A Review of Financial Markets and Investment Decisions

In Chapter 3 we discussed household saving and the role of financial markets in delivering those funds to borrowers. Depositing money in the bank is virtually riskless today because of federal bank-deposit insurance. I deposit my money; the bank provides services (security, record keeping, and funds transfers) and pays modest interest. I can spend the money directly by writing checks, or transfer my money to a savings account or a certificate of deposit. In return for sacrificing **liquidity**,[1] I receive a higher interest rate. The stock market pays a higher average rate of return than bank deposits do because there is a greater risk of financial loss in the stock market, and because there are greater transaction costs in buying and selling stocks or bonds (paying brokerage commissions) than there are in withdrawing funds from a saving or checking account.

Economists abstract from risk by defining the **expected value** of a financial asset. Depositing $1000 in a certificate of deposit is essentially riskless. If the CD pays 2.5 percent per year, next year I will have $1,025; in two years I would have $1000(1.025)^2 =$ $1050.63. However, suppose that I decide to buy $1,000 worth of stock in a start-up company, Flybynight.com. The company representative promises that I'll get 20 percent per year on my investment. After checking with a trusted financial advisor[2] I learn that there is an 80-percent chance that the stock will "take off" and be worth $1,440 in two years (a 20-percent return, compounded), but that there is a 20-percent chance that the stock will be worthless. The **expected value** in two years is the average of the two scenarios, where each scenario is weighted by its probability: $EV = .2(0) + .8(1440) = \$1{,}152$. Now, since I have the option of investing my money for two years at 2.5 percent, the **present expected value** is $PEV = \frac{1{,}152}{(1.025)^2} = \$1{,}096.50$. The expected return to Flybynight.com is only $96.50 better than depositing my money in a CD; this difference is called the **risk premium**. Would you be willing to risk a 20-percent loss of $1000 in exchange for $96.50? If not, then you are **risk adverse**; a risk-adverse person suffers **disutility** from bearing risk, and therefore must be paid a positive risk premium if she is to bear risk. If your behavior were consistent, you would pay more than $96.50 (pay a risk premium) to avoid a loss. Risk-adverse people tend to buy insurance, even when they know that the present expected insurance payment (which occurs only if something bad happens) is less than the present value of premiums.[3]

If you would prefer to put the $1,000 into the stock market for a $96.50 risk premium, then you might be (1) a risk lover, who would actually pay a premium to take a risk (i.e., a gambler who keeps playing, even knowing that the odds favor the house); (2) a **risk-neutral** person, who always prefers the option with the highest expected return,

---

[1] Liquidity is the ease with which wealth can be transformed into cash. Money (cash plus checking deposits) are 100 percent liquid; savings deposits are less liquid. Houses and cocaine are very illiquid.

[2] Is this an oxymoron?

[3] Life, of course, is more complicated than theory. Insurance agents have found a way of coercing people to buy life insurance as a sign of affection for one's family; try as I might, I have never been allowed to talk to a life insurance agent without Regina being present. Then I have to explain to Regina why I only want $500,000 of insurance instead of $1,000,000; stating the obvious, that I wouldn't be around to enjoy it, is construed by the agent as a deficit of affection on my part.

regardless of risk;[4] or (3) a risk-averse person who demands a risk premium smaller than $96.50. A **risk-loving** person will tend to prefer prospects with a chance of a big payout, even if the expected value of that prospect is smaller than the expected value for a less risky prospect. A risk-neutral decision maker will prefer the prospect with the highest expected value. A risk-averse person prefers a certain prospect to a risky one, and would pay a risk premium to avoid risk.

Recall that economists distinguish between loaning money at interest, and an **investment**, which is a resource-using activity whereby a person or a business incurs an opportunity cost in the present (foregone income, research costs, machine or building purchase costs) with the hope of increased productivity (and hence, increased income) in the future. If I deposit my money in a bank account, I am lending my money to the bank; the bank *leases* my money by paying interest. If the bank lends the money to a business, the business *leases* the money from the bank by paying interest; the bank earns a profit by charging their borrowers higher interest than the banks pay their depositors (the bank bears the risk of loan default). If and only if the business purchases plant, equipment, or otherwise uses the money to purchase resources does the loan lead to an investment.

Human Capital Investments

One of the true investments that people can make (as opposed to lending money to a business that purchases plant and equipment) is the investment in **human capital**. *Capital* is a produced means of production; *human capital* is an investment that is intended to make people more productive. The two most important types of human capital investments are **formal education** (which should be self-explanatory) and **on-the-job training**, which occurs when workers devote time and effort to learning on the job. Other types of human capital investments include exercise and diet that increase stamina, changing locations to take a higher paying job (presumably because the person is more productive at the new location), and even plastic surgery.[5]

The difference between on-the-job training and formal education is often a difference in convenience. Carpenters can best be trained by other carpenters by watching and **learning by doing**. Accountants are trained in college before being set loose on accounting firms, but often much of the time they spend as neophyte accountants is learning the ropes. The movie *Master and Commander: Far Side of the World* has several scenes where the captain *schools* the midshipmen in seafaring arts.

Generally speaking, the student learns *how to think* in formal education, while he or she learns to apply that aptitude for learning to a specific task on the job. Many occupations, most notably medicine, have a formal internship program following the completion of formal education. Assistant professors and associate attorneys are also expected

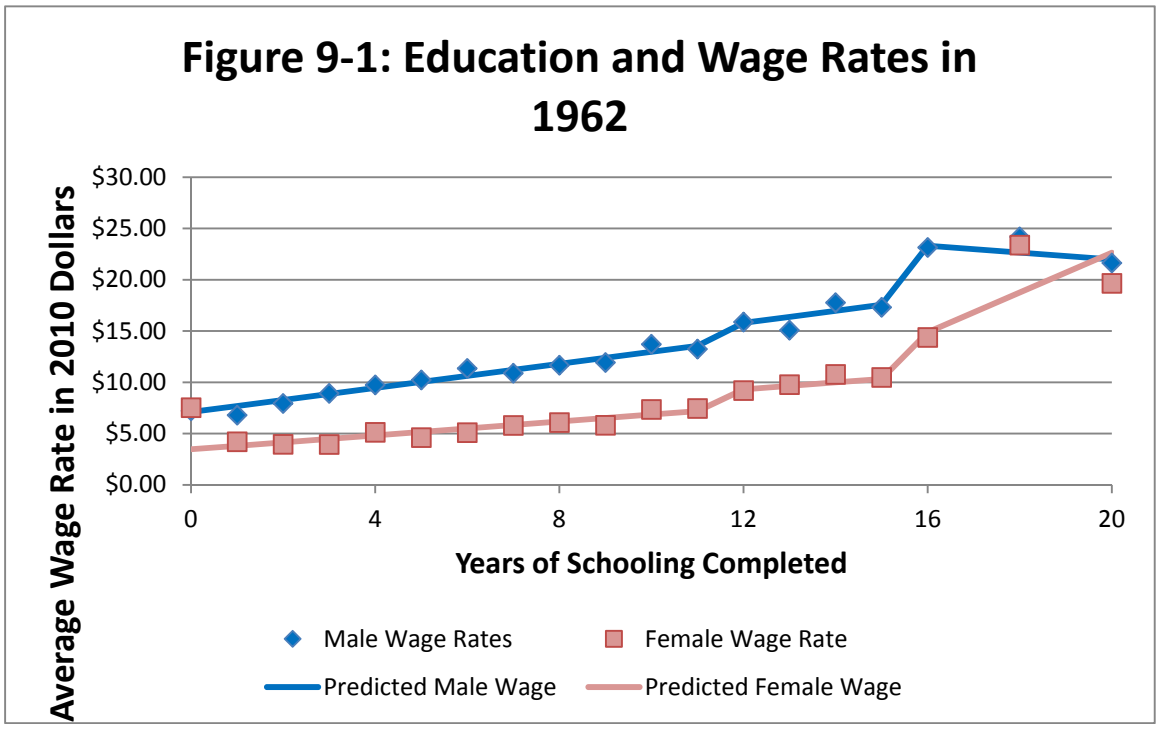
[4] Large organizations—countries, corporations, banks, and insurance companies—act *as if* they are risk neutral because of the law of large numbers. The more chances one takes, the smaller will be the departure from the expected value, *as long as the risks are independent of each other*. Hence, an insurance company will insure homes against random events, like lightning strikes, but charges much more to insurance against war, acts of terrorism, or widespread natural disasters.

[5] A few years ago after an exotic dancer's breast-augmentation surgery increased her bust size from 36 inches to 72 inches, she was allowed to deduct the cost of her operation after the tax judge ruled that such an operation provided no personal benefits.

to learn on the job, without neglecting their formal job requirements. Failure to learn by doing implies termination (not achieving tenure or not making partner).

So far we have investigated the market for a simple labor skill, apple pickers, which people can easily learn by watching other workers. However, the theory of competitive labor markets is relevant to a large number of markets, including the market for economists. However, it takes years of study and experience to become a professional economist. Recall that economists refer to **human capital** as those skills that are created through investment-like activities.[6]

Figure 9-1 shows the relation between average wage rate (in 2009 dollars) and years of schooling, using data from the March 1962 *Current Population Survey*. Each blue point represents the average male wage rate, expressed in 2010 dollars,[7] while the blue line represents the **fitted regression line**. According to this line, each year of schooling from the first through the eleventh grade and for the thirteenth through the fifteenth grade increases a man's wage rate by nearly $0.58 per hour. Completing the 12th grade increases earnings by $1.65 and completing college increases earnings by $5.18 per hour. These two jumps are known as the **sheepskin effect**: completing a course of study is worth more to employers than is completing a year of schooling that does not lead to a degree. Employers value workers who can complete tasks.



[6] In my first publication, "Education and Income: An Analysis by Fable," *The American Economist*, Fall 1973, I argued that success in schooling is more likely for students who like learning and are good at it. Hence, education is a consumption activity (an activity that generates immediate rewards) with investment-like payoffs.

[7] I use the consumer price index to translate wage rates computed from 1962 (wage and salary earnings in 1961 divided by total hours worked in 1961), times the ratio of the consumer price index for 2009 (218.056) to the consumer price index in 1961 (29.9). In other words, we multiply the wage rate in 1961 dollars by 7.3 to obtain wage rates in 2009 dollars.

What is remarkable about the earnings patterns for men in 1962 is that completing a post-graduate degree could reduce a man's earnings. Men with masters degrees earned an average of $24.17, compared to $23.14 per hour for a college graduate. Completing a Ph D, law degree, medical degree, or another advanced degree *reduced* the hourly wage rate to $21.62 per hour, 6.6% less than a bachelor's degree and 10.6% less than a masters's degre. Each year of schooling except for the 12th and 16th increased a woman's wage rate by only $0.34 per hour; she gained $1.78 with a high school diploma and $4.21 per hour with a college diploma. However, after the 16th grade an extra year of schooling increased a woman's pay by $1.94 per hour, so that a woman with an advanced degree earned as much as a man with an equivalent education.

Figure 9-2 jumps ahead in time to 1987, about the time most of you were born. According to Figure 9-2, the average wage rate for men with zero education started at $12.21 per hour and increased by only $0.10 per hour for each additional year of schooling through the eleventh grade, rising by $3.83 per hour with a high-school diploma. By contrast, the first eleven years of schooling added nothing to the hourly earnings of a woman, who earned an average of $9.05 per hour. Women gained $2.61 from high school graduation. A reversal of the pattern in 1962, men gained $0.95 per hour per year of graduate school, while women received only an additional $0.21 per hour. Hence, the relative earnings of men and women diverged after college.

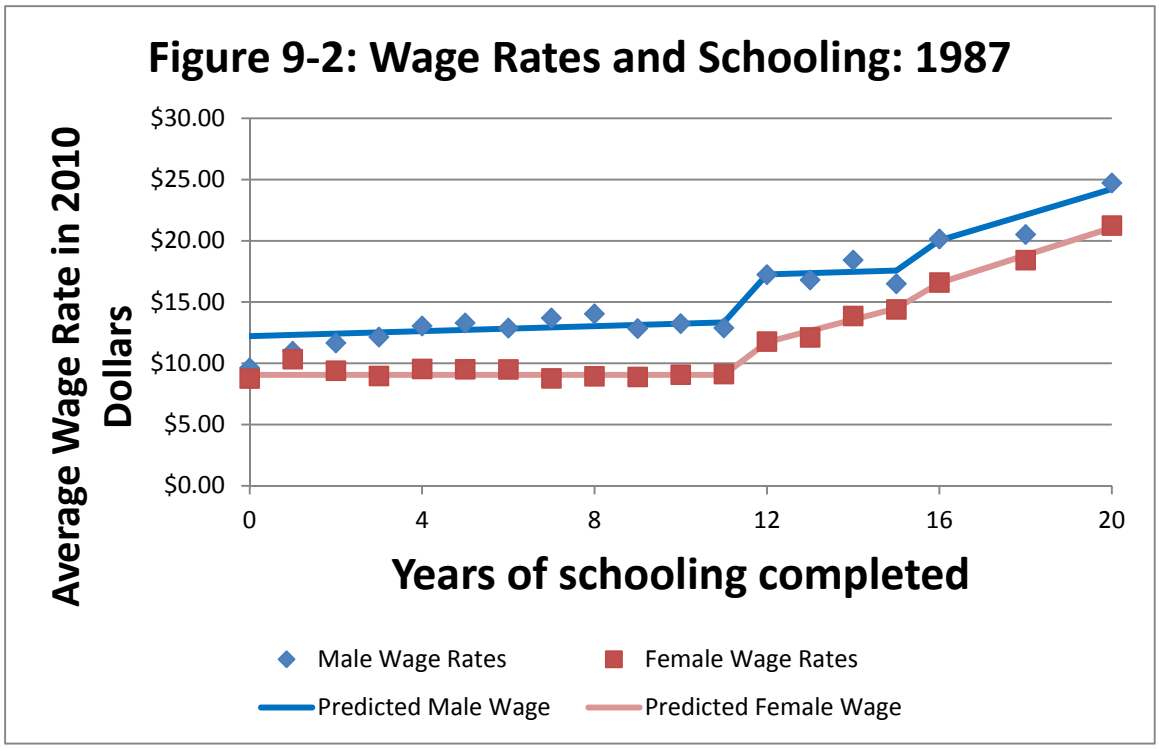
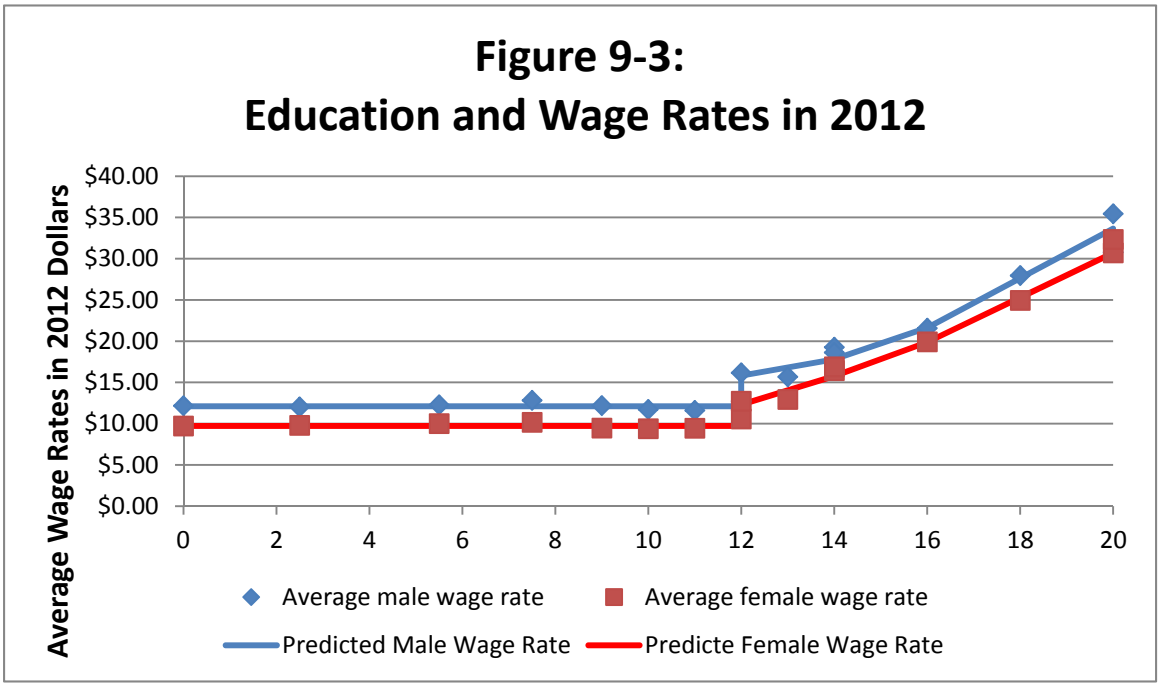


Figure 9-3 plots the relation between the wage rate and the years of schooling in 2011. Here we find that the relation between the wage rate and schooling is flat for both men and women through the 12th grade. A person without a high school diploma earned about the same wage rate in 2011 as a comparable person earned in 1987. If a student considered the prospects of graduation slim, there would be no incentive to continue through the 12th grade only to receive a "certificate of attendance" if she did not pass her

proficiency exam. Both men and women receive a small bump from high school graduation and roughly the same gain for each year of school after high school, so that the small gap between male and female wage rates is roughly constant over all education levels.



The evolution in the human capital market between 1962 and 2011 shows the effect of the transition of the American economy from manufacturing to service and information technology. Part of this evolution reflects the *sheepskin effect*, which predicts that employers have an incentive to embellish that ability, and the prudent employer understands this incentive. Therefore, employers seek *documentation* of education, such as school transcripts, standardized test scores, professional certifications, and letters of recommendation from former employers.[8] A transcript documenting that the student dropped out of high school in the 11th grade not only reports the level of education, but also communicates to the employer that the job seeker *failed* to complete his or her education.

The Choice of a College Major: Human Capital Investment Decisions Under Uncertainty

Most students pick their college major based on a number of factors: their enjoyment of the subject matter, their aptitude for that major (how hard the subject is compared to other students, their perception of the monetary and non-monetary aspects of the occupation(s) associated with the major, and the riskiness of the occupations. The 2010 American Community Survey[9] collected information about the undergraduate major (field of

[8] Another recent trend in our litigious society is for job seekers to sue their former employers for adverse letters of recommendation. As a result, corporate attorneys are recommending that their clients write very terse letters of the form "John Smith was employed here from January 1 to December 31, 2001."

[9] In 1999 to Bureau of the Census decided to collect a sample of approximately 3,000,000 people, usually collected every 10 years as part of the decennial census (the long-form) every year. They called the survey the American Community Survey; this week (May 21-May 25, 2012) the Republican House of Representa-

degree) for all subjects with a bachelor's degree or better. Using these data we can compare the average earnings and the variability in earnings for each major. Table 9-1 shows the data for selected college majors, based on tentative choices by members of the summer 2012 ECON 180 class. The last line shows the data for all majors; we use this line as a reference. For the 28,171 graduates with bioscience degrees,[10] the average earnings are $64,250, with a standard deviation of $90,299.[11] Compared to the average college graduates, bio-science majors earn about 29% more than average, and experience a standard deviation about 37% higher than for the typical graduate. I measure a major's riskiness as the ratio of the standard deviation to the mean. So while the average riskiness for all majors is 1.32, being a bio-science major is riskier. If risk is bad (the prospect of earnings well above average is matched by the prospect of earnings substantially below average), then we would expect riskier occupations to pay more. We find that a typical business major (excluding the business-economics major) earns slightly more than the average, and experiences slightly less risk.[12] By comparison, economics majors earn about 16.7% more than (other) business majors, but experience greater risk. Note that engineering majors, while earning substantially more than the average college graduate have a smaller risk factor – roughly comparable to social work majors. Hospitality majors earn less than (other) business majors, and experience greater risk. Of all the majors listed, social work majors earn the lowest average pay and tie engineers for the least risk. Let's hear it for *altruism!*

Table 9-1

Earnings Statistics for Selected College Majors

Undergraduate	Number	Mean	Stdev	riskiness	Percentile			maximum
Major					25th	50th	75th	
Bio-science	28,171	$64,250	$90,299	1.41	$8,000	$37,800	$80,000	$641,000
Business	76,747	$58,844	$70,867	1.20	$7,000	$45,000	$75,000	$641,000
Economics	15,830	$68,681	$99,230	1.44	$5,400	$35,000	$84,000	$641,000
Engineering	51,253	$66,941	$71,627	1.07	$12,600	$60,000	$95,000	$641,000
Hospitality	1,726	$45,948	$58,655	1.28	$9,600	$35,000	$60,000	$568,000
Social Work	4,954	$33,220	$35,615	1.07	$1,800	$30,000	$50,000	$499,000
All Majors	628,589	$49,726	$65,806	1.32	$100	$35,000	$70,000	$641,000

The last four columns in Table 9-1 show the values for the 25th, 50th (median) and 75th percentiles. Note in each case, the median annual earnings are substantially less than the average annual earnings. This reflects the *skewness* of earnings data. The lowest wage or salary a person can receive[13]is $0, and the wage and the maximum salary report-

tives voted to discontinue (that is, defund) the ACS (the savings would be trivial). Many American businesses have complained that they use the ACS for their economic and marketing decisions; perhaps, after they defeat Barack Obama, the House will relent.

[10]Biology, biochemical sciences, botany, molecular biology, ecology, genetics, microbiology, pharmacology, physiology, zoology, or miscellaneous biology.

[11] Average earnings are computed by adding all annual earnings and dividing by the sample size; the standard deviation is obtained by subtracting the sample mean from the individual's earnings, squaring, dividing by the number of observations (minus 1), and taking the square root.

[12] The risk for all professions reflects differences in the difficulty of the major, non-monetary benefits, prestige, and other factors not likely to vary within majors.

[13] A rich person might be willing to pay a substantial amount to obtain a prestigious or enjoyable job; clearly Mitt Romney, should he win the presidential election, will earn less than the amount of his own fortune

ed is $641,000.[14] Figure 9-4 shows that it is more likely that a college graduates will be close to zero (below average) than close to $600,000, compared to the blue reference line, which depicts how the data would look if earnings were normally distributed.

Figure 9-4

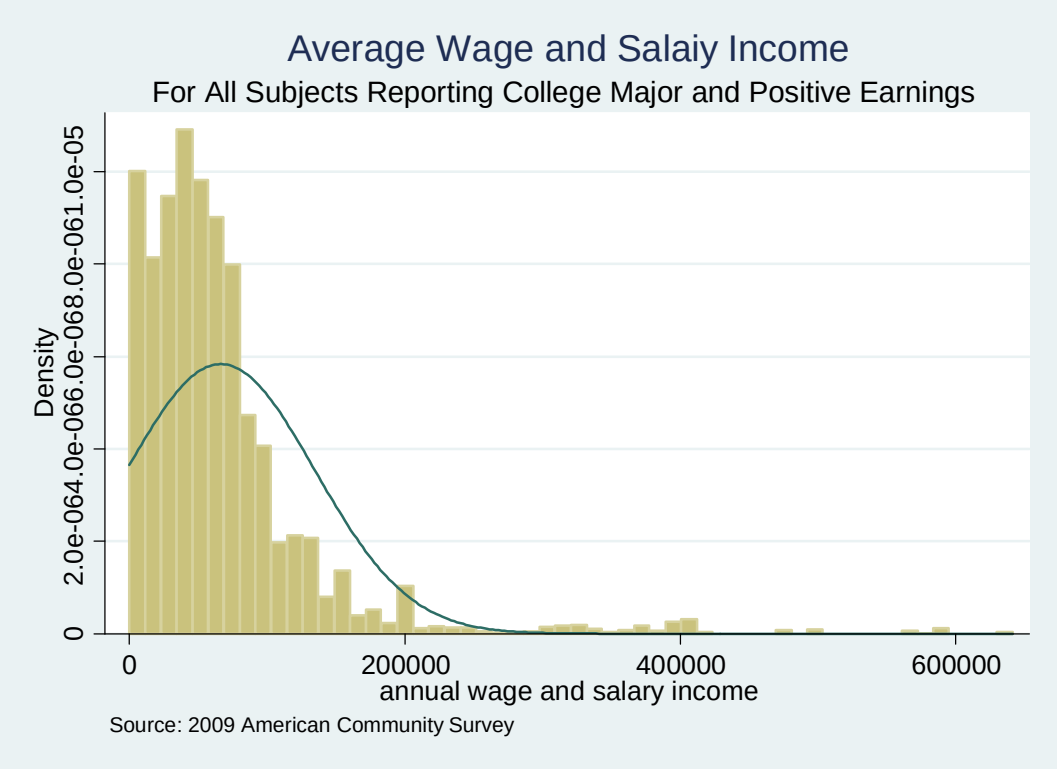


Table 9-1 contrasts the earnings of bio-science and economics majors according to the highest degree they attain. If a bio-science major obtains a professional (most likely a medical) degree, they earn considerably more than economics majors who receive a professional (most likely a law) degree. However, for the roughly 50% of bio-science and economics majors who do not advance beyond the bachelor's degree, economics majors earn considerably more, on average, than do bio-science majors. Similarly, if bio-science majors settle for a master's degree, they can expect to earn less than an economics major who obtains a master's degree. Finally, economists with academic doctorates (Ph.D.'s) earn considerably more, on average, than do bio-science majors who settle for an academic, as opposed to a professional, doctorate. What Table 9-2 are the tournament aspects of the bio-science major. Slightly less than 25% of bio-science receive a professional degree; these winners earn approximately three times what the bio-science major earns who stalls at the bachelor's degree; this reflects the fact that only a fraction of bio-science majors who apply to medical school are admitted. By contrast, nearly every eco-

---

he is spending in pursuit of the Republican nomination and the presidential election. However, were he sampled in the 2013 American Community Survey (his first year as president), he would report only his wage and salary, and would not report how much he had bet to improve his chances of winning the presidency. The lowest individual earnings reported in the 2009 ACS is $0 for someone who worked without pay.

[14] The earnings data are *top-coded* to avoid violating respondent confidentiality.

nomics major who desires a Ph. D. in economics or a law degree gains admission; hence an economics major with an advanced degree earns 50% to 60% more than a bachelor's degree economist earns.

Table 9-2

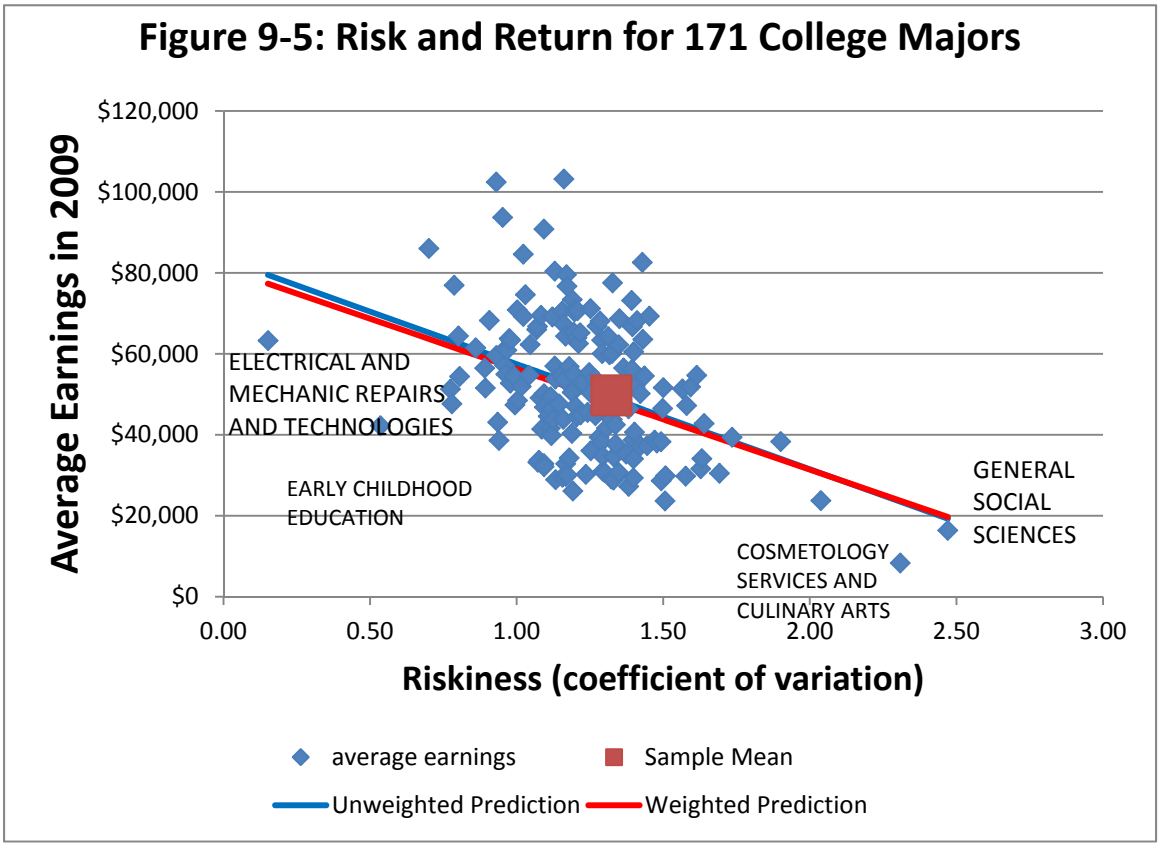
Average Wage and Salary Income by Degree and Major

Highest	Bioscience		Economics	
Degree	earnings	percent	earnings	percent
bachelor's	$32,678	46.64%	$61,906	49.85%
masters	$54,648	18.87%	$65,802	38.33%
professional	$124,626	23.71%	$110,730	8.33%
doctorate	$84,864	10.78%	$96,736	3.49%
Total	$64,250	100.00%	$68,681	100.00%

To complete this section on the riskiness of human capital investments, Figure 9-5 depicts the risk-return tradeoff for 171 college majors. The horizontal axis depicts the riskiness of alternative majors, measured as the coefficient of variation (standard deviation divided by average wage and salary income), ranging from the safest occupation (electrical and mechanic repairs and technologies) to the riskiest (general social sciences). The trend lines show that as the riskiness of a college major increases, the average earnings (the return) *decreases*. This finding contradicts the convention in finance literature that riskier financial "investments" generate greater return. According to finance theory, people are generally risk averse; if they purchase a stock or bond, they less risky assets to assets with a greater coefficient of variation. Suppose there were 2 shares of stock, both selling for $20 at their initial public offering. After a few years, purchasers of shares in company A received an average dividend of $2 per year, while experiencing wide swings in the value of their shares from $1 to $39. Over the same period, purchasers of shares in company B also receive dividends of $2 per year, but the price of their shares fluctuate only between $18 and $22. As a result, shareholders would sell shares in company A (causing the price to fall, to say, $15), and would attempt to purchase shares in company B, causing their shares to rise (to say, $25). If both companies continued to pay dividends of $2 per year, and holders of company A stock would receive a 13.3% return, while the holders of company B stock would receive an 8% return.

There are several possible explanations that can possibly explain why human capital investments exhibit a negative relation between risk and return. First, there is no secondary market for human capital; those who mistakenly pick the wrong major (in terms of their own interests) cannot sell their education to another. Second, while financial markets are highly competitive, allowing individuals to purchase shares in any company for roughly the same commission rate, many occupations (such as medicine) are not competitive. Hence whether one wins the lottery at age 22 largely determines whether a bio-science major will receive a high or low income. Third, there is essentially no effort involved in purchasing financial assets; whether one's education pays off depends largely on how much effort one puts forth later in life. Rewards in engineering do not vary greatly by the amount of effort the engineer puts forth; there is a very different outcome for economists. One can become an economics professor and have a comfortable life, or one

can be a hedge fund manager and have a frantic but (potentially) lucrative life. Furthermore, some majors (economics, bio-science) are relatively difficult while others (social work and hospitality) are relatively easy. Hence, there is likely to be a greater range of outcomes for easy majors than for difficult ones.



Specific versus General Human Capital Investments

Another concern with human capital investments relates to whether skills are **portable** (general human capital) or not (specific human capital). By portable we mean that skills rewarded by one employer are also rewarded by other employers. Formal education creates **general human capital**, meaning that the worker can use those skills (literacy, mathematics, statistical analysis) in many different kinds of jobs for many different employers. The student bears the costs of formal education because the employer must pay the market wage for those skills, or the worker will "walk," taking his or her skills along. A moment's reflection will indicate that many skills created through on-the-job training are also portable. Learning to be an electrician, or a plumber, or an accountant would enhance one's productivity with many alternative jobs. Accordingly, apprentices typically are paid less per hour than journeymen are, not only because they don't know as much, but also because part of their "working time" is actually learning time.

The presence of minimum wage laws and other employment regulations may actually deter on-the-job training. Suppose that a carpenter's apprentice is worth $10 per hour when she works, but adds nothing to output when she learns (typically by watching

a master carpenter). If she "clocks" 40 hours per week, the government requires that she be paid $8.25 per hour, even though she produces only $10 x 20/40 = $5 per hour in average output. The result, the minimum wage law, prices her out of the market, making her ineligible for on-the-job training.

By contrast, specific education is applicable to only one employer. A management trainee who learns intricate organization charts and operating procedures specific to a company would not become more productive with another employer, unless that second employer could benefit from learning company secrets.[15] In fact, he would likely be barred from revealing company secrets by a covenant not to compete. When workers invest their time to acquire specific human capital, they are usually compensated for that time. Paying workers more than they produce during the learning (investment) phase generates a positive return for the firm, which pays the worker less than he produces in the future. The cost of losing or replacing specific human capital investments helps explain why businesses typically retain managerial workers during economic downturn, while laying off workers with general human capital. Finally, it is possible that specific human capital investments yield some monopsony power to the employer, who, by definition, is the only buyer of those worker skills.

The Production of Education

Most financial investments involve an arm's length relation between the creditor (e.g., bond owner) and debtor (company selling the bond). If the company's use of those funds is profitable, the lender will receive promised interest (bonds) or a share of the profits (stocks). A person who invests in human capital is directly involved in the production of skills and knowledge. Indeed, the production function for human capital involves labor time by both students and instructors, in addition to capital (computers, classrooms), and land (the college campus). Students have the options of securing pure knowledge (studying at the library without matriculating, auditing classes, informal web-based learning), or formally registering for a course of study, agreeing to fulfilling certain academic requirements in exchange for reported grades (the transcript) and, if successful, the diploma.

Like other investments, investments in human capital are risky. Students who fail to learn required material or have an ideological or personal clash with the professor receive a failing grade for the course and a blot on their record (transcript). As they learn more about their chosen major, they may find they do not enjoy that topic.[16] Changing majors may postpone graduation; many students are reluctant to change majors because they have too much time and effort invested in their major. It is good to remember an

[15] When employers fear that employees will divulge company secrets to competitors, they often require those employees to sign a *covenant not to compete* as part of their employment contract. The employer waves the right to fire the worker at will and usually pays a higher wage; in return, the employee promises not to work for a competitor for some specified time after his or her current employment terminates. Breach of that covenant can leave both the employee and the new employer liable for damages to the original employer's profits.

[16] As a student at Miami University, I changed majors four times: from journalism to English, from English to mathematics, from mathematics to political science, and finally, from political science to economics. As an economist, I combine all those skills: data collection and analysis (journalism), writing (English), problem solving (mathematics), and logic (political science).

important economics lesson: Bygones are bygones; do not continue to invest resources in a losing cause, or your losses are likely to increase.

The production of education is fraught with asymmetric information problems. First, before students possess the information their education is to provide, they lack the ability to estimate its value. After they have acquired that information, they have lost the incentive to pay for it.[17] For this reason, a college degree is contingent on students fulfilling a fairly rigorous set of degree requirements. Students who fulfill these requirements receive a diploma, and according to the sheepskin effect, a substantial increase in earning potential. Those who fail to meet those requirements receive low grades and a transcript that stigmatizes them as quitters or failures.

But exactly what is the university's objective function? We learned in Chapter 2 that universities, like most religious organizations, hospitals, and artistic companies, are *not-for-profit* institutions. Hence, most universities do not seek to maximize the difference between tuition (and grant) revenue and costs. Typically, universities wish to achieve prestige. But not everyone can be the best, so schools look for their niche. To be a great university requires an elite faculty. The University of Chicago has on its faculty more than half of the Nobel laureates in economics in the world. Yale can boast that both 2004 presidential candidates—George W. Bush and John F. Kerry—are Yale grads, although each was a heritage student, who received special consideration as sons of Yale alumni. UNLV can boast of being the best (and only) four-year public university in the city of Las Vegas.[18]

When picking a university, most people with academic doctorates consider many aspects of their job—the pay, the climate, the prestige, the research facilities, and the quality of the students. Private universities typically practice price discrimination by charging higher tuition to rich but mediocre students, in order to offer scholarships to middle- and lower-income promising students. Today, a high-income college applicant with low test scores has approximately the same academic prospects as a low-income student with high test scores. Also, the student's progress is monitored by grades on the off chance that the university's admissions department erred in the student's admission or financial reward or that the student slacks off or is a diamond in the rough.

An interesting tale, which may be true or merely an academic legend, illustrates an adverse selection problem for universities aspiring to attract the "best" students. Rumor has it that during the 1930s, when the economy was already undergoing a major depression, Harvard University experienced a rash of student suicides. Harvard admitted only straight-A students who were the top student in their preparatory or high school. But once at Harvard, which graded on a curve, many of those students received C's, D's, or even F's. Unable to handle the humiliation or confront disappointed parents, some students tragically took their own lives. A decade later Harvard undergraduates were predominantly World War II veterans, attending school on the GI bill. For survivors of

[17] Economics Nobel laureate Kenneth Arrow popularized this conundrum, which has become known as *Arrow's paradox.*

[18] You take your glory where you can find it. Actually, the UNLV campus is outside the Las Vegas city limits, and the existence of Nevada State College in Henderson, UNLV is no longer the only four-year college in Clark County.

Pearl Harbor, D-Day, Okinawa, and Bastogne, receiving a grade of C was trivial. Thereafter, Harvard and other universities appreciated the value of diversity.

Recently Princeton University announced a faculty policy of reducing the percentage of A's awarded to undergraduates from 73 percent to 35 percent. Many students decried the reduction in the reward for their educational effort, but the Princeton faculty has been steadfast in its remediation of **grade inflation**. While price inflation results from too much money chasing too few goods, grade inflation occurs when too many high grades chase too little educational excellence. This is a pernicious problem at UNLV, which measures faculty performance by polling students a week before final exams and asking, essentially, "Are you happy?" Students confronting unfinished semester projects, uncertain final exams, and low grades tend to reply "No," and their instructors can be denied tenure, promotion, or "merit" pay increases. Those who have aced their exams are allowed to submit plagiarized papers from online term-paper mills and whose instructor has waived the final exam reward their instructors with rave reviews. Good instructors leave UNLV in disgust; mediocre instructors are promoted to full professorships.

To make matters even worse, UNLV, along with other institutions that have opted to maximize the number of students enrolled in classes early in the semester when the state allocates university budgets, has a very lax course drop policy. Universities typically allow students to adjust their course schedules in the first week of the semester, dropping courses that they do not need or that conflict with a modified work schedule, and add courses on a space-available basis. After the first week, however, courses are closed and students may no longer add them. Nevertheless, students are free to drop their courses ten weeks into the semester. These drops do not appear on the student's transcript. So a student can craft a high grade point average by consistently registering for six to eight courses, then dropping the most difficult two or three courses, receiving A's and B's in the remaining easy courses. This type of incentive system is known as **moral hazard**: When people are shielded from the consequences of undesirable behavior, they are less inclined to avoid that behavior. This policy further penalizes rigorous instructors who experience excessive drops (a mark of incompetence to some department chairs). Good instructors and good students are driven from UNLV, a consequence of **adverse selection**. UNLV's drop policy exacerbates the asymmetric information problem between graduates and potential employers. Word has it that while Las Vegas hotels and casinos hire UNLV graduates for entry-level (e.g., front-desk) jobs, they hire upper management candidates from more selective universities.

Suppose that Sally graduates from UNLV in four years, with a GPA of 3.8, having registered for 288 credit hours, and having completed the required 180 credit hours. Nowhere do employers learn that Sally bailed out of three of eight of her classes, following a strategy of over-committing and underperforming. This work ethic may show up in her employment interview, but perhaps she will get the job based on her superb (if counterfeit) academic record and sterling letters of recommendation from mediocre professors. It is unlikely that Sally will be able to hide her lack of education and poor work habits forever, however. Eventually, Sally is terminated and leaves her first job with a scarred resume. Following old Scottish expression, "Fool me once, shame on you; fool me twice, same on me," this employer will give little credence to high GPAs from UNLV

again. Accommodating poor students ultimately hurts good students. Since good students have more options than poor students, good students will flee UNLV.

Because potential employers understand that *some* UNLV students have inflated grades, they will reduce their wage offer to *all* UNLV graduates. Students with rigorous educations will avoid these employers, who will receive job applications only from subpar students. Eventually poor students drive out good, and the UNLV president wonders why UNLV has failed to become the UCLA of Nevada. Students who desire an education should seek out exceptional departments—like economics and architecture—who maintain high standards despite the lack of administration support. And serious students should petition their student government for an immediate change whereby UNLV posts drops on student transcripts, or moves the drop deadline to the first week of the semester.

Discrimination in Education[19]

Nearly every school rewards educational success and punishes educational failure. This discrimination starts in kindergarten and continues through graduate or professional schools. Successful students receive A's, gold stars, and encouraging words from their teachers. Unsuccessful students receive F's, black marks, hostile parent-teacher conferences, and, in the extreme, failure (having to repeat a grade). I myself started school as an unsuccessful student; I could not read, particularly orally. I still remember humiliating sessions when nuns in the first and second grades ridiculed my stammering and encouraged my classmates' derision. In the third grade I had a lay teacher, Miss Koogler, who recommended to my parents that I repeat the third grade. My parents concurred and so I repeated the third grade, the second time with a nun as my teacher and my oldest younger sister as a classmate. Luckily, I learned to read and I learned to love schooling. By the eighth grade I was accompanying several of my male classmates to algebra and English courses at the parochial high school. In high school I took honors classes and graduated sixth out of 333.

Having grown up in a white, mostly Catholic neighborhood, I did not meet a black student until high school. Dayton (Ohio) Chaminade, my high school, was the premier college-preparatory high school in the city, due mostly to the fact that the same order of religious brothers (male nuns) who taught at my high school also staffed the University of Dayton. Since most of my high school teachers were taking graduate courses to obtain Ph. D.'s so they could teach college, they instilled in us a yearning to attend college and succeed. And because the Dayton public high schools were racially segregated, the richest black families sent their sons (mostly Baptist) to study at my high school. In my narrow experience, black students were more affluent than white students.[20]

---

[19] Much of this section is inspired by Charles J. Ogletree, Jr., *All Deliberate Speed: Reflections on the First Half-Century of Brown v. Board of Education*, Norton, 2004.

[20] Ironically, our oldest son had the same experience in the first grade. I was teaching at Memphis State in 1985 when our son Michael was six years old. Like most children of Memphis State faculty, Mike attended campus school, which was staffed by master teachers from the School of Education. Because the Memphis City Schools were virtually all black (whites having fled to the suburbs or white-Christian academies in the face of court-ordered bussing), the black families with political or economic clout sent their sons and daughters to campus school. After about a week in the first grade, Mike came home and announced "Dad-

Racial and gender discrimination have been ubiquitous in the educational system since the inception of our country. Slave owners were forbidden by law from teaching their slaves to read or write. Even freed slaves were banned from Southern schools, so free blacks and escaped slaves migrated north prior to the Civil War to achieve an education. Although blacks had access to schools in the North, those schools were usually reserved for blacks only. After the Civil War, slavery was replaced by **Jim Crow** laws that denied civil rights to former slaves. The Fifteenth Amendment to the Constitution, ratified in 1870, stated:

> The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color or previous condition of servitude.[21]

So Southern states prohibited blacks from voting, or interacting with whites on an equal basis (including attending integrated schools) based on their *grandfather's* condition of servitude. This racist loophole was formally upheld in the United States in 1896 in *Plessey v. Ferguson*, wherein the Supreme Court ruled, 7-1, that racial segregation in the form of *separate but equal* accommodations for blacks and whites was constitutional.

From the end of the Civil War until the middle of the twentieth century were schools segregated **de juro** in the South and **de facto** in the rest of the country. The *Plessey* rule of separate but equal emphasize the separation of the races, and governments cared little that black schools were inferior to white schools; after all, blacks could not vote. "On May 17, 1954, an otherwise uneventful Monday afternoon, fifteen months into Dwight D. Eisenhower's presidency, Chief Justice Earl Warren, speaking on behalf of a unanimous Supreme Court, issued a historic ruling that he and his colleagues hoped would irrevocably change the social fabric of the United States. 'We conclude that in the field of public education the doctrine of *separate but equal* has no place. Separate educational facilities are inherently unequal.'"[22]

The Supreme Court's decision in *Brown v. Board of Education* did not end segregation or discrimination in American education. However, the *Brown* decision did turn school segregation from an unchallenged fact of life in the country into a wedge issue separating liberals (the majority) and conservatives (then, the minority). A price for the unanimous Supreme Court decision was the inclusion of the words "all deliberate speed" in the Court's order to offending school districts that were not defendants in the *Brown v.* (Topeka, Kansas) *Board of Education*. In the South, Democratic politicians like George Wallace, Lester Maddox, and Bull Conner curried favor with the white supremacist majority by using state and local police to defy desegregation orders. With the passage of the Civil Rights Act in 1964, the Democratic Party split, between the pro-civil rights North and West, and the anti-civil rights south. Slowly, but inexorably, white supremacist politicians either switched to the Republican Party or were replaced by Republicans at election time. Today, the South is solidly Republican and blacks are one of the key core constituencies of the Democratic Party. For those who claim that racial equality has

---

dy, I know why our neighbors don't like black people; black people have a lot more money than white people do!"

[21] *Microsoft ® Encarta ®* 2006. © 1993–2005 Microsoft Corporation. All rights reserved.

[22] Ogletree, *All Deliberate Speed*, p. 3.

been achieved, how do you explain that the Republican Party became the dominant political party by pandering to racism?

Evidence of Educational Advances by Minorities

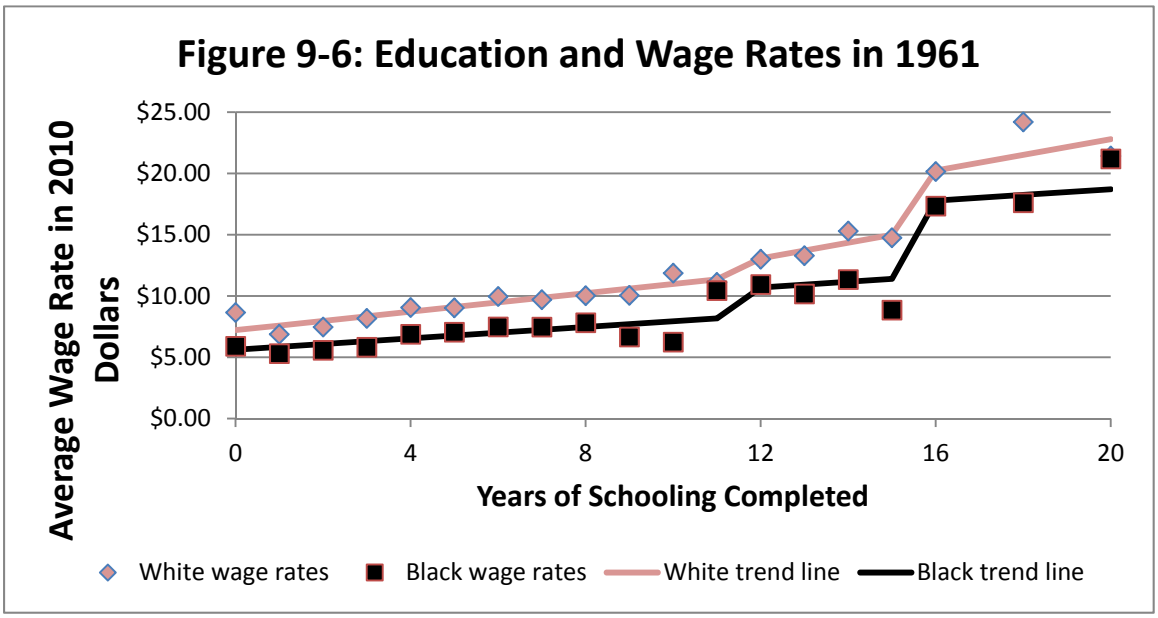
Table 9-3 shows the average inflation-adjusted wage rate for whites and blacks by level of educational attainment. For those who do not complete high school, the inflation-adjusted wage rate decreased by 0.62 percent per year for whites and blacks. For those with the least education, the typical black worker nearly earns 98 percent per hour of what the average white worker earns; those relative earnings remain roughly constant, since wages decline at the same rate for both groups. For high school graduates without college, the inflation-adjusted wage rate were essentially constant over time. Among those who attempt, but do not complete, college, white wage rates are essentially flat while black inflation-adjusted wage rates decline by 0.26 percent per year. Among college graduates, the rate of increase for whites is 0.63%, substantially greater than the 0.48% rate of increase in the black inflation-adjusted wage rate. Finally, for those with post-graduate degrees, white wages grew at 1.06% per year, nearly twice the rate of 0.64% for blacks with advanced degrees. For high school graduates and above, blacks earn approximately 90% of what whites earn per hour, while white wage rates are declining less or increasing by more than black wage rates are.

Table 9-3
Average Wage Rates (in 2012 dollars) by Ethnicity and Educational Attainment

	Less than High School		High School Graduates		Less than 4 years college		College Graduates		Post Graduate Degree	
Year	white	black	white	black	white	black	white	black	white	black
1979	$14.26	$13.55	$17.41	$16.13	$17.17	$16.63	$19.02	$18.59	$22.25	$22.02
1980	$13.53	$12.81	$16.52	$15.38	$16.37	$15.86	$18.18	$18.29	$21.72	$22.45
1981	$13.20	$12.84	$16.23	$15.06	$16.19	$15.84	$17.93	$16.92	$21.40	$19.83
1982	$12.95	$12.50	$16.14	$14.86	$15.98	$15.29	$18.31	$17.31	$21.13	$20.27
1983	$12.76	$12.47	$16.12	$14.98	$15.93	$15.28	$18.18	$18.06	$21.92	$20.36
1984	$12.47	$12.23	$15.93	$14.86	$15.80	$15.57	$18.11	$17.44	$21.63	$21.88
1985	$12.33	$11.88	$16.08	$14.57	$15.96	$15.14	$18.61	$18.36	$22.82	$20.75
1986	$12.22	$12.08	$16.17	$15.00	$16.09	$15.78	$18.81	$18.29	$22.52	$21.53
1987	$11.96	$11.79	$16.17	$14.84	$16.11	$15.44	$19.17	$18.29	$22.61	$21.12
1988	$11.88	$11.52	$16.03	$14.59	$15.86	$15.22	$19.26	$18.19	$22.67	$21.04
1989	$11.95	$11.44	$15.97	$14.41	$15.96	$15.20	$19.35	$18.31	$22.68	$20.68
1990	$11.65	$11.36	$15.95	$14.40	$16.06	$15.33	$19.65	$18.28	$23.23	$21.83
1991	$11.65	$11.25	$15.85	$14.29	$15.98	$15.19	$19.15	$18.80	$23.88	$20.37
1992	$11.42	$11.24	$15.74	$14.17	$15.49	$14.62	$19.50	$18.29	$24.60	$23.15
1993	$11.17	$11.27	$15.74	$14.04	$15.47	$14.35	$19.67	$18.35	$25.25	$21.42
1994	$10.91	$11.14	$16.11	$14.63	$15.57	$14.63	$20.21	$19.19	$27.94	$22.61
1995	$10.57	$10.70	$16.05	$14.43	$15.48	$14.50	$20.20	$19.14	$26.20	$24.39
1996	$10.35	$10.39	$15.93	$14.05	$15.48	$13.96	$19.78	$18.16	$26.39	$23.17
1997	$10.48	$10.29	$16.10	$14.13	$15.68	$14.31	$20.16	$18.13	$26.49	$21.07
1998	$10.88	$10.54	$16.49	$14.77	$15.98	$14.98	$20.91	$19.42	$27.46	$24.42
1999	$10.76	$10.58	$16.72	$14.86	$16.18	$14.76	$21.53	$20.62	$27.95	$24.45
2000	$10.79	$10.70	$16.83	$15.08	$16.22	$15.23	$21.63	$20.04	$28.04	$24.62
2001	$10.94	$10.84	$17.15	$15.13	$16.56	$15.08	$22.08	$20.19	$28.85	$23.02
2002	$11.11	$11.09	$17.34	$15.29	$16.63	$15.16	$22.09	$20.39	$29.07	$25.45
2003	$11.12	$11.03	$17.32	$15.51	$16.63	$15.22	$21.85	$20.87	$28.51	$24.05
2004	$10.96	$10.74	$17.26	$15.19	$16.54	$15.01	$21.78	$19.97	$28.69	$24.42
2005	$10.85	$10.55	$17.16	$15.03	$16.40	$14.63	$21.56	$20.49	$28.52	$26.17
2006	$10.86	$10.56	$17.19	$15.06	$16.41	$14.86	$21.64	$20.33	$28.29	$23.68
2007	$11.04	$10.77	$17.26	$14.97	$16.45	$14.84	$21.52	$20.10	$28.06	$24.67
2008	$10.91	$10.41	$17.19	$14.81	$16.31	$14.38	$21.56	$20.54	$28.39	$25.68
2009	$11.26	$10.85	$17.51	$15.11	$16.51	$14.79	$21.75	$19.89	$28.78	$23.43
2010	$11.13	$10.82	$17.40	$15.17	$16.38	$14.76	$21.59	$19.92	$28.27	$23.51
2011	$11.07	$10.55	$17.14	$14.85	$16.04	$14.29	$20.96	$19.66	$28.28	$24.64
2012	$11.00	$10.30	$17.04	$14.66	$15.87	$13.91	$20.82	$19.13	$27.77	$25.13
Total	$11.90	$11.56	$16.56	$14.82	$16.11	$14.90	$20.50	$19.33	$25.93	$23.29
Black/White		97.13%		89.51%		92.50%		94.30%		89.79%
Growth Rate	-0.62%	-0.62%	0.24%	0.01%	0.05%	-0.26%	0.62%	0.46%	1.06%	0.63%

We find that the gap between the earnings of blacks and whites tends to increase with education, and that that gap has been widening since 1979. There are several possible explanations. First, schools in segregated neighborhoods typically afford better educational opportunity for white and upper-income students than for black and lower-income students. Second, discrimination by teachers who expect blacks to underperform relative to whites often creates self-fulfilling prophecies. Third, there is a well-documented anti-intellectual culture among black youth, a culture that both Bill Cosby and Barack Obama have been working to overturn.

Figure 9-6 shows the return to education for whites and blacks in 1961, based on the same procedures used in Figure 9-1. The black trend line[23] is flatter than the trend line for whites,[24] implying that an extra year of schooling was a "better investment" for whites compared to blacks. White earnings and black earnings diverge except at high school and college graduation.



In Figure 9-7, we revisit the relation between schooling and the average wage rate using data from 1987. Up to the 12th grade, the average wage rate for whites declines and is flat for blacks. Upon high school graduation, both black and white earnings rise with the number of years of school completed, with divergence occurring after college graduation.

[23] The equation for whites is $\hat{W}_w = 7.27 + 0.376S_w + 1.33HSG + .64(S_w - 12) + 4.59cg$ which implies each year of schooling increases the wage rate by \$0.376 through the 11th grade, \$1.60 for the 12th year, and \$0.64 after high school, except for the 16th year that adds \$5.23 per year.

[24] The trend line for blacks is $\hat{W}_b = \$5.61 + 0.23S + 2.29HSG + 6.16CG$, which implies that every year of schooling adds \$0.23 per hour to a black person's wage rate, except for the 12th grade (\$2.52) and the 16th year (\$6.39).

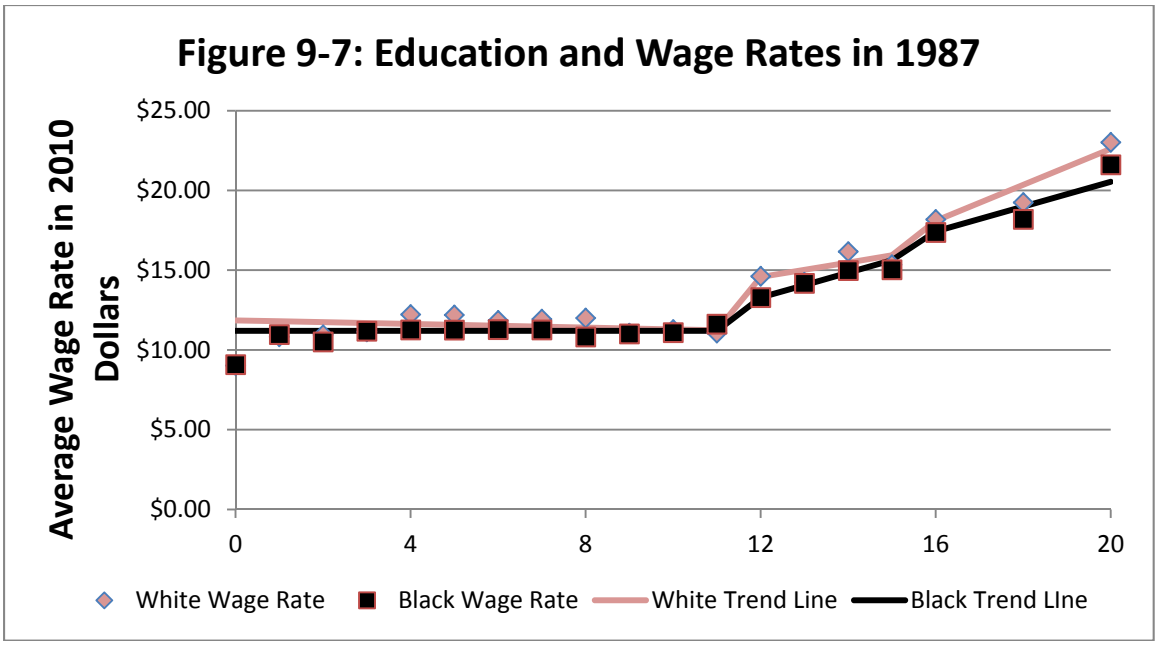
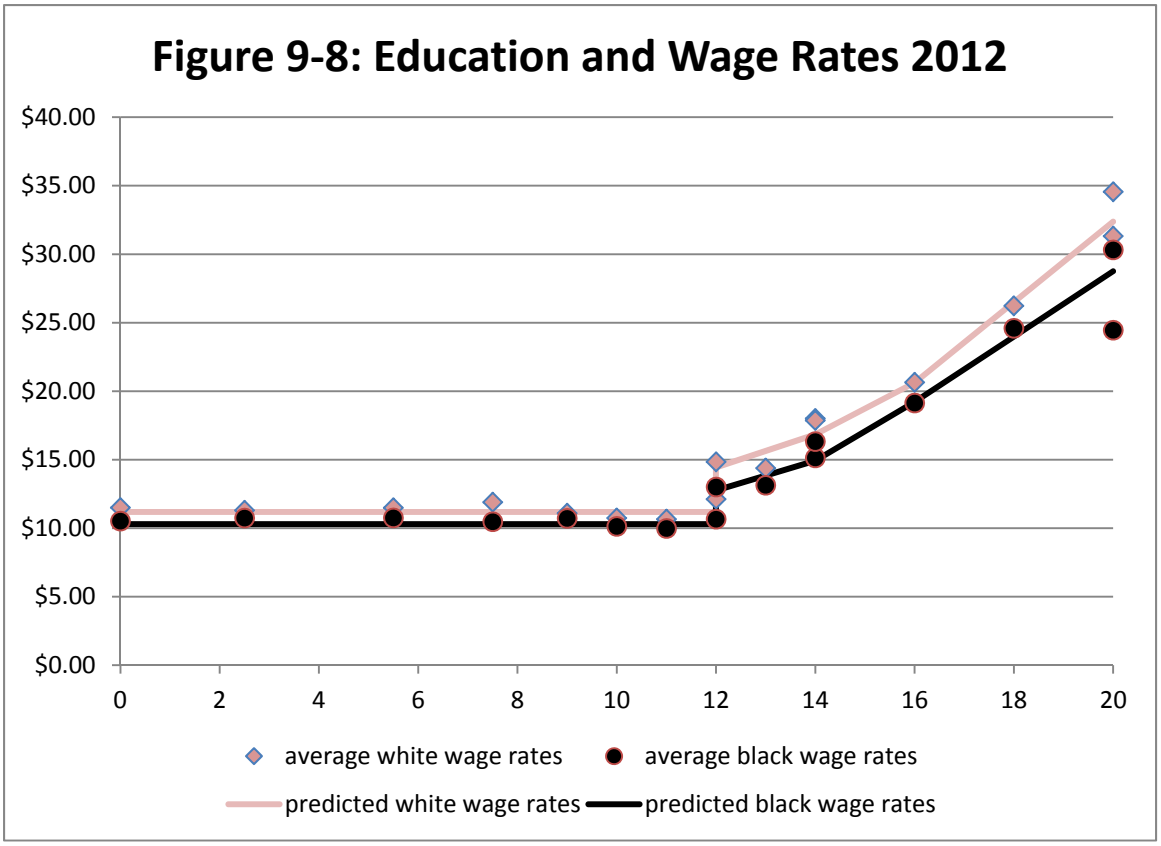


Figure 9-8 shows the most recent data for 2012. Notice that both the black and the white trend lines are flat below twelve years of schooling. For all the economic advantage that education gives them, high school dropouts might as well have dropped out in kindergarten. The return to a year of schooling after high school is constant for blacks but increases for whites after college, causing wage rates to diverge.



Educational Opportunity and Affirmative Action:

From *Brown* to *Griggs* to *Bakke* and Beyond

In the wake of the *Brown* case in 1954, most schools evolved from segregated **de juro** to segregated **de facto.** As we have seen, black educational attainment has lagged behind white educational attainment, and blacks are paid less per hour than are whites with the same educational attainment. Whether the lower educational attainment of blacks is due to choice (the conservative contention) or due to lack of opportunity (the liberal contention) is one of many **wedge issues** politicians use to raise money and votes from their political bases, but neither side wishes to resolve, lest the party lose a partisan advantage. Another important wedge issue is **affirmative action**, which has come to mean **reverse discrimination** to conservatives, while liberals continue to interpret the words in their original intent, that is, to take steps to find and nurture minority and female applicants for the best schools and the best jobs.

While we already discussed employment discrimination in the last chapter, we re-introduce the topic here because of the critical connection between educational attainment and economic opportunity. When Congress debated the Civil Rights Act, a major concern voiced by opponents was that the act would interfere with the right of an employer to hire the most qualified job applicants. Both in debate and in the text of the act itself, Congress made it clear that a law against racial discrimination would not directly interfere with the interests of the employer to hire the most qualified applicants. At the same time, some proponents of the Civil Rights Act expressed reservations that this qualification would be used as a loophole by segregationist employers. Events soon proved that those fears were well founded.

In 1971 a black laborer employed by the Duke Power Company of North Carolina sued his employer for racial discrimination under the provisions of the 1964 Civil Rights Act. Duke Power Company required a high school diploma for any job above laborer, but would waive the requirement for job applicants who were recommended by a supervisor. When Griggs sued, there were many whites who did not have a high school diploma in higher-level jobs, but no blacks. The lower court ruled in favor of Duke Power because Griggs had not demonstrated that Duke Power Company intended to discriminate. A unanimous Supreme Court (then headed by Chief Justice Warren Burger, a Nixon appointee) overturned the lower court and ruled that when employment test result in an underrepresentation of a protected demographic group, the burden falls on the employer to demonstrate that that test is related to productivity. [25]

In the *Griggs* case the Court set a two-step standard for employment discrimination cases: (1) the plaintiff bears the burden of proof to show that an "employment test" (e.g., an educational requirement) falls disproportionately on a protected group; and (2) if the plaintiff demonstrates **adverse treatment,** the burden of proof shifts to the employer who must then show that the employment test is relevant to the job. In the case of *Duke Power*, statisticians retained by Griggs's attorneys showed that there was no statistically significant difference between white Duke Power employees who had high school diplo-

[25] See http://people.eku.edu/palmerj/319/Griggs%20vs%20Duke%20Power.htm.

mas and white Duke employees who did not. Therefore, the employment test functioned just like a grandfather clause—that is, a criterion (was a person's grandfather a slave?), that was highly correlated with race, which had the effect of circumventing the law against racial discrimination.

The decision in the *Griggs* case had profound repercussions for employers in general and for schools in particular. Employers and schools that had an underrepresentation of women, blacks, or other minority employees realized that they would have difficulty defending against a discrimination suit. Many employers and schools undertook **affirmative action** programs to identify and promote women, blacks, and other minority applicants. That leads us to the interesting and controversial case of Alan Bakke. Imagine you were the chancellor at the University of California, Davis, and you realized that the demographic profile of medical students would pass the legal standard for discrimination:

> The Medical School of the University of California at Davis opened in 1968 with an entering class of 50 students. In 1971, the size of the entering class was increased to 100 students, a level at which it remains. No admissions program for disadvantaged or minority students existed when the school opened, and the first class contained three Asians but no blacks, no Mexican-Americans, and no American Indians. Over the next two years, the faculty devised a special admissions program to increase the representation of "disadvantaged" students in each Medical School class. The special program consisted of a separate admissions system operating in coordination with the regular admissions process.
>
> From the year of the increase in class size—1971—through 1974, the special program resulted in the admission of 21 black students, 30 Mexican-Americans, and 12 Asians, for a total of 63 minority students. Over the same period, the regular admissions program produced 1 black, 6 Mexican-Americans, and 37 Asians, for a total of 44 minority students. Although disadvantaged whites applied to the special program in large numbers, none received an offer of admission through that process. Indeed, in 1974, at least, the special committee explicitly considered only "disadvantaged" special applicants who were members of one of the designated minority groups.
>
> Allan Bakke is a white male who applied to the Davis Medical School in both 1973 and 1974. In both years, Bakke's application was considered under the general admissions program, and he received an interview. His 1973 interview was with Dr. Theodore C. West, who considered Bakke "a very desirable applicant to [the] medical school." Despite a strong benchmark score of 468 out of 500, Bakke was rejected.… In neither year did the chairman of the admissions committee, Dr. Lowery, exercise his discretion to place Bakke on the waiting list. In both years, applicants were admitted under the special program with grade point averages, MCT scores, and benchmark scores significantly lower than Bakke's.

> After the second rejection, Bakke filed the instant suit in the Superior Court of California. He sought mandatory, injunctive, and declaratory relief compelling his admission to the Medical School. He alleged that the Medical School's special admissions program operated to exclude him from the school on the basis of his race, in violation of his rights under the Equal Protection Clause of the Fourteenth Amendment, Art. I, § 21, of the California Constitution, and § 601 of Title VI of the Civil Rights Act of 1964.…[26]

Before continuing with the Court's ruling, consider the result if Bakke had sued the American Medical Association, or even the University of California, under an antitrust statute. By conspiring to maintain an artificially low number of medical school students, the University of California conspired with the American Medical Association to restrict trade and create a monopoly price for health care. Had the Court ordered that the AMA approve, say, a doubling of the number of medical student slots at all medical schools, there would have been no need for discrimination. Since Bakke did not sue under an antitrust statute, the Supreme Court had to limit its ruling to the facts of the case. The Court essentially split a legal hair, finding against the UC-Davis because it used an explicit racial quota, which, by discriminating in favor of racial minorities, could not help but discriminate against Allan Bakke, a white male without connections that would have earned him a heritage admission.[27] The Court explicitly approved of affirmative action programs like that at Harvard University, which included ethnicity as one factor in admission (i.e., accepting lower test scores from minority applicants) without establishing an explicit quota.

To this day, affirmative action continues to be a controversial issue, particularly when used by publicly funded universities. Soon after the *Brown* case, Harvard University granted the second highest number of law degrees to blacks, after Howard University, a traditionally black university. Private schools wish to maximize prestige, not tuition revenue, so Ivy League and other elite universities charge rich applicants (who are marginally qualified) market-clearing tuition in order to use the surplus (dare we say profit) to attract highly qualified, low-income scholarship students. This practice places marginally qualified middle-income white students at a disadvantage; they either must mortgage their future with mammoth student loans, or settle for lower-quality public universities.

What is the mission of a public university? Is it to behave just like private schools and admit students on a two-track system, those who can afford to buy their way in must be marginally qualified, and those who need a tuition subsidy must be overqualified? When the UC-Davis medical school tried this, they ended up with a virtually all white, all male medical school class? Should public schools admit only the most qualified? Are

---

[26] Justice Powell's written majority decision in *University of California Regents v. Bakke*, Microsoft® Encarta® Reference Library 2003. © 1993–2002 Microsoft Corporation. All rights reserved.

[27] According to Charles J. Ogletree, Jr., "In 1972, after working with NASA [as an engineer] for six years, Bakke began applying to medical schools. He was thirty-two at the start of his application process. … Over a two-year period, Bakke applied to eleven medical schools. … He was rejected by all of them despite '[high] undergraduate grads . . . laudatory recommendation letters, proven motivation and professional background and medical school admission test scores substantially higher than those of the average medical student admitted to Davis that year.'" *All Deliberate Speed*, p. 152.

test scores the only measure of qualifications? Or, are test scores ultimately a grandfather clause, meant to restrict college enrollment to white supremacists?

Summary

1. People augment their skills by investing in human capital, particularly through formal education and on-the-job training. Statistics show that education has very little effect on average earnings up to the twelfth year of schooling. The decision by some students to drop out of school may be a rational one if they believe they have a low probability of educational success.
2. Starting with high school graduation, the returns to education are particularly high for completing enough education to receive a diploma or degree. While the return to another year of schooling is low, the return to graduating from high school, receiving a two-year college degree, a four-year bachelor's degree, a master's degree, an academic doctorate, or a professional degree are much higher. Completing a course of study shows potential employers or clients that one finishes what he or she starts, and demonstrates a mastery of an academic discipline.
3. In 1979 the average wage rate for men increased steadily through until after the eighth grade, then actually declined with additional schooling through the 12^{th} grade, after which the average wage rate increased with additional schooling. The wage rate for women was essentially flat from 0 years of schooling through 12 years of schooling, then the earnings gap between men and women remained roughly constant. By 2007 neither men nor women gained higher wages from the first 12 years of schooling, after which both male and female wages increase with additional schooling. Women nearly close the gap on men upon college graduation, after which men gain more from an additional year of schooling than women do.
4. Producing human capital creates **asymmetric information** problems between graduates and potential employers. Schools who inflate student grades cause employers to discount the achievement of good and poor graduates, which leads to an **adverse selection** problem whereby poor students drive out good students. Finally, the prospect of acquiring a degree by completing only easy courses leads to **moral hazard**: Good students who graduate from easy universities will find it difficult to prove to employers that they did not gain a diploma without gaining an education.
5. **General human capital** represents skills that can be used in a wide variety of employment situations. Employers have little incentive to pay for general human capital because workers will be able to demand a market wage for those skills after acquiring them. General human capital is typically acquired through formal education, or on-the-job training, whereby the apprentice is paid only for the time he or she works, and finances training time through a lower wage rate. Unfortunately, minimum wage laws sometimes interfere with a mutually beneficial apprentice relation between trainees and trainers.
6. The United States has had a long history of educational discrimination. Black slaves could not be taught to read under threat of punishment to their owners and death to the slaves. Even freed blacks were rarely permitted to attend school with whites. After the Civil War freed slaves, blacks were prohibited from going to schools with

whites in the South due to Jim Crow laws (**de juro**, or legal, segregation) and typically went to all black schools in the rest of the country because of housing segregation. In 1954 the United States Supreme Court overturned legal segregation (based on the *Plessey v. Ferguson* case) in *Brown v. Board of Education*, although school segregation persists.

7. In 1979 white wage rates declined as education increased, while black wage rates increased with education, becoming nearly equal at eleven years of schooling. After high school graduation, white earnings increased more rapidly with education than black wage rates did. By 2007 neither black nor white wage rates increased with educational attainment through the 12^{th} grade; beyond high school, white wage rates tend to respond more to another year of schooling than black wage rates do.
8. In 1971 the Supreme Court ruled in *Griggs v. Duke Power* that when employment requirements (including educational requirements) that have an adverse effect on blacks or other groups protected by the Civil Rights Act shifts the burden of proof in discrimination cases from the plaintiff to the defendant. This ruling led many employers and universities to adopt **affirmative action** programs to defend themselves against charge of race-biased employment.
9. In the *Bakke* case a divided Supreme Court ordered that the University of California, Davis Medical School to admit Allan Bakke, arguing that the UC-D admission program was an illegal quota system. However, the Supreme Court allowed schools to consider race and gender as part of their admissions criteria. **Affirmative action** remains a controversial practice to this day.

Glossary

Human capital: Additions to a person's skills and knowledge created through education, on-the-job training, or other resource-using activities.

Sheepskin effect: The higher return to completing the last year of study and completing a degree, compared to the return on a year of education that does not culminate in a degree.

Present value: The amount of money that must be invested in financial markets today to achieve a particular future value of that money.

Asymmetric information: An exchange situation in which one agent (e.g., the student) has more accurate information about the quality of the good exchanged (labor services) than does the other agent (the potential employer).

Moral hazard: The tendency of individuals to change their behavior when the adverse consequences of that behavior decrease. For instance, students who can drop their courses 10 weeks into the semester have less incentive to study than do students who are locked into their schedule after the first week.

Adverse selection: A consequence of asymmetric information and moral hazard whereby the quality of the good being exchanged declines because the less informed party reduces the bid price.

Segregation: The forced separation of races or other groups, using the force of law (**de juro segregation**) or informal means (**de facto segregation**).

Adverse treatment: The court or statistical finding that an employment or other test causes a disproportionately low number of successful minority applicants.

Burden of proof: The legal rule of who has to actually prove their case in court.

Affirmative action: A pro-active attempt to identify and promote minority candidates, usually with the goal of heading off a charge of discrimination.