. Does this mean that a firm should have a bias toward hiring high school graduates because they are cheaper to hire? In most cases the answer is no. Most employers, even very large ones, employ a small part of the local labor force, so the total availability of workers is irrelevant. There are two exceptions, both of which arise when the firm employs a sufficiently large part of the relevant labor market that its hiring has some effect on the market price.[5]

The first case is where a firm employs a very large fraction of the local labor force (say, a factory in rural Thailand where there are few other employers). In that case, hiring more of a certain type of worker drives up the wage. The analysis is as before, but the firm needs to take into account the rising wage in analyzing output per dollar labor cost.

---

[5]This is the economic condition where the firm has *monopsony* power.

The second case is more important. When the type of labor being hired is very specific, the market for it may be thin (there are few buyers for this type of worker). If so, there may be significant search costs to finding a worker with the right skills. The wage must build in these amortized search costs, because it is a cost of employing this type of worker. Once that is done, the analysis is as earlier.

The Firm's Financial Condition

Suppose that the firm is in financial distress. How should this affect its hiring decisions? Similarly, if the firm is having a very successful period, should this affect hiring? Once again, intuition can be misleading. None of the analysis makes mention of the firm's financial condition. Choosing the wrong kind of labor will only make the financial condition worse.

A firm in financial distress may have trouble paying employees because of cash flow problems. However, this is a *financial* problem, not a *labor* problem. The best solution to such a problem would be to arrange financing to cover the short-term cash flow problems, so that the firm can hire workers when it is profitable to do so. In fact, creditors should encourage this if it increases profits, because it makes it more likely that the debt will eventually be paid off.

MAKING DECISIONS WITH IMPERFECT INFORMATION

Throughout this chapter, we have conducted our analyses based on data that either exist or were assumed to exist. Unfortunately, the information required is often not immediately available or is expensive to obtain. What can a manager do in such circumstances? There are three possibilities: (1) make a decision independent of analysis, (2) estimate the relevant information, or (3) conduct an experiment.

Make a Decision Independent of Analysis

If the data are too difficult to obtain, the solution is then to guess an answer, using gut instinct, experience, or standard practice. Implicit in the guess are a number of calculations that are not made explicit but are there nonetheless. This approach is easiest, but least likely to lead to an effective decision. Even a little formal thinking is likely to lead to a better result, and if that thinking is supported by some estimation of the tradeoffs involved, the decision is even more likely to be made effectively. This book is intended to guide you to more structured, and therefore better, decisions about organizational design.

Estimate the Relevant Information

Rather than guessing at the answer, a manager may estimate the key numbers to determine the appropriate course of action. Such an approach is likely to lead to better decision making than will guesswork. Moreover, this book can help with such an approach.

Suppose, for example, that you develop a formal analysis of a personnel issue using the concepts in this book. This analysis will help you uncover the important pieces of information needed to make a good decision. The conclusions depend on certain pieces of information, such as the effect on productivity of high school graduates of working side by side with college graduates. When such information is not available, an estimate—even an informed guess—may be appropriate.

The structured approach also makes it easier for you to consider how robust the conclusion is by varying estimates up and down. In some cases the correct decision may be the same for a wide range of values for the estimated information. In those cases, the right answer is clear. In other cases it may be that the correct decision depends critically on the specific value of the information. In those cases, it would be worth further expenditures to get a more accurate estimate before making any decision.

This approach may involve educated guesses, but the decision can often be improved further by using available data to estimate the tradeoffs under consideration. As mentioned in the introduction, many companies now use workforce analytics to guide personnel policies. We will also see a few examples of this in later chapters. This is increasingly viable with the dramatic fall in costs and rise in capabilities of computers. In the old days, firms kept personnel records on computer tapes that were difficult and slow to access. Now, firms often have detailed personnel records at hand and database and other software to analyze the data easily. In addition, human resource professional associations and consulting firms can often provide additional data on practices, costs, and effects across a wide sample of firms. It is becoming more and more feasible to provide estimates—sometimes rough ones and sometimes fairly sophisticated ones—of the impact of organizational policies on desired outcomes such as turnover or profitability.

Experiment

The third option is to experiment. Sometimes this is easy to do and carries little cost. When data on relative productivity of different types of workers is unavailable, the firm might hire some of each type (perhaps even part time or as temps) and measure their output. Similarly, when trying to figure out the correct commission rate in a sales force incentive plan, the firm might experiment with different rates in different locations before rolling out a plan for the entire organization.

Sometimes experimenting is difficult and potentially costly. There are five questions that a manager can consider beforehand to determine whether experimenting is a viable option:

1. What are we trying to learn and why do we want to know it?
2. Will obtaining the answer have a large or small effect on profit?
3. What kind of data are necessary to answer the question?
4. How costly is it to obtain these data?
5. Will the data that we are likely to collect provide a reliable answer to the question?

Question 1 must be answered before any experiment can be run. Otherwise the experimenters may get so caught up in running the experiment that it becomes a purpose in and of itself.

In order to justify a major experiment, the answer to Question 2 must be that the potential effects on profits are large compared to the costs of the experiment.

Question 3 must have a well-defined answer. If it is difficult to specify in advance the kind of information required, experimentation is likely to result in money spent without useful results. Managers should be able to say in advance that if the results turn out one way, the decision will be made in a certain way. If they turn out the other way, the decision will be different. If this statement cannot be made in advance, it makes no sense to gather the data.

Question 4 must be asked to complement Question 2. If the cost of obtaining the data is large, it may not be cost effective to undertake the experiment, even if the results will have a significant effect on profit.

The data are most valuable if they give an unambiguous answer to the question posed. If the data obtained contain a great deal of error, or if they only roughly approximate the kind of information needed to answer the question, the experiment is less valuable.

Of these approaches, the first is almost always the least effective. If the analysis is complex and information is incomplete or unavailable, you may be tempted to use intuition or gut instinct to make a decision. Your intuition and instincts are usually based on your experience, so they are not worthless. However, we have seen examples in this chapter where the analysis led us to some counterintuitive conclusions. The point of the kind of formal analysis described in this book is to improve your decision making by making it more rigorous and clarifying the important (and unimportant) issues. Moreover, more formal thinking can help you realize the situations in which your experience guides you correctly and incorrectly. Unfortunately, too often in this area managers rely on intuition, because the problems can be very hard to analyze formally and with structure. By the end of this book, you will have tools that will increase the effectiveness of your decisions about personnel and organizational design.

SUMMARY

This chapter provided a simple, short introduction to the topic of hiring. We follow this up in the next chapter with consideration of the job offer. The primary purpose of this chapter was to get you started in thinking about organizational issues using economic tools. A little formal thinking can go a long way in clarifying issues, sometimes leading to surprising conclusions.

The chapter raised several issues. We started with a scenario of choosing between two job candidates, one with relatively predictable job performance and one more risky. To the extent that turnover costs can be avoided, the risky candidate actually may be a good thing for an employer. This is because risky job candidates may have option value.

If one turned out to be a poor choice, the loss is limited because the firm can terminate the employee. The firm may be able to capture a substantial return if the employee turns out to be a star in some circumstances.

We then considered an employee's output to wage ratio. The best worker is not the cheapest nor the most productive, but the one with the highest ratio of productivity to cost. We should hire as long as the marginal productivity of the last worker hired is greater than or equal to the cost of the worker.

The chapter introduced some important economic ideas that you should begin to incorporate into your everyday thinking. First, never forget that you are constrained by market competition. In the case of personnel management, the job package that you offer your employees must be adequate to attract and retain the kind of employees that you want—especially if they are known to be stars. Second, always try to think in terms of tradeoffs and alternatives. When you are analyzing a decision, consider not only the benefits but the costs and balance them against each other. The costs will be determined primarily by labor market pressures, which act as a constraint on optimal personnel policies. The benefits of employees depend on the production process, how they work, whom they work with, and what capital they work with. Some benefits and costs may be subtle or intangible, but they may still be important. One good example is that you should always include your best alternatives when making a decision. A choice may be profitable, but it may be less profitable than other options.

◆ ◆ ◆ ◆ ◆ STUDY QUESTIONS

1. You are recruiting to fill a position in your firm. Should you try to "sell" the job to applicants by describing it in the nicest terms that you can? Should you make the job sound as desirable as possible? As a job applicant, should you try as hard as you can to convince the recruiter that you are the perfect candidate for the job? Think about these issues over the next several chapters.

2. Potential employees can be unusual in many ways. Can you think of any attributes of job applicants that would make them risky hires, but in a way that might suggest they have high option value as employees? In what ways might candidates be risky that would suggest their option value is not high?

3. Suppose that you are a risky candidate for a job, because your background is unusual compared to rival applicants, and the employer finds it difficult to estimate how successful you will be in the position. What aspects of your experience, skills, and other characteristics might you use to try to convince the firm to take a chance and hire you? What might you offer the firm in negotiating for the job? Why?

4. Capital (including advanced information technology) can serve as a *substitute* for employees in producing a firm's output. It can also serve as a *complement*, making workers more productive at their tasks. Which effect do you think is likely to be more important in practice? Why? Which kinds of jobs are most likely to be ones in which computers or machines can *replace* workers? Which are most likely to be

ones in which they cannot replace workers but can help workers perform their jobs better?

5. Many employment issues are complex and involve interpersonal relationships, psychology, or qualitative considerations. For this reason, they are often difficult to quantify. If you cannot quantify some of the issues that we discuss, are the tools developed in the text irrelevant? Why or why not?

6. Think about this question as you read the rest of the book: Why might a firm delegate design of most human resource policies to an HR department? What costs and benefits do you see from such a practice? What is a feasible alternative approach?

7. After reading the introduction and this chapter, how would you characterize the approach of personnel economics? What distinguishes it from other approaches to studying organizational design that you are familiar with?

REFERENCES

Blackmore, Ritchie. 1973, July-August. Interviewed in *Guitar Player*.

Friedman, Thomas. "How to Get a Job at Google." *New York Times*, February 22, 2014.

U.S. Department of Labor. (various years). *Current Population Survey*. Washington, D.C.

U.S. Department of Labor. (2010). *International Labor Comparisons*. Washington, D.C.

World Bank. (2010). *World Development Indicators*. Washington, D.C.

FURTHER READING

Boehmer, David. 2013. *Hiring an Oddball: Redefining Talent*. Chicago: Heidrick& Struggles.

Lazear, Edward. 1995. "Hiring Risky Workers." In *Internal Labour Markets, Incentives, and Employment*, edited by Isao Ohashi and Toshiaki Tachibanaki. New York: St. Martins Press, 1998.